INSTALLATION INSTRUCTIONS

LIBERTY SHINGLE

Shingle-layer flexible bituminous shingle, with a glass fibre carrier and colour ceramic-coated basalt grains as finishing – Fig. **1**.
The shingle is characterized by three shaped tabs, with self-adhesive points.

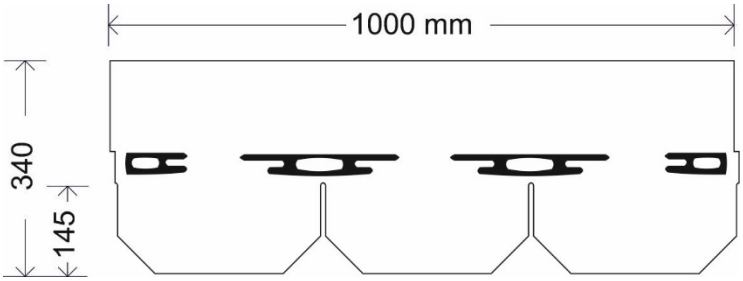

***Fig. 1** – Liberty shingle dimensions*

1. GENERAL RECOMMANDATIONS

- Stock pallets in a dry, covered and ventilated area.
- Avoid exposing the pallets to the direct sunlight or bad weather for long periods. Do not leave the pallets exposed to temperatures that are too high (>40°C) or too low (<5°C).
- Do not stack pallets on top of each other to avoid sticking of shingles inside the bundle.
- Use only shingles of the same production batch for one roof. Small colour differences between shingles are not to be considered a fault.
- Shingles must be installed on a flat, rigid, continuous, and coplanar surface which will remain so over the time.
- Shingles must be applied on pitched roofs with a slope between 5° and 85°.
- The shingles installation method depends on the slope and length of the pitches, as well as on the substrate type - see paragraph 2.
- For nail installation of the shingles, use hot dipped galvanized nails with wide head (≥9,5mm), improved adherence and minimum 25mm length (32mm for the ridge elements), which has anyway to be evaluated depending on the substrate to ensure fastening.
- For torch installation, do not proceed on windy or particularly moisty days. Do not step on the membrane that has just been torched, to avoid footprint phenomena.
- Shingles must have a minimum temperature of 5° C to be applied.
- Under low outside temperatures, wind or wet conditions, warm the self-adhesive points of the shingles to improve adhesion and if it is necessary, apply the bitumen mastic Bitustick under the tabs.
- At the end of the day, the roofer must always check the good adhesion of the tabs and of the shingles.

2. INSTALLATION METHOD

The installation method of bituminous shingles depends on several factors: type of substrate, length and slope of pitch and type of membrane used. In particular:

- Installation surfaces made with wood panels (plywood or OSB) and similar are defined as nailable substrates.
- Installation surfaces made of concrete, fibrocement and similar are defined as non-nailable substrates.

For standard pitches with a maximum length of 7m, the following applies (summarised in Tab. 1):

- In the case of low roofing slopes (between 5° and 14°) or non-nailable substrate, bituminous shingles must be torch-applied on the Safety R-Evolution T membrane or on the Safety EPP polymer bitumen membrane with APP or APAO compound, which will ensure the waterproofing of the roof.
- In the case of low roofing slopes (between 5° and 14°) and nailable substrate, is available the Safety R-Evolution N membrane, self-sealing for nail installation.
- For higher slopes (between 14° and 85°) and a nailable substrate, bituminous shingles can be applied with the nail installation technique, but it is mandatory to use the Startbar underlayer membrane. The number of nails per shingle to be used is specified in Tab. 1, based on the slope of the pitches.

TYPE OF SUBSTRATE	PITCH LENGTH	RANGE OF PITCH SLOPE	INSTALLATION METHOD	TYPE OF MEMBRANE
NOT NAILABLE	≤ 7m	5° - 14° (9%-25%)	BY TORCH	Safety R-Evolution T / Safety EPP membrane
NAILABLE	≤ 7m	5° - 14° (9%-25%)	BY TORCH	Safety R-Evolution T / Safety EPP membrane
			BY NAILS (4/shingle)	Safety R-Evolution N membrane
		14° - 60° (25%-173%)	BY NAILS (4/shingle)	Startbar underlayer membrane
		60° - 85° (173%-1100%)	BY NAILS (6/shingle)	Startbar underlayer membrane

Tab. 1 - *Shingle installation method vs pitch slope*

NOTES:

- In case of pitch slopes greater than 14° and non-nailable substrate, it is advisable to contact the technical office for further information.
- For pitches between 7 and 10m in length and a nailable substrate, the minimum pitch slope goes up from 14° to 17°. For these roof lengths and a pitch greater than 17°, it is recommended to use the mixed installation technique. The first few meters should be waterproofed with a bituminous membrane and the shingles should be fixed using a torch-on method. For the remaining 7 metres, it is possible to use an underlay and fix the shingles with nails.
- In case of areas classified as windy or snowy, for constructions with complex geometry (e.g. presence of windows, variations in slope or inclination), situated at altitudes above 1000m or buildings of great height, for pitches longer than 10m, it is advisable to contact the technical office for further information regarding the bituminous shingles fastening and their method of installation.

3. PRELIMINARY OPERATIONS

- Before installing the bituminous shingles, install the gutters or the drips and fix them properly to the substrate through tie-rods – Fig. 2.

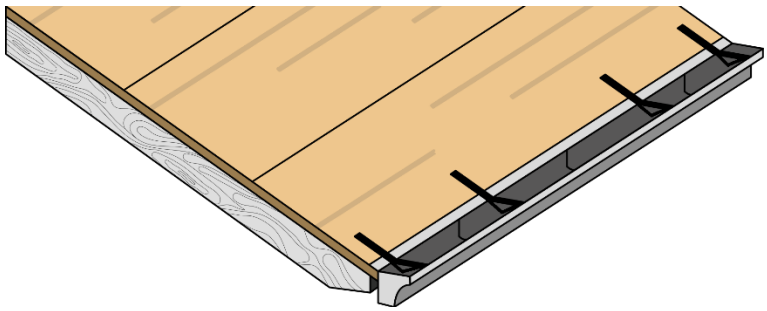

Fig. 2 *- Gutter installation*

- Apply the most appropriate membrane/underlayer according to the shingles installation method (paragraph 2) and ensure an appropriate flap in the gutter / over the drip.

4. TRACING OF THE ROOF

Once the membrane or the underlayer has been installed on the roof, before shingles installation, the pitch must be traced:

- Trace a straight ***x*** (orthogonal to the line of maximum slope) 18 cm from the eaves line, so that the shingle protrudes 1,5 cm from it;
- Locate a point A on line ***x*** and mark points B and C equidistant from A (example 150 cm);
- Starting from B and C, by using a string as a compass, identify the meeting point D, as close as possible to the ridge.
- Join A with D and identify the line ***y***;
- Draw a line ***z***, parallel to line ***y*** distant 16,5 cm;
- Draw horizontal lines parallel to ***x***, each one distant 14.5 cm from the previous, until you reach the ridge - see Fig. 3.

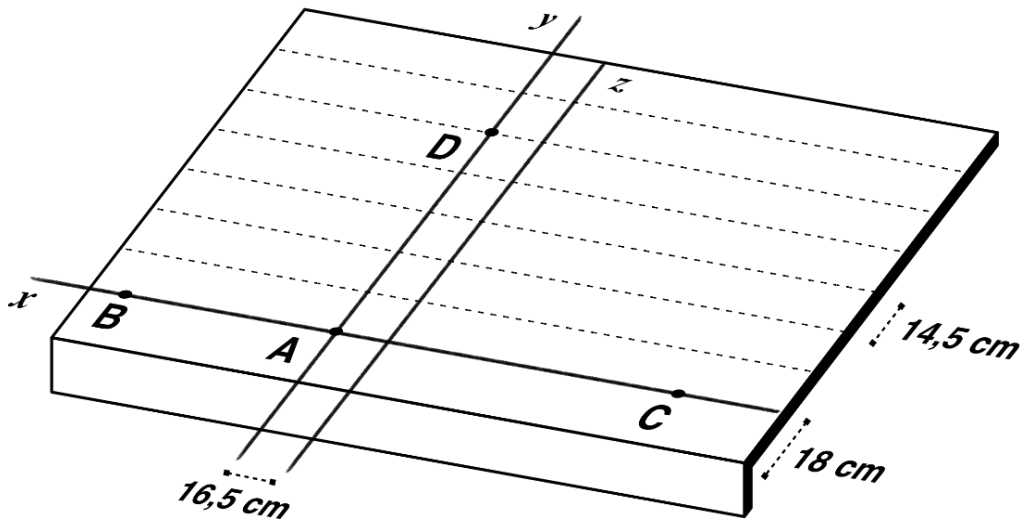

Fig. 3 *- Tracing of the pitch [cm]*

5. NAIL INSTALLATION OF THE SHINGLE

For the nail installation of the shingles, proceed as follows:

- Install the lateral flashing above the membrane/underlayer membrane applied to the roof. Apply a Bitustick bead to the external side of the lateral flashings. Proceed with the shingles installation, as described below, on the lateral flashing leaving a space of about 3cm between the end of the shingles and the edge of the lateral flashing – Fig. 4. Do not use nails less than 25 cm from the flashings.

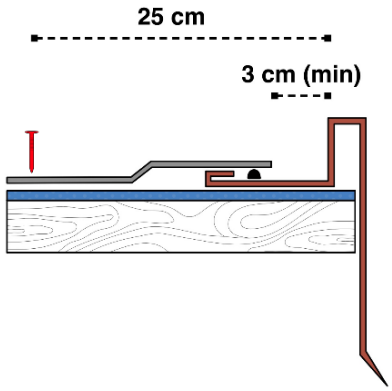

Fig. 4 *– Lateral flashing detail*

- Alternatively, fix a triangular-section batten along the lateral edge of the roof, before the membranes/underlay. Position the membrane/underlay above the triangular batten and lay the shingle on top, cutting it at the vertex of the batten. Once the pitch is completed, apply a perimeter metal flashing over the shingles. - Fig. 5.

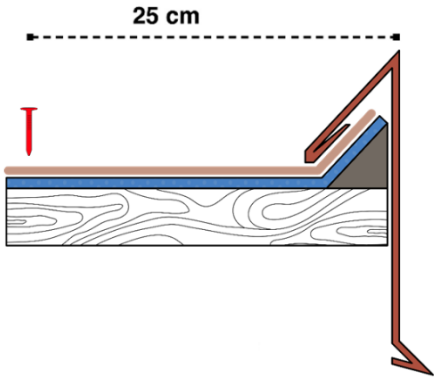

Fig. 5 *– Lateral flashing detail with triangular wooden batten*

- Arrange the shingles for the starting row cutting the tabs, as shown in Fig. 6;

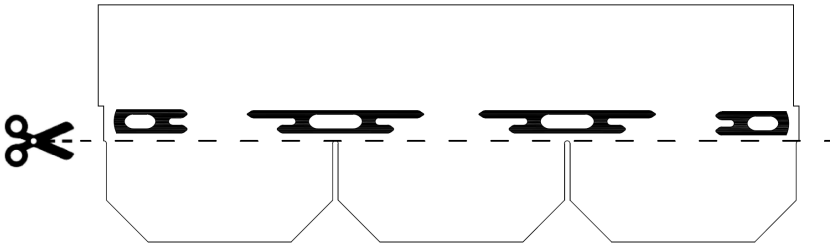

Fig. 6 *– Starting row preparation*

- Apply over the membrane/underlayer a bead of bituminous adhesive Bitustick close to the gutter line - Fig. 7;
- Then, proceed with the installation of the shingles of the starting row: align the lateral edge of the first shingle on the vertical ***y*** and the upper edge on the horizontal ***x***. Fix the shingle to the substrate with nails placed at the upper ends of the shingle. Arrange and nail the other shingles of the starting row, adjacent, following the same method of fixing.
- All the cutting and alignment operations between the shingles are facilitated by special references (cuts on the upper edge and shaped lateral profiles).
- Proceed with the installation of the first row of shingles: align the lateral edge of the first shingle on the vertical ***z*** and the upper edge on the horizontal 14,5 cm from ***x*** – Fig. 7. Nail the shingle to the substrate by placing 4 nails per shingle, in the centre of the self-adhesive points, as per Fig. 8 a). In the event of pitched slopes between 60° and 85°, place 2 additional nails close to the second and third nail, for a total of 6 nails per shingle, as per Fig. 8 b). Proceed by placing all the shingles in the first row.

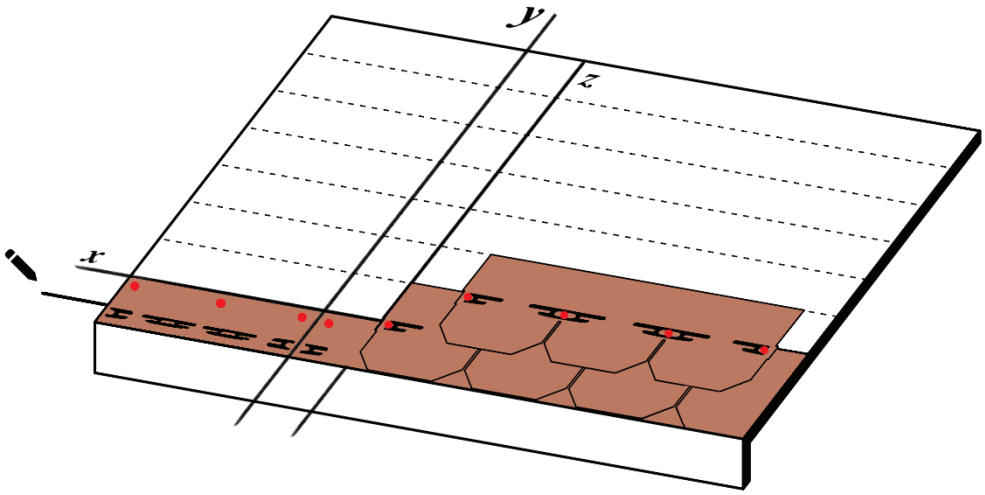

Fig. 7 *– Shingles installation*

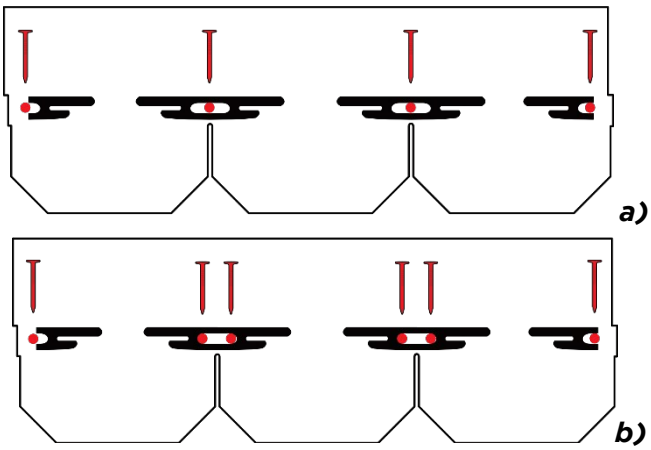

Fig. 8 *– Shingle nailing* ***a)*** *slopes <60°;* ***b)*** *slopes >60°*

- Move forward with the installation of the second row of shingles starting from the vertical line ***y*** and aligning the upper edge of the shingle to the horizontal line 29 cm from ***x***.

- Repeat the procedure of installation of the bituminous shingles in rows, until the full coverage of the pitch to the ridge.
- The last row of bituminous shingles must protrude above the ridge line; the excess part will be folded over the ridge line and must be fixed with minimum two nails - Fig. 9.
- Repeat the same steps for the other pitch.

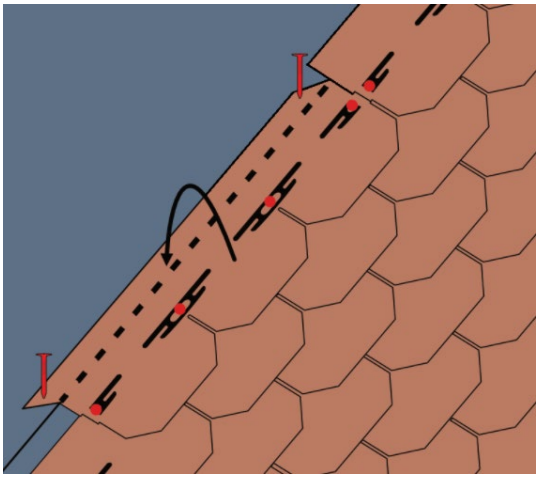

Fig. 9 *– Shingles installation at the ridge*

- Arrange the ridge elements by cutting an entire shingle into three pieces and shaping the top with a certain angle of cut – Fig. 10.

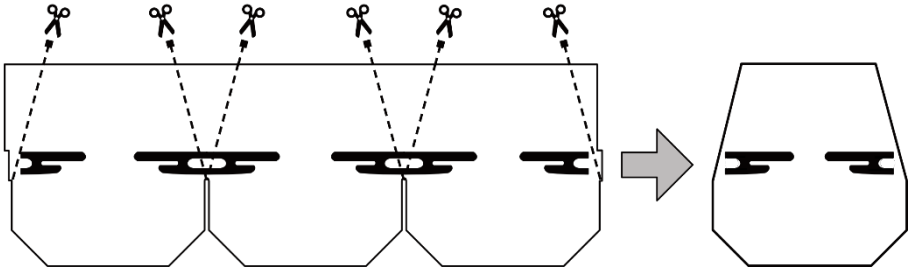

Fig. 10 *– Ridge elements preparation*

- Fix the first ridge element with 2 galvanized nails at least 32mm long, one nail on each side - Fig. 11. Proceed with the installation of the other ridge elements in sequence, leaving an exposed part of 9 cm between one element and the next.

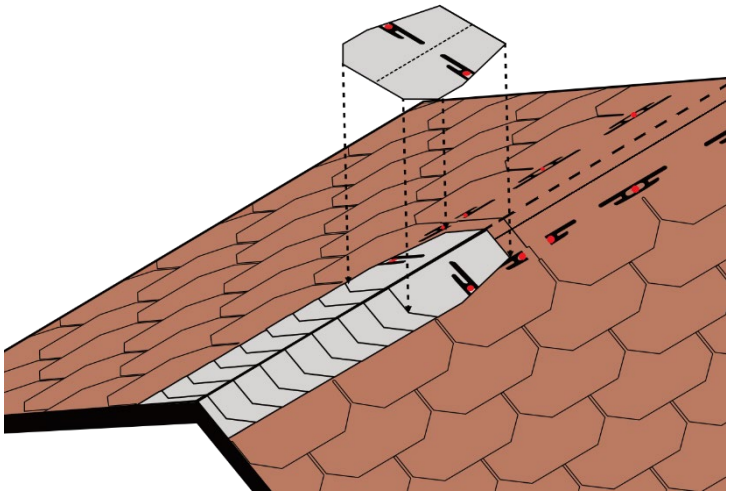

Fig. 11 – *Ridge elements installation*

- Follow the same instructions also for the shingle installation at the hips.
- As for the roof valleys, prepare a band of bituminous membrane about 100cm wide, applied by torch in advance, to ensure its waterproofing - Fig. 12.
- Install the starting row and the shingles of the first pitch, making them rise 25 cm above the valley line. It is advisable to cut the shingle, once installed, following a parallel line to the valley at 25cm. The shingles should be fixed by torch where there is the bituminous membrane and by nail in the remaining part. Do not nail the shingles less than 40 cm from the valley line – Fig. 12.

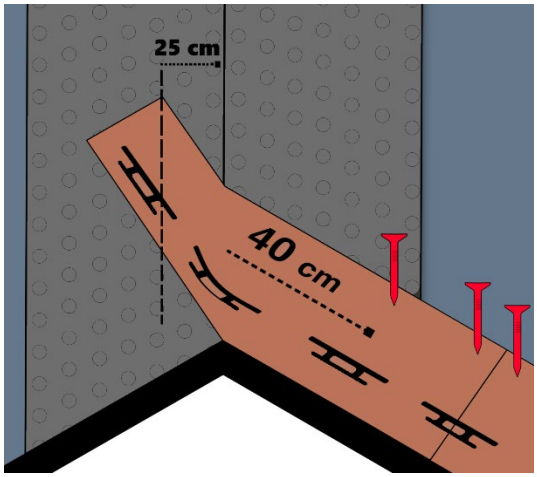

Fig. 12 *– Shingles installation at valleys*

- Once you have completed the first pitch for the entire length of the valley, move to the adjacent pitch. Start installing the shingles from the starting row and continue in successive rows. The last shingle in each row must reach at least the axis of the valley - Fig. 13. Nail the shingles up to 40 cm from the axis of the valley and apply them with torch in correspondence of the bituminous membrane. Once the installation of the shingles is completed even for the second pitch, trace the axis of the valley. Then cut the shingles of the second pitch following the valley line - Fig. 13.

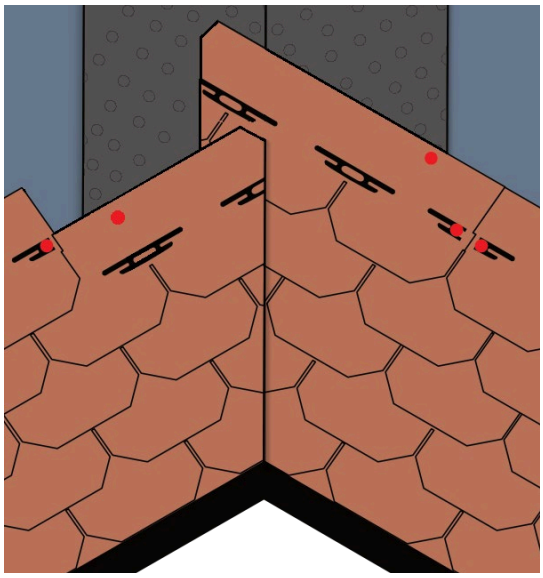

Fig. 13 *– Shingles installation at valleys*

- Cross-cut the top edge of the shingle to the valley - Fig. 14, so as to convey the descending water along the axis of the valley. Lift the shingles one at a time and fix them by torch to the membrane below. Where you come to the gritty shingle of the first pitch, apply Bitustick to the lower part to fix it - Fig. 14.

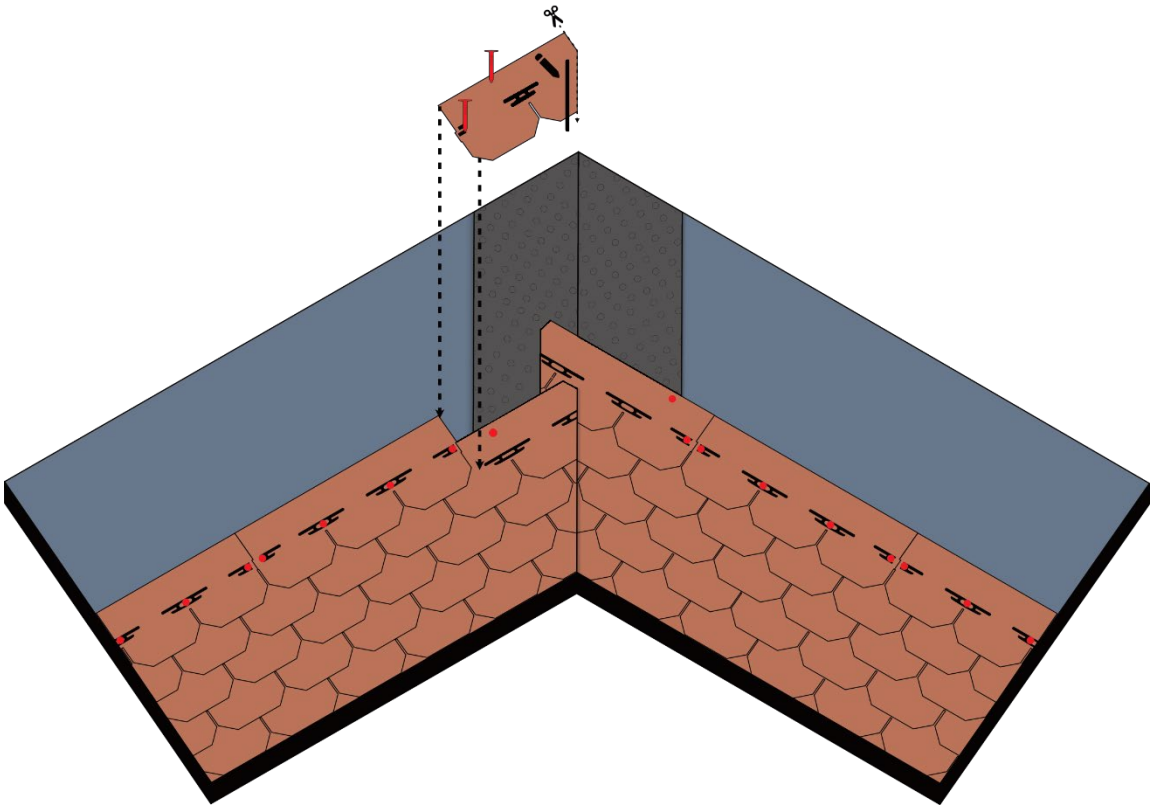

Fig. 14 *– Shingles installation at valleys*

6. TORCH INSTALLATION OF THE SHINGLE

For the torch installation of the shingles, proceed as follows:

- Install the lateral flashings above the membrane applied to the roof. Apply a band of bituminous membrane, about 25 cm wide, to overlap the flashing. Proceed with the normal installation of the shingles by torch, as will be described below, above the lateral flashing. Leave a space of about 3cm between the end of the shingles and the edge of the lateral flashing. - Fig. 15.

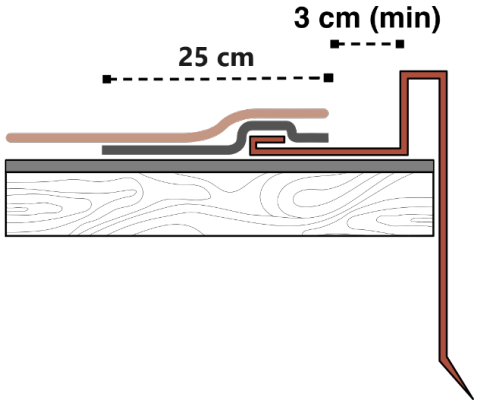

Fig. 15 *– Lateral flashing detail*

- Arrange the shingles for the starting row cutting the tabs, as shown in Fig. 6;
- Move forward with the installation of the shingles of the starting row: align the lateral edge of the first shingle on the vertical ***y*** and the upper edge on the horizontal ***x***.
- Fix starting row shingles to the membrane using the torch and lifting one side of the shingle at a time with a tool. Direct the flame towards the membrane to melt it. The back of the shingle will only be heated indirectly by the flame - see Fig. 16. Lower the bituminous shingle and press it (for example, by pressing with a foot) to help the penetration of the bitumen of the two elements: shingle and membrane.
- Repeat the procedure for each shingle until the starting row is complete.

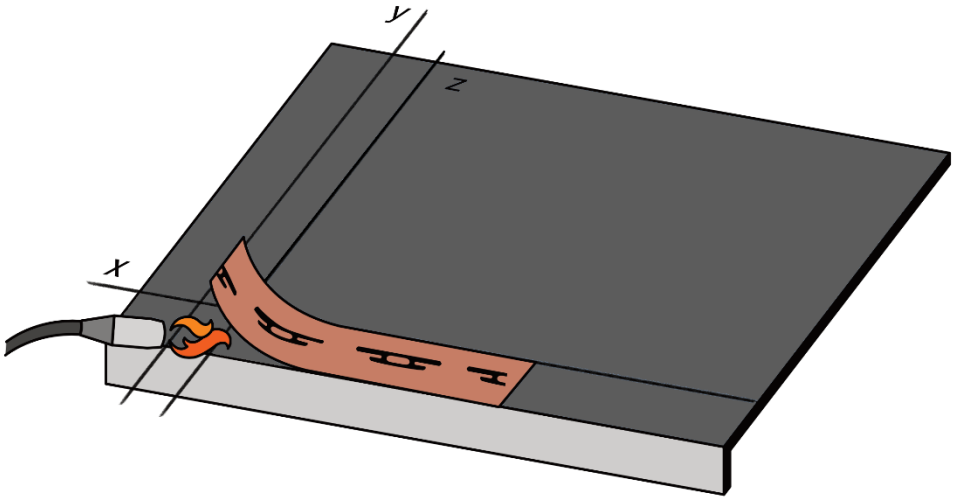

Fig. 16 – *Starting row shingles installation by torch*

- Proceed with the installation of the first row of shingles: align the lateral edge of the first shingle on the vertical ***z*** and the upper edge on the horizontal 14,5 cm from ***x*** - see Fig. 17. Fix the shingle to the membrane using the torch and lifting the top of the shingle with a tool, Fig. 17. The self-adhesive points will fix the tabs of the shingles of the first row to the shingles below, of the starting row. Move forward installing all the shingles of the first row.

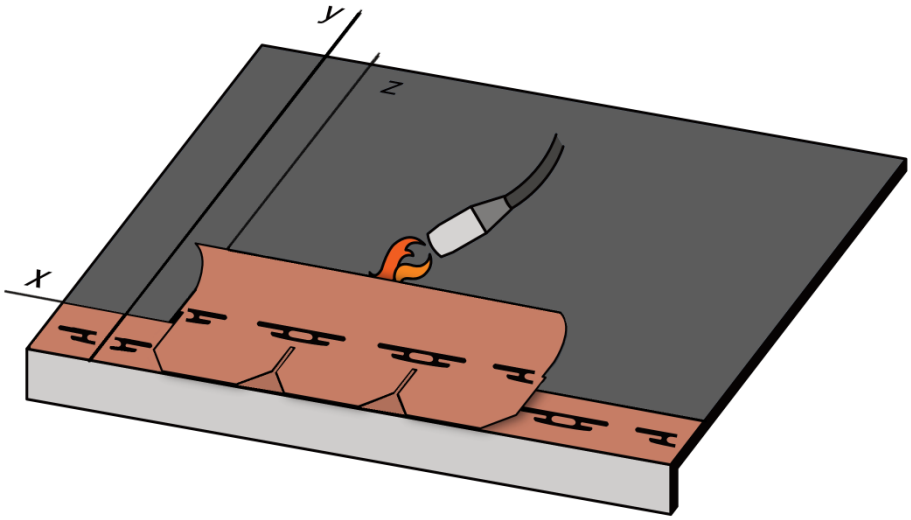

Fig. 17 – *First row shingles installation by torch*

- Proceed with the installation of the second row of shingles starting from the vertical line ***y*** and aligning the upper edge of the shingle to the horizontal line 29 cm from ***x***.
- Fix the shingles with the torch as described above. Proceed with the installation of all the shingles in the row.
- Repeat the same steps for installation of the bituminous shingles in rows, until the entire pitch is covered, leaving the last 10 cm of bituminous membrane at the ridge exposed. If necessary, cut the top of the last row of shingles – Fig. 18

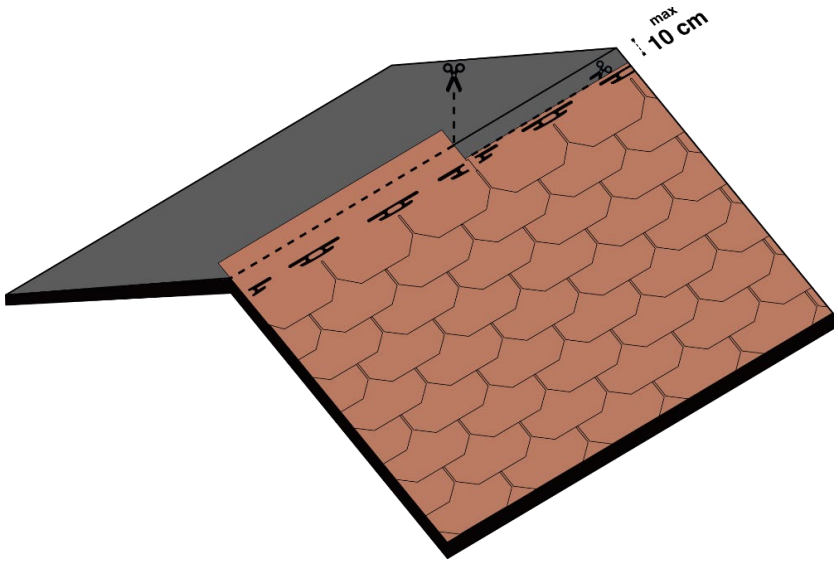

Fig. 18 – *Shingles installation until the ridge*

- Arrange the ridge elements by cutting an entire shingle into three pieces and shaping the top with a certain angle of cut - Fig. 10.
- Apply a band of bituminous membrane Safety EPP on the ridge by torch - Fig. 19.
- Install the ridge elements, fixing them to the underlying membrane with the torch, always heating the membrane and not the shingle element.
- Proceed with the installation of the other ridge elements in sequence, leaving an exposed part of 9 cm between one element and the next, see Fig. 19.

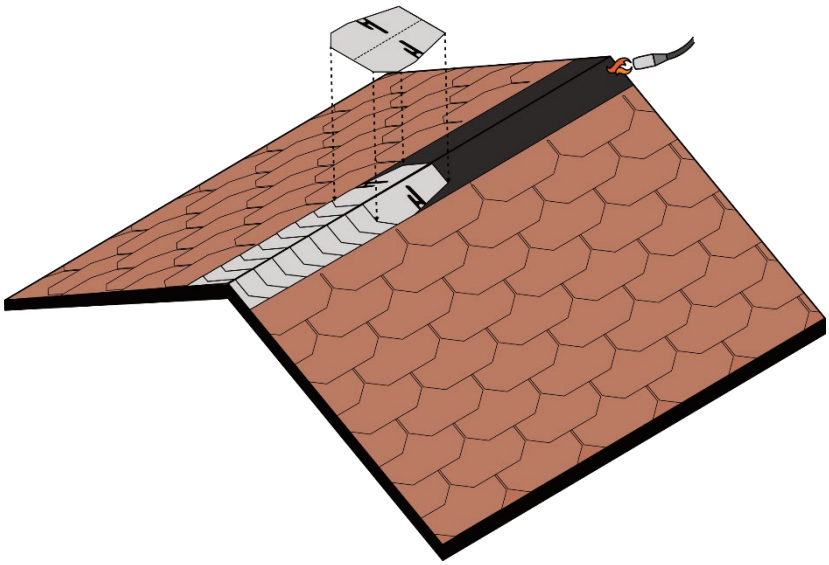

Fig. 19 – *Ridge elements installation by torch*

- Follow the same instructions also for the shingles installation at the hips.
- As for the roof valleys, prepare a band of bituminous membrane about 100cm wide, applied by torch in advance, to ensure its waterproofing. Starting from a pitch, lay the bituminous shingles in rows, starting with the starting row shingles, so that the shingles pass at least 25 cm above the axis of the valley. Fix them by torch, always heating the membrane and do not torch directly the back of the shingle. Proceed at the same way with the first-row shingles. It is advisable to cut the shingles along the 25cm line parallel to the valley once the elements are installed – Fig. 20.
- Once the installation of the shingles of the entire pitch and for the entire length of the watershed has been completed, move to the adjacent pitch. Start installing the shingles from the starting row and continue in successive rows. Fix them with the flame of a torch, always heating the membrane and not the shingle element. The last shingle in each row should reach at least the valley line. Once the installation of the shingles is completed also for the second pitch, mark the axis of the valley. Then, proceed to cut the shingles of the second pitch following the valley line, as for the nail installation
- Cross-cut the top edge of the shingle to the valley, so as to convey the descending water along the axis of the valley. Lift the shingles of the second pitch at the valley line, one at a time and apply Bitustick at the bottom, for their final bonding - Fig. 21.
- Once the installation is finished, always check the adhesion between the membrane and the bituminous shingles.

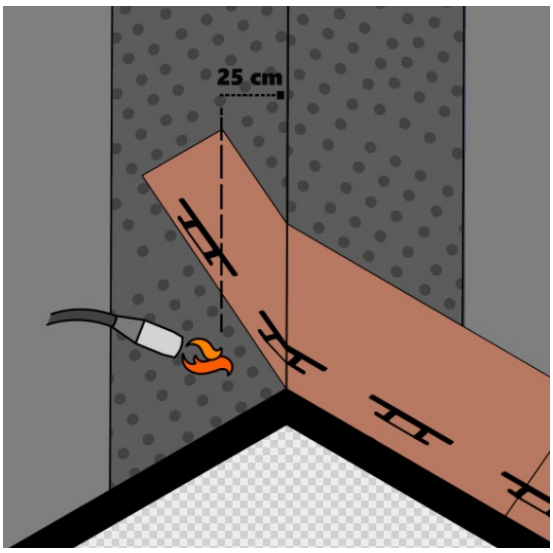

Fig. 20 *– Shingles installation by torch at the valley*

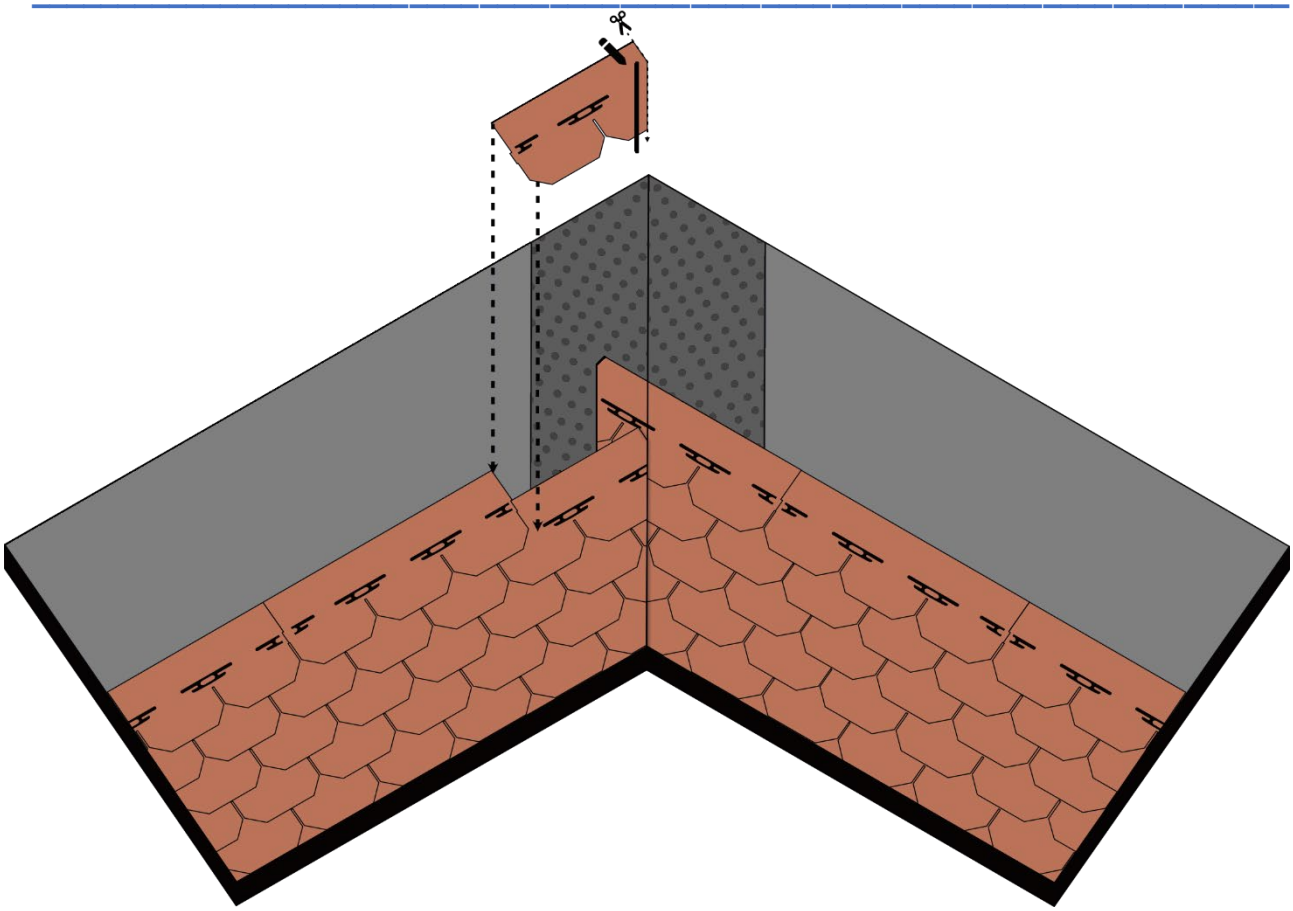

Fig. 21 *– Shingles installation by torch at the valley*

7. FINISHES AND INSTALLATION DETAILS

All finishes for flashings, valleys, chimneys, snow stops, etc. can be performed with aluminium or other compatible metals. For their installation refer to the specific installation instructions.

The Liberty shingle model is equipped with self-adhesive points that softens with the heat and thus allows the gluing of the shingle tabs of the subsequent rows. If necessary, you can force their activation with a heat gun. It is important to verify the adhesion of the tabs and of the shingles, at the end of the day, once the shingles installation is completed.