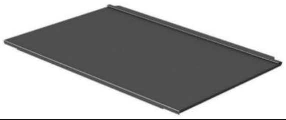
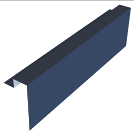
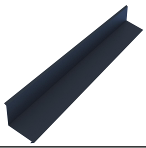
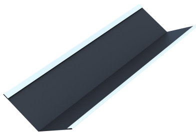
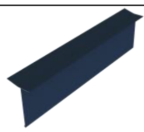
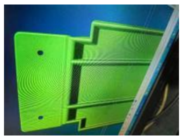
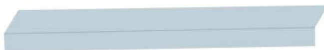
Installation Instructions for Photovoltaic Tile Roofing System

(2024·Chinese Version)

Table of Contents

I. Bill of Materials

Serial No.	Material name	Specifications	Product drawing	Use site
1	PLUS photovoltaic tile	L*W 1408*438 mm		Slope roof
2	Metal monolithic tile	L*W 1388*376 mm		Slope roof
3	Metal 1/2 tile	L*W 694*376 mm		Slope roof
4	Metal 1/4 tile	L*W 400*376 mm		Slope roof
5	Ridge tile	L 2500 mm		Ridge
6	Ridge tile head	——		Ridge
7	Gable board	L 2500 mm		Eaves
8	Side tile head	——		Gable board bottom
9	Vertical flashing board	L 2500 mm		Gable
10	Horizontal flashing board	L 2500 mm		Gable
11	Aluminum foil composite thermal insulation waterproof cushion	Single-sided silver		Sloping cullis
12	Cullis board	L 2500 mm		Sloping cullis
13	Cornice board	L 2500 mm		Cornice

14	Metal tile connector TD-C-01 (Unnotched)	425*75 mm		Butt bottom of the left and right sides of the metal tile Butt bottom of the left and right sides between the metal tile and the photovoltaic tile
15	Metal tile connector TD-C-02 (Notched)	425*75 mm		Butt bottom of the left and right sides of the metal tile Butt bottom of the left and right sides between the metal tile and the photovoltaic tile
16	Butyl tape	15 m/roll		Cornice board, attached board for gable board, flashing board, ridge tile attached joist
17	Countersunk dovetail screw	40 mm		Fixed position of photovoltaic tiles and metal tiles
18	Wind-resistant buckle	——		Fixed position of photovoltaic tiles
19	Attached board	——		Cornice, gable
20	Fixed hook piece	——		Tile fixation
21	Z-shaped joist	——		Flashing
22	U-shaped joist	——		Ridge
23	Counter batten	T*W 30*50 mm		Roofing, on-demand procurement
24	Tile batten	T*W 30*50 mm		Roofing, on-demand procurement
25	Countersunk head tapping screw	D*L 4*50 mm		Roofing, on-demand procurement
26	Weatherproofing sealant			Node closing, on-demand procurement
27	DC cable			Photovoltaic tile
28	MC4 connector			Photovoltaic tile

II. Tool Preparation

			
Multimeter	**Wire stripping pliers (Crimping pliers)**	**Pistol drill**	**Angle grinder**
			
Cutting saw	**Flanging pliers**	**Electric tin snips**	**Tin snips**
			
Utility knife	**Steel tape**	**Tape measure**	**Laser level**
			
Spirit level	**Ink fountain**	**Hammer**	**Glue gun**
			
Safety rope	**Reflective vest**	**Safety helmet**	**Goggles**
			
Broom			

Tool preparation is for reference only. Corresponding tools with alternative functions can be purchased according to local conditions, and can be used selectively according to the installation steps to achieve the installation effect.

III. Installation Sequence

Precautions in advance:

1. The construction personnel shall be familiar with the overall layout according to the layout drawings of roof components, and determine the position where cables enter the roof.

2. Please conduct the following checks prior to installation:

(1) The materials used for installation are not damaged, and the quantity is consistent with the bill of materials.

(2) Installation tools are available.

(3) All cable connectors are dry and free of dirt prior to installation.

3. Confirm the cable connection mode

The photovoltaic tile units are connected in series according to the layout drawings, and connected with the photovoltaic special cable laid on the roof in advance. **The other side of the cable is connected to the inverter equipment.**

Serial No.	Installation scheme	Materials used	Material picture	Installation page number
1	Installation of counter batten	30*50 mm anti-corrosive wood 4*50 mm countersunk head tapping screw	See Bill of Materials No. 23, 25	5-6
2	Laying of aluminum foil composite thermal insulation waterproof cushion	Aluminium foil	See Bill of Materials No. 11	8-9
3	Installation of tile batten	30*50 mm anti-corrosive wood 4*50 mm countersunk head tapping screw	See Bill of Materials No. 24, 25	10-11
4	Installation of cornice board	Cornice board, butyl adhesive tape, attached board, 4*50 mm countersunk head tapping screw	See Bill of Materials No. 13, 16, 19, 25	12-13
5	Installation of gable board	Gable board, side tile head, butyl adhesive tape, attached board and fixed hook piece	See Bill of Materials No. 7, 8, 16, 19, 20	15-16
6	Installation of cullis board	Cullis board, fixed hook piece, countersunk head tapping screw	See Bill of Materials No. 12, 20, 25	18-19
7	Installation of vertical flashing board	Vertical flashing board, butyl adhesive tape, hook piece, countersunk tapping screw, weatherproofing sealant.	See Bill of Materials No. 9, 16, 20, 25, 26	20-21
8	Installation of tiles	Photovoltaic tile, metal tile, metal tile connector, countersunk dovetail screw, wind-resistant buckle, DC cable, MC4 connector, photovoltaic layout drawings	See Bill of Materials No. 1-4, 14, 15, 17, 18, 27, 28	22-24
9	Node closing	Ridge tile, ridge tile head, U-shaped joist, horizontal flashing board, Z-shaped joist, butyl adhesive tape, weatherproofing sealant, countersunk head tapping screw	See Bill of Materials No. 5, 6, 22, 10, 21, 16, 26, 25	27-31
10	Installation of electrical materials	Roof assembly string drawings		

IV. Installation Procedures

4.1 Installation of counter batten

4.1.1 Introduction to procedures

Counter battens are wooden strips that are installed vertically over pitched roofs to which tiling battens are attached. They are used to fix the tiling battens and elevate the underside of the roof tiles, which facilitates roof ventilation.

4.1.1 Precautions

Requirements for construction surface:

1. Concrete base surface: Clean with a broom to ensure that there are no oil stains, protrusions, cracks, honeycombs, pitted surfaces, peeling and sanding;

2. Pipes, equipment or embedded parts protruding from the roof shall be installed before the construction of additional waterproof layers;

3. It is required that the flatness error of the construction surface is less than or equal to 40 mm, and the flatness error is greater than 40 mm, and the anti-corrosive wooden joist is used for leveling.

Only when the above conditions are met can the construction of the next procedure be carried out.

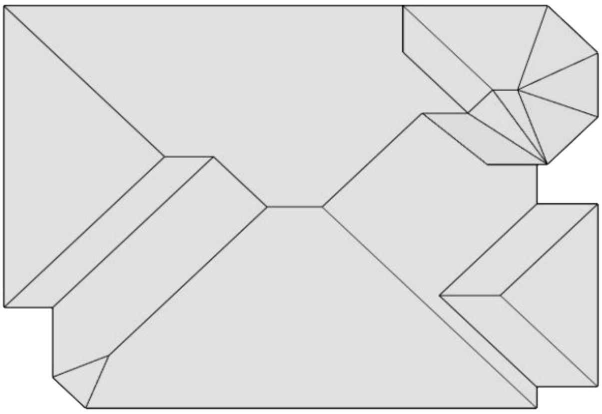
4.1.3 Procedure materials

	
Counter batten 30 (h)*50 mm anti-corrosive wood strip	Countersunk head tapping screw Diameter 4*50 mm
See Bill of Materials No. 23	See Bill of Materials No. 25

4.1.4 Using tools

			
Pistol drill	**Cutting saw**	**Laser level**	**Ink fountain**
			
Steel tape	**Tape measure**	**Spirit level**	

4.1.5 Installation steps



Schematic diagram of the base course

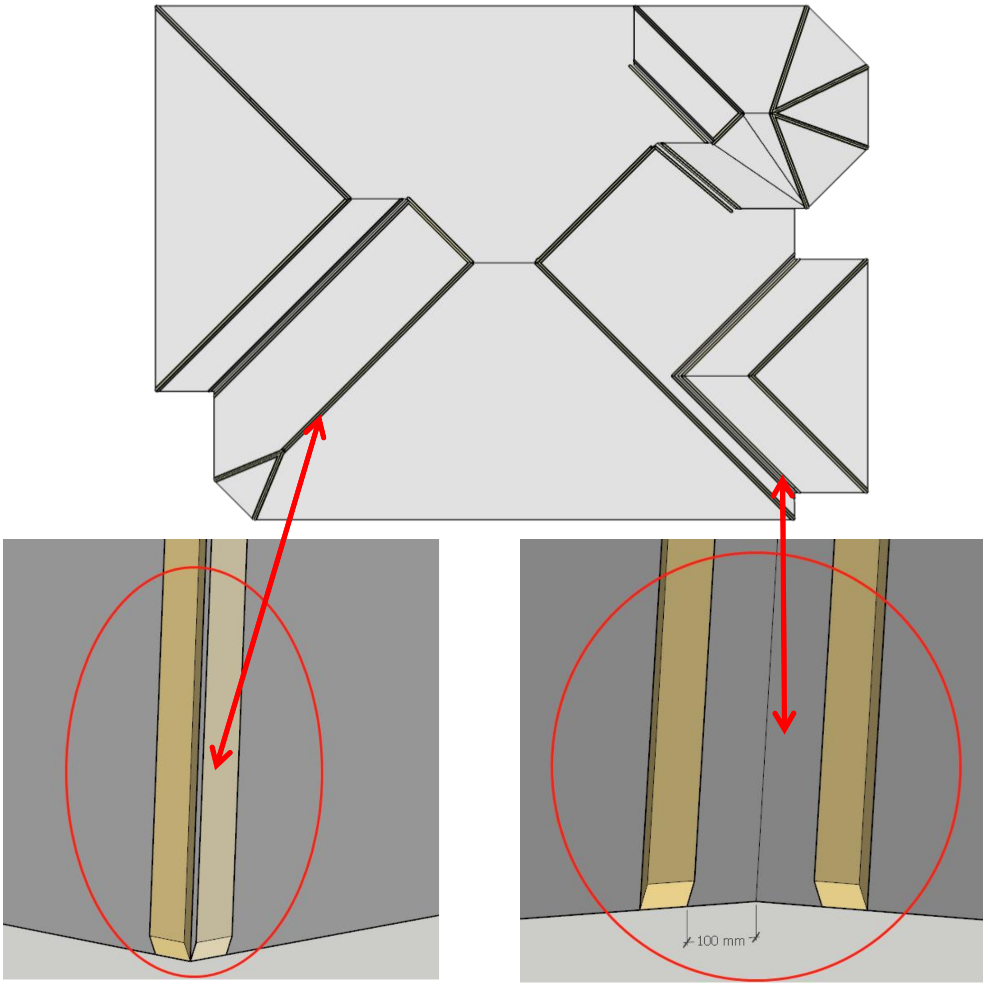
1. Add counter battens at the sloping ridge and cullis position of the base course

A. Measure the horizontal position by using a laser level.

B. Snap the line by using an ink fountain.

C. Mark the position ≥ 100 mm from the center line by using steel tape, and the fixed distance between countersunk head tapping screws shall be ≤ 400 mm.

D. Place the counter battens at the sloping ridge and cullis, fix countersunk head tapping screws on the roof base through the counter battens with a pistol drill, and follow similar steps as above until the entire sloping ridge and cullis of the roof are laid.



The installation position of the counter batten on both sides of the sloping ridge should be consistent with the center line of the sloping ridge

The installation position of the counter batten on both sides of the cullis should be at least ≥ 100 mm away from the center line of the cullis at the base course

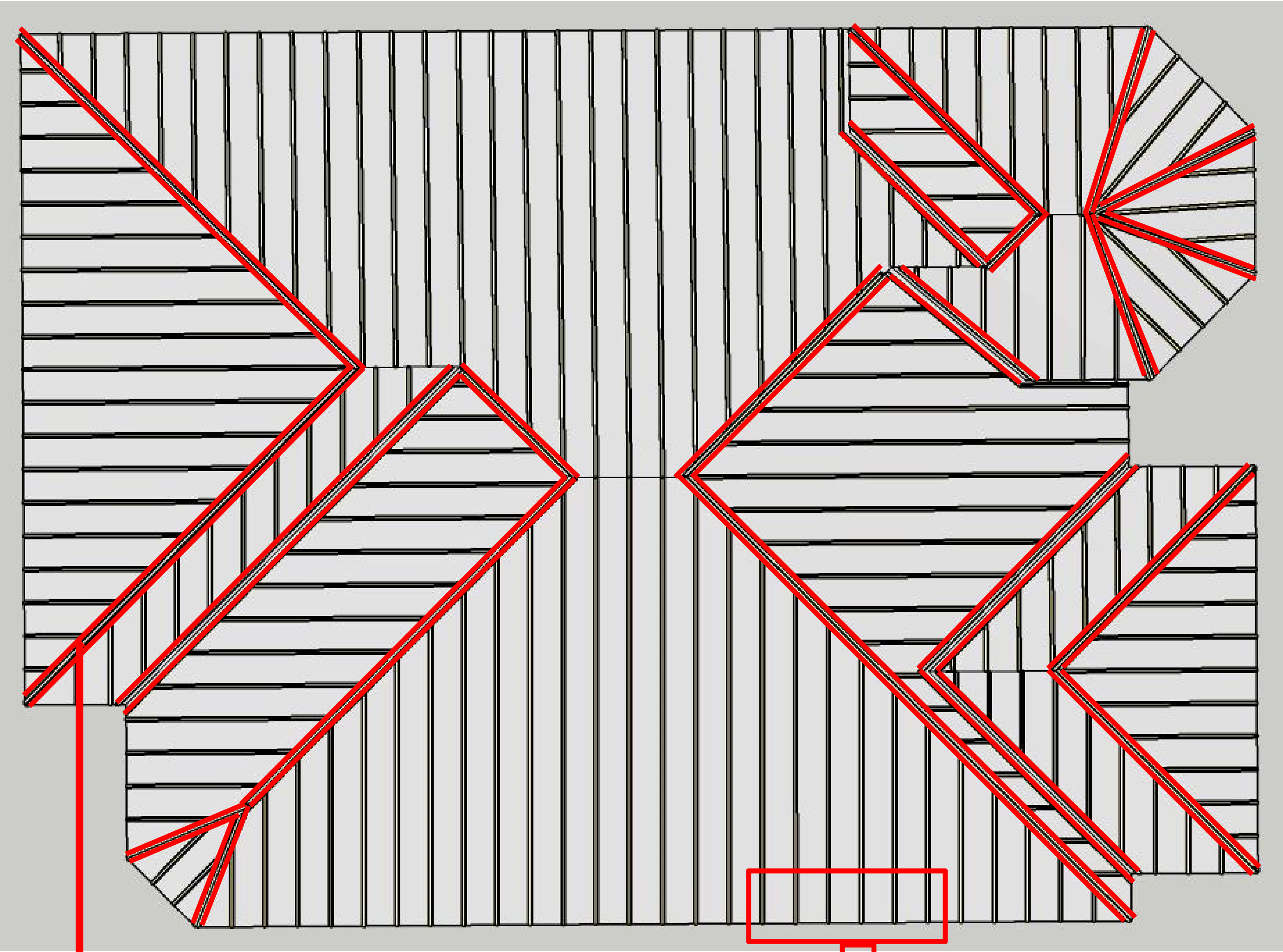
2. Install counter battens at the main roof position

A. Measure the horizontal position by using a laser level.

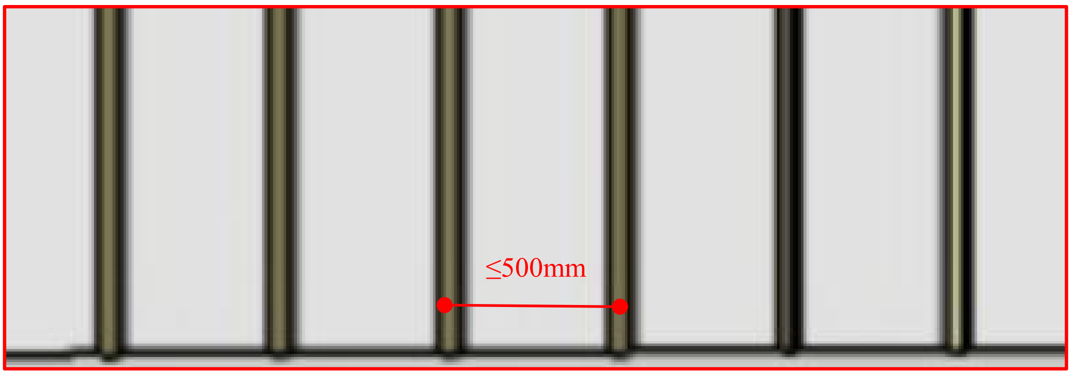
B. Snap the line by using an ink fountain.

C. Mark the spacing between the counter battens ≤ 500 mm by using steel tape, and the fixed distance between countersunk head tapping screws shall be ≤ 400 mm.

D. Place the counter battens evenly perpendicular to the cornice, fix countersunk head tapping screws on the roof base through the counter battens with a pistol drill, and follow similar steps as above until the entire roof is laid.



The positions marked in red in the picture above are the added counter battens. See the previous page for the installation method.



Layout drawings of the remaining counter battens

4.2 Laying of aluminum foil composite thermal insulation waterproof membrane

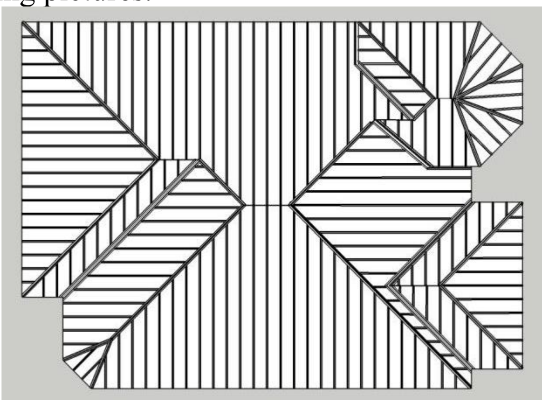
4.2.1 Introduction to procedures

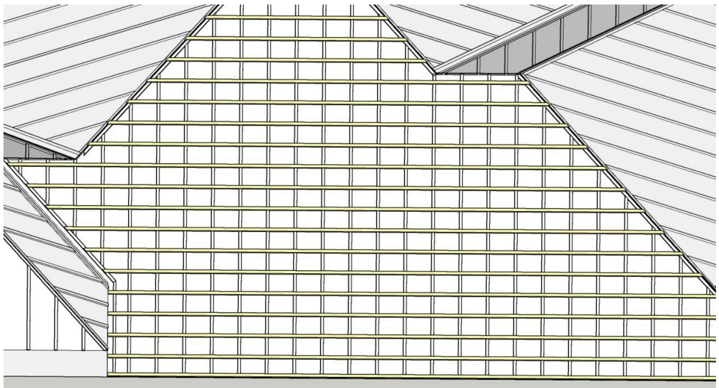
Excellent thermal insulation performance, with 80% thermal ray reflectivity; Effective two-way effect of outdoor thermal insulation and indoor thermal insulation; Sound waterproof performance after full laying; High anti-aging performance, soft and light, and easy to construct without dead ends.

4.2.1 Precautions

1. Lay the aluminum foil composite thermal insulation waterproof membrane after laying the counter battens.

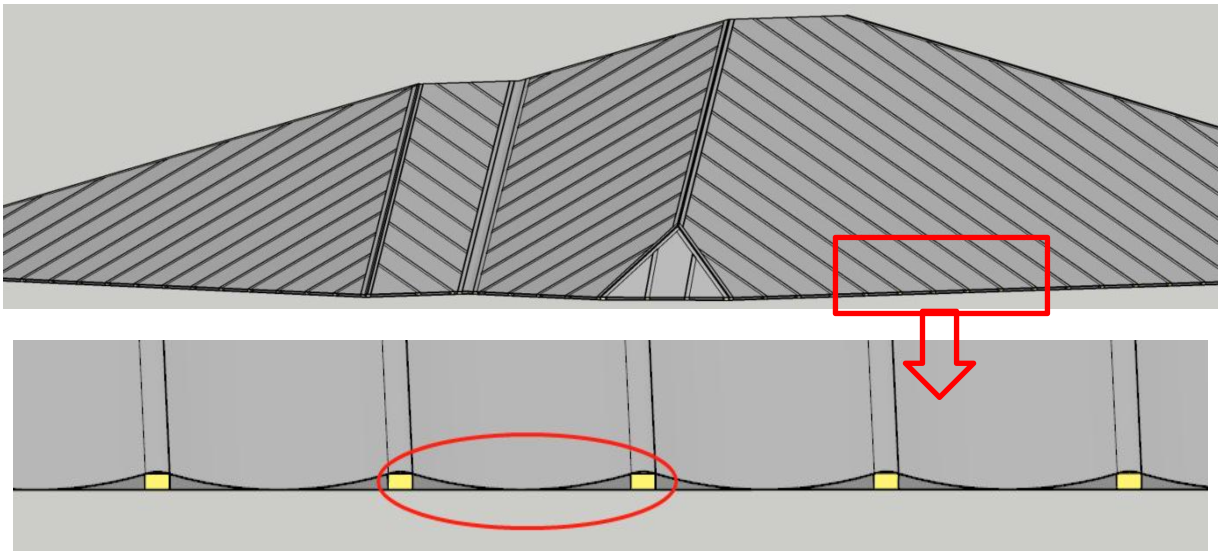
2. Lay a layer of aluminum foil composite thermal insulation waterproof membrane, and fix and install it by using battens (see 4.3 for installation steps). The two procedures of 4.2 and 4.3 must be installed simultaneously, and follow similar steps as above. The roof installation is completed as shown in the following pictures.





3. When overlapping at the flat ridge or sloping ridge, the overlapping cannot occur directly above the roof ridge, but must be carried out up and down at a distance of ≥ 500 mm from the roof ridge.

4. There should be a concave shape between the counter battens (see attached picture).



4.2.3 Procedure materials

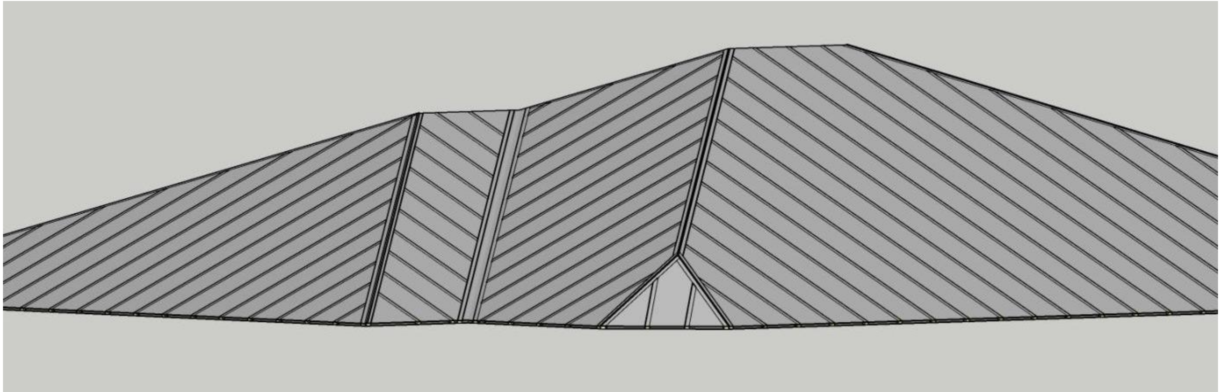
Aluminum foil composite thermal insulation waterproof cushion Single-sided silver	Countersunk head tapping screw Diameter 4*50 mm
See Bill of Materials No. 11	See Bill of Materials No. 25

4.2.4 Using tools

			
Pistol drill	**Steel tape**	**Utility knife**	

4.2.5 Installation steps

1. Starting from the roof cornice position (it is recommended to start from the roof with a large single slope area), horizontally lay the aluminum foil composite thermal insulation waterproof cushion from bottom to top, with overlapping size ≥ 100 mm. Follow similar steps as above until the entire roof is laid.



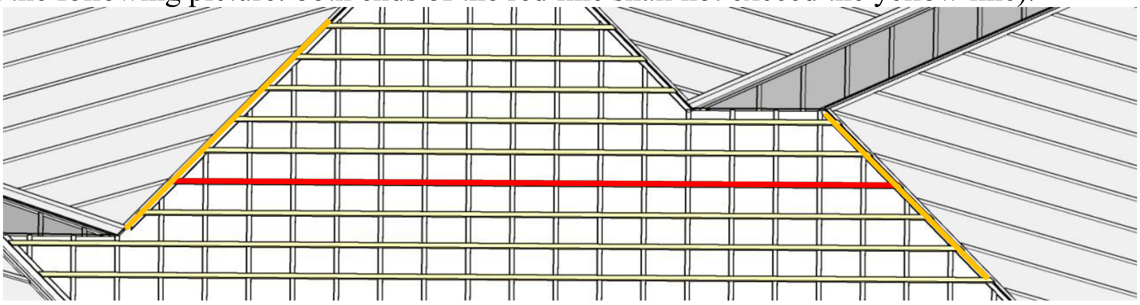
4.3 Installation of tile batten

4.3.1 Introduction to procedures

Tile battens refer to the procedure of arranging tiles on a sloping roof. Generally, tile battens are installed on the roof and the tiles are hung on the tile battens.

4.3.1 Precautions

1. Tile battens should be installed straight and checked during construction, and deviations should be corrected at any time to avoid rework;
2. In case of insufficient length of tile battens, they should be spliced directly in butt joint, otherwise the excess length should be cut off;
3. The fixed nails should be completely screwed into the tile battens, and the nail heads shall not protrude from the surface of the tile battens;
4. The ends of the tile battens shall not exceed the boundary of the additional counter battens (as marked in the following picture: both ends of the red line shall not exceed the yellow line).



4.3.3 Procedure materials

	
Counter batten 30 (h)*50 mm anti-corrosive wood strip	Countersunk head tapping screw Diameter 4*50 mm
See Bill of Materials No. 24	See Bill of Materials No. 25

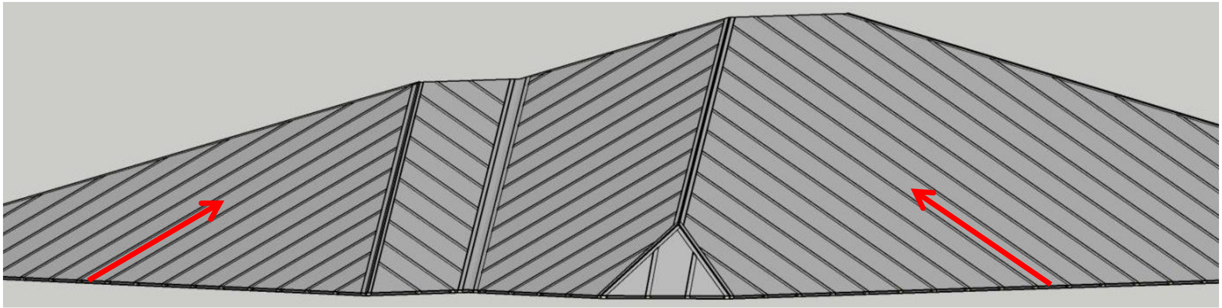
4.3.4 Using tools

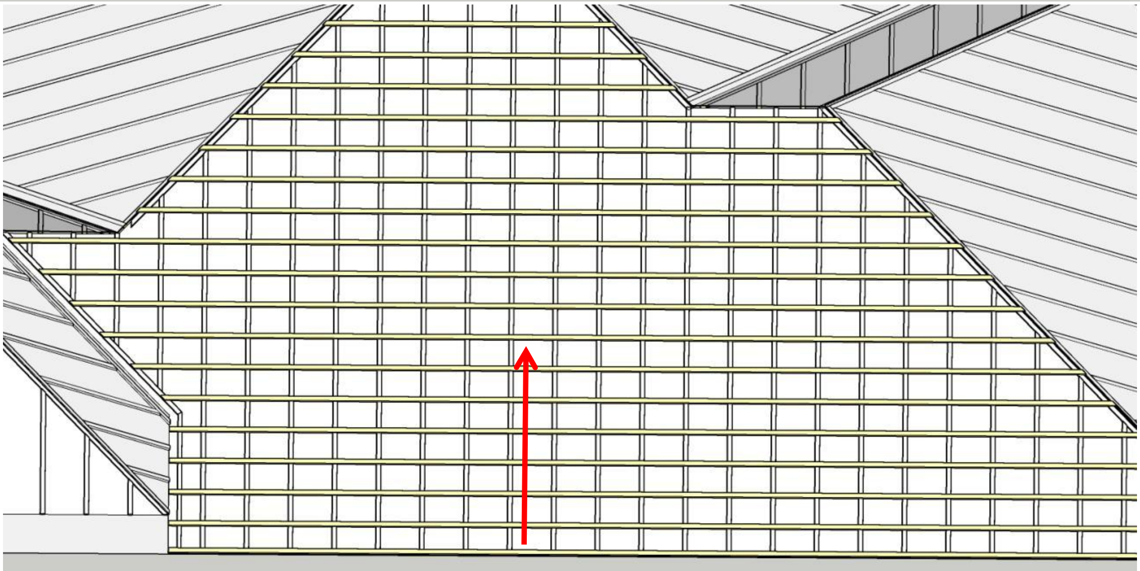
			
Pistol drill	**Cutting saw**	**Laser level**	**Ink fountain**
			

Steel tape	**Tape measure**	**Spirit level**	

4.3.5 Installation steps

1. Tile battens shall be arranged horizontally from bottom to top, and installed and fixed at specified intervals.



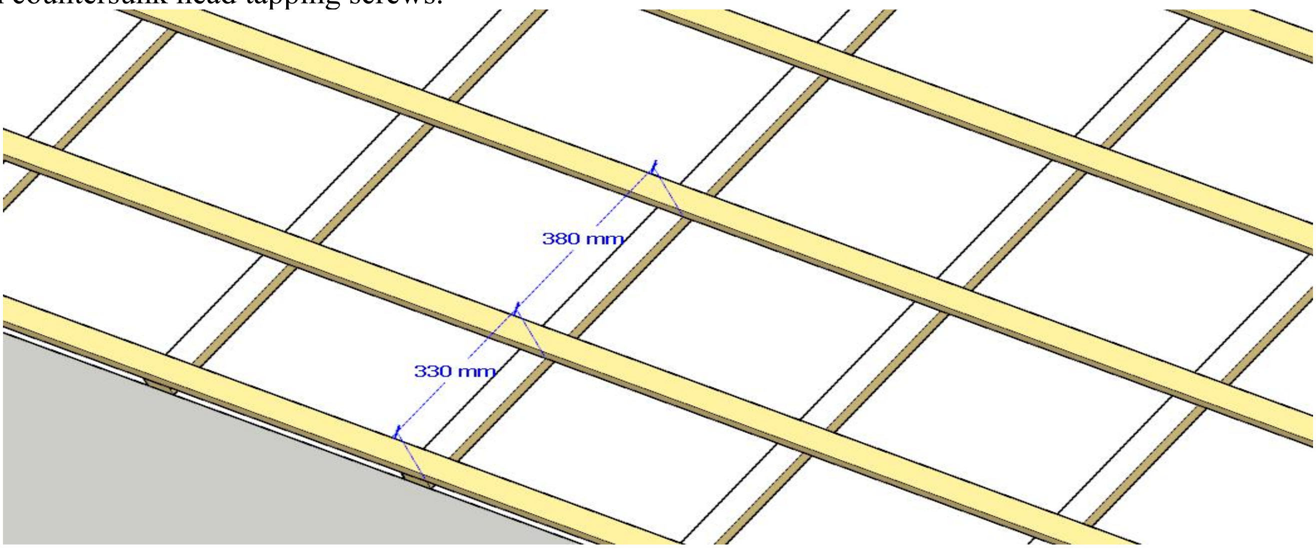


2. Installation of tile batten

A. The first row of tile battens at the bottom is used as the installation strip of the cornice board, while the tile battens starting from the second row are used as the installation strip of tiles.

B. The bottom of the first row of tile battens is horizontally aligned with the cornice wall. The spacing between the second row and the first row is 330 mm, and that between the third row and the second row is 380 mm. From the third row upwards, they are installed with a spacing of 380 mm until the top ridge of the roof.

C. The intersection points of the tile battens and the counter battens are fixed points, which are fixed with countersunk head tapping screws.



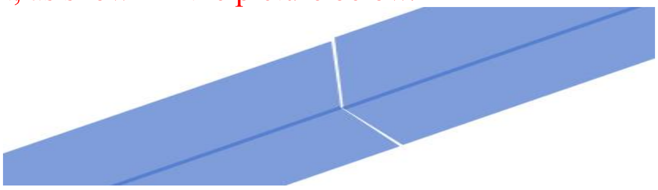
4.4 Installation of cornice board

4.4.1 Introduction to procedures

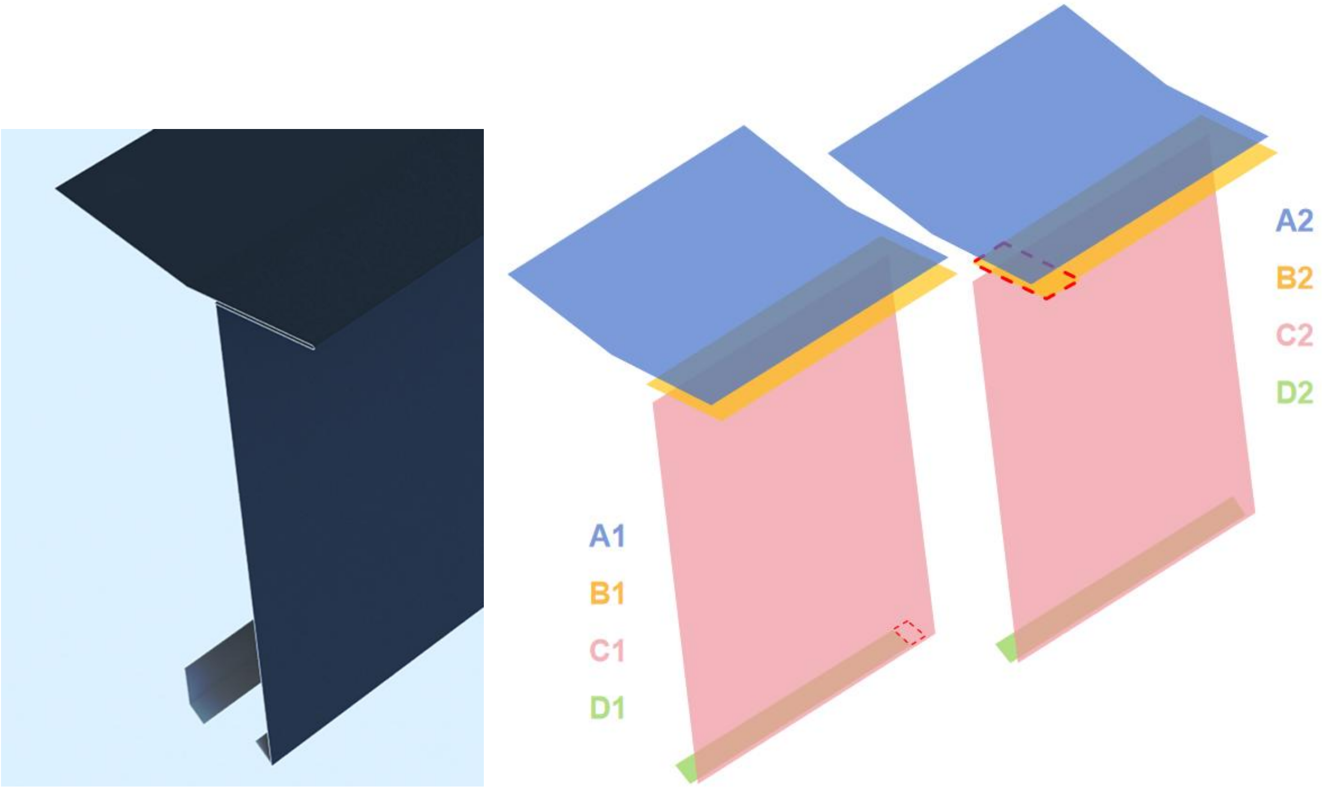
Cornice boards refer to the metal boards nailed to the eaves outside the sloping roof, which increase the beauty and waterproof of the cornice position.

4.4.1 Precautions

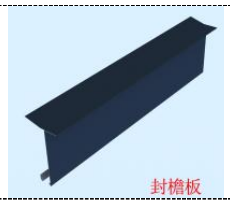
1. The attached boards do not need to be overlapped on the left and right during installation but should be directly installed in butt joint, as shown in the picture below.



2. The cornice board is installed from the right side of the roof cornice to the left side, with the left cornice board at the top and the right cornice board at the bottom. The left and right cornice boards are installed with overlap. When overlapping, the side opening B2 and the bottom opening D1 are cut and then overlapped. The bending part of the link between A2 and B2 needs to be cut, and the A2 surface can be kept. If it is not cut, the overlapping will be affected. The purpose of cutting is to ensure that the overlapping part can be more compact and fixed more firmly. The cutting width is 50 mm and the overlapping spacing is 50 mm. See the picture below for the cutting method:



4.4.3 Procedure materials

			
Cornice board	Attached board	Butyl tape	Countersunk head tapping

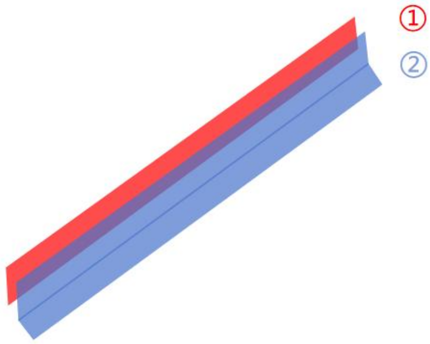
			screw Diameter 4*50 mm
See Bill of Materials No. 13	See Bill of Materials No. 19	See Bill of Materials No. 16	See Bill of Materials No. 25

4.4.4 Using tools

			
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**
			
Utility knife	**Electric tin snips**	**Tin snips**	**Spirit level**

4.4.5 Installation steps

1. Cut butyl tape with the same length as the attached board and stick it on the back of the attached board; As shown below: ① Butyl tape, ② Attached board;

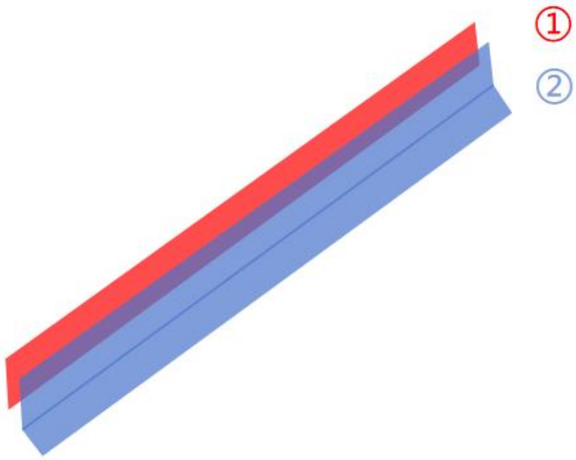


2. Place the cornice boards on the first row of tile battens, and determine the position of the attached board on the facade wall of the cornice;

3. Arrange the attached boards horizontally in turn according to the determined position of the attached boards;

4. Place the butyl tape between the wall and the attached boards, and fix it on the wall by directly penetrating the attached boards with countersunk head tapping screws, with the screw fixing distance of ≤ 400 mm;

5. Place the cornice board from the right side of the roof cornice to the left side along the direction of the first row of tile battens in turn, hook the attached board at the bottom, and fix the upper part on the tile battens with countersunk head tapping screws, with the screw fixing distance of ≤ 400 mm.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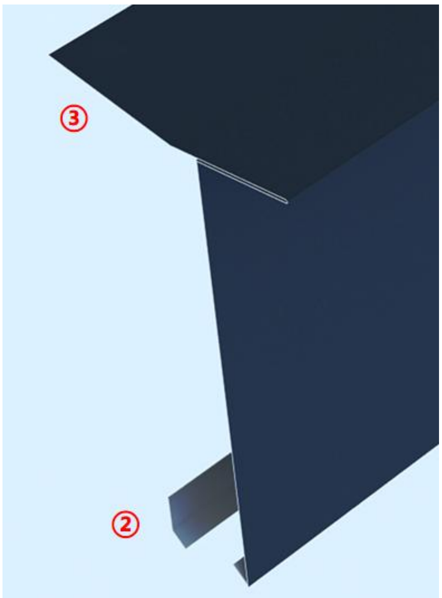
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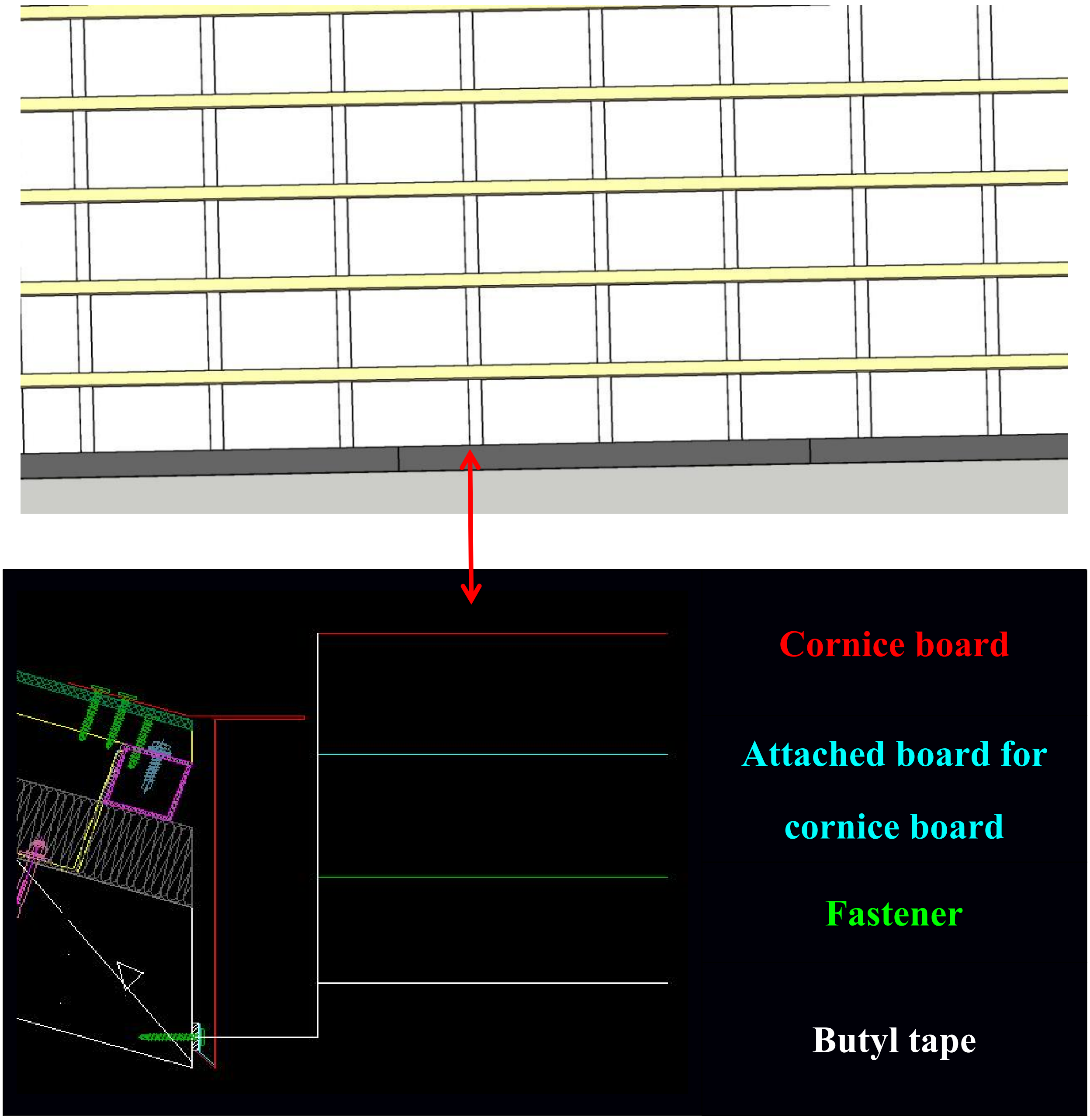

Cornice board
Attached board for
cornice board
Fastener
Butyl tape

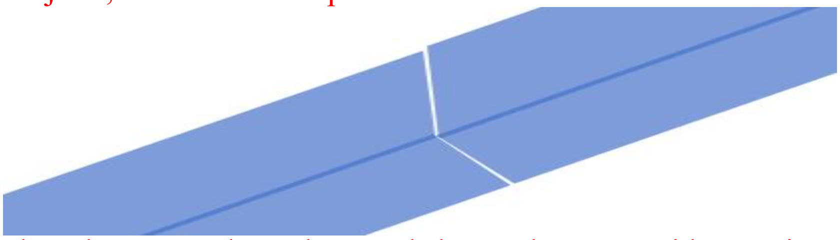
4.5 Installation of gable board

4.5.1 Introduction to procedures

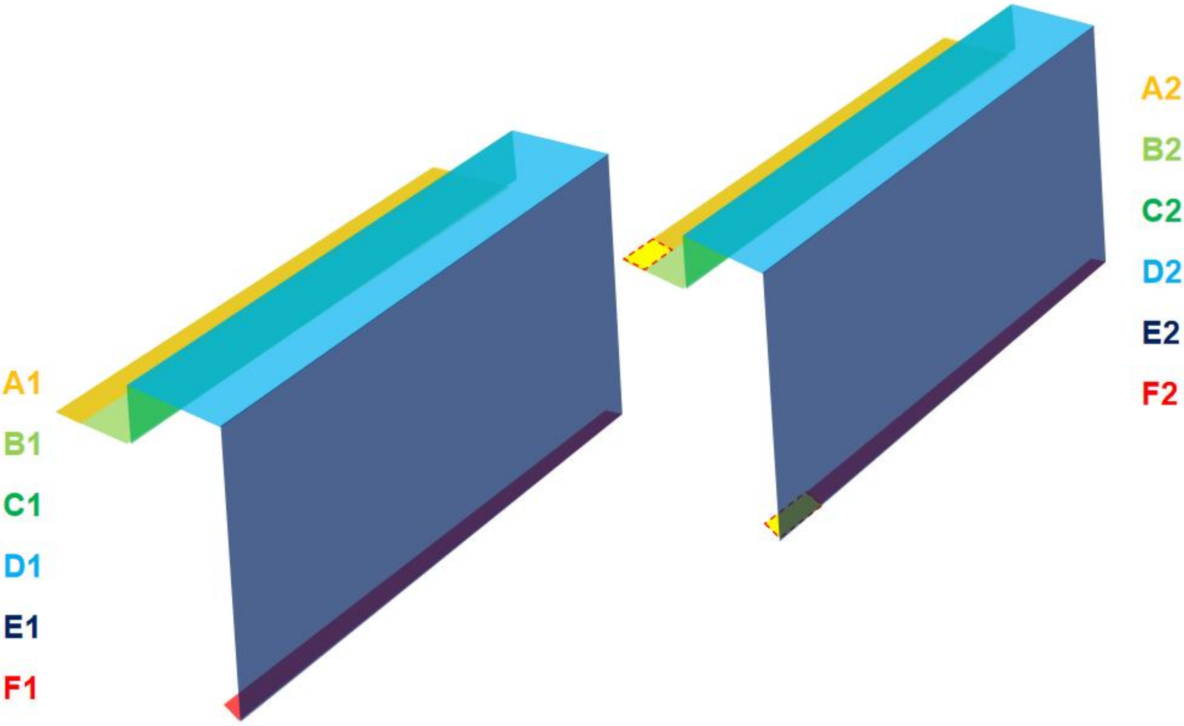
Gable boards can effectively prevent rainwater from leaking into the house and are waterproof.

4.5.1 Precautions

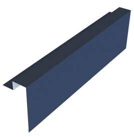
1. The attached boards do not need to be overlapped on the left and right during installation, but should be directly installed in butt joint, as shown in the picture below.



2. When the gable boards are overlapped up and down, the upper side opening A2 and the bottom opening F2 are cut and then overlapped. The cutting width is 50mm and the overlapping spacing is 50 mm. See the picture below for the cutting method:



4.5.3 Procedure materials

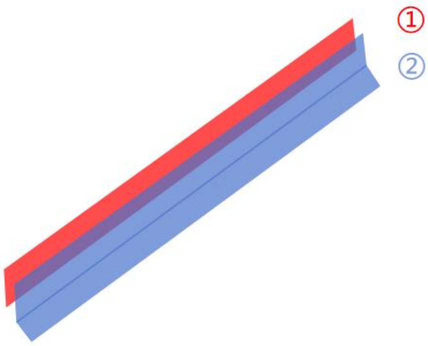
					
Gable board	Attached board	Butyl tape	Fixed hook piece	Countersunk head tapping screw Diameter 4*50 mm	Side tile head
See Bill of Materials No. 7	See Bill of Materials No. 19	See Bill of Materials No. 16	See Bill of Materials No. 20	See Bill of Materials No. 25	See Bill of Materials No. 8

4.5.4 Using tools

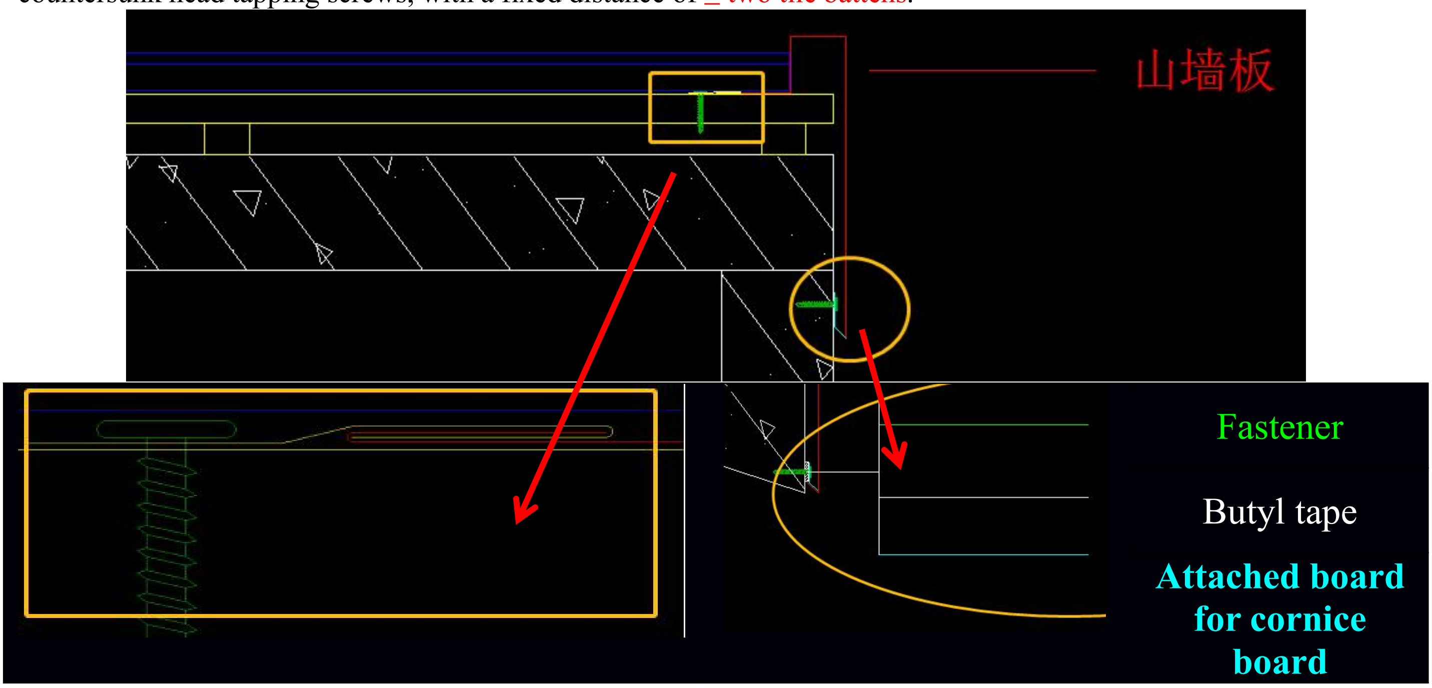
			
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**
			
Flanging pliers	**Electric tin snips**	**Tin snips**	**Spirit level**

4.5.5 Installation steps

1. Cut butyl tape with the same length as the attached board and stick it on the back of the attached board; As shown below: ① Butyl tape, ② Attached board;



2. Place the gable boards on the tile battens, and determine the position of the attached board on the facade wall of the attached boards;
3. Arrange the fixed attached boards horizontally in turn according to the determined position of the attached boards;
4. Place the butyl tape between the wall and the attached boards, and fix it on the wall by directly penetrating the attached boards with countersunk head tapping screws, with the screw fixing distance of ≤ 400 mm;
5. Place the gable boards in turn from bottom to top, and hook the attached boards at the bottom of the gable boards. Hook the flanging of gable boards at the upper part with hooks, and fix the hooks on the tile battens with countersunk head tapping screws, with a fixed distance of ≤ two tile battens.



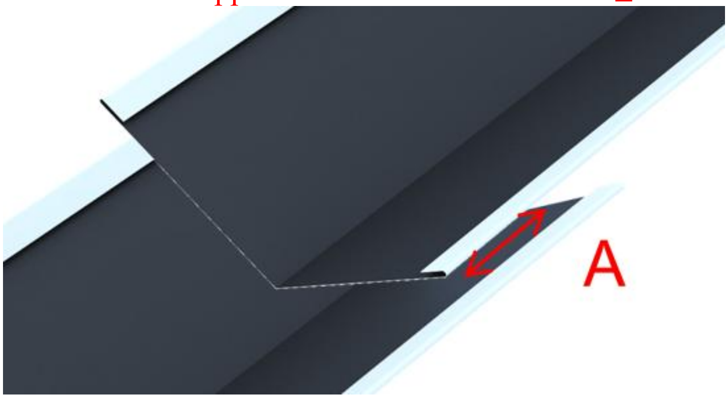
4.6 Installation of cullis board

4.6.1 Introduction to procedures

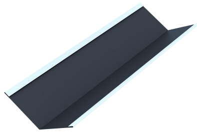
Cullis boards are building materials used for roof drainage. They are V-shaped in structure, allowing rainwater to flow into the trough and drain out of the roof through the drainage holes in the trough, which effectively improves the waterproofing of the roof.

4.6.1 Precautions

1. The overlap distance A between the upper and lower cullis boards is ≥ 100 mm.



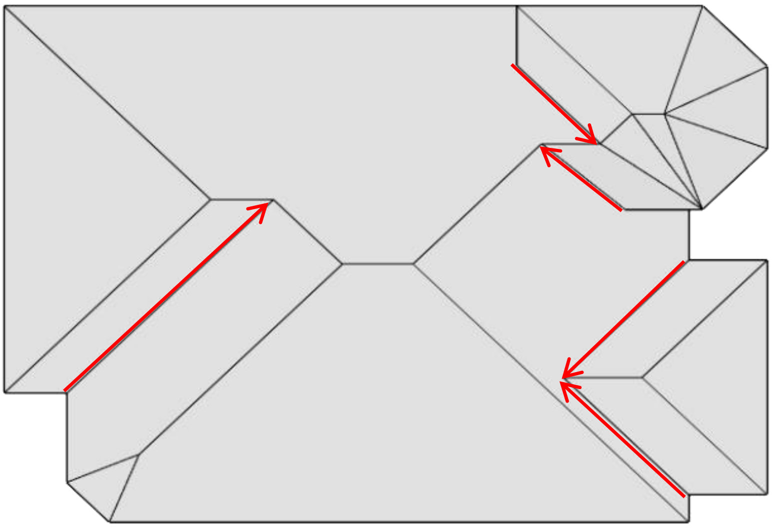
4.6.3 Procedure materials

		
Cullis board	Fixed hook piece	Countersunk head tapping screw Diameter 4*50 mm
See Bill of Materials No. 12	See Bill of Materials No. 20	See Bill of Materials No. 25

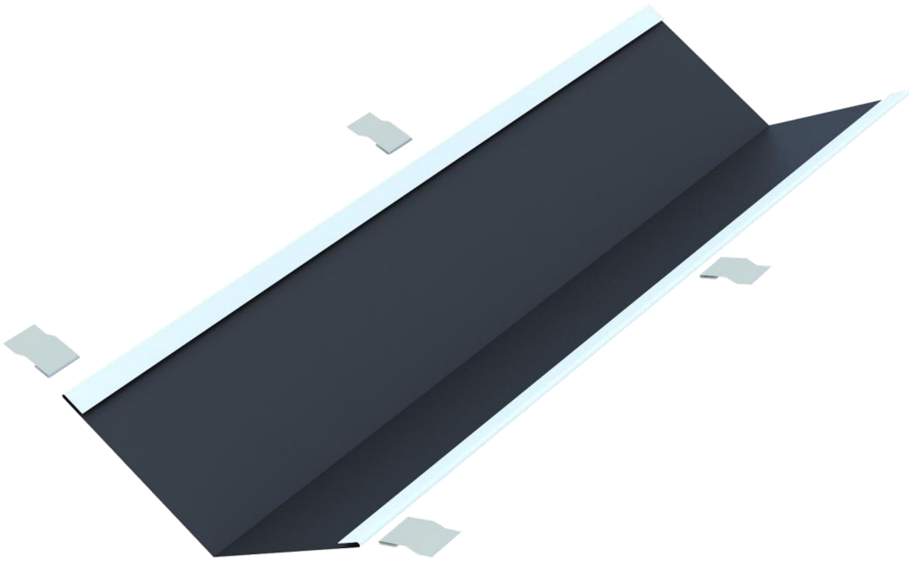
4.6.4 Using tools

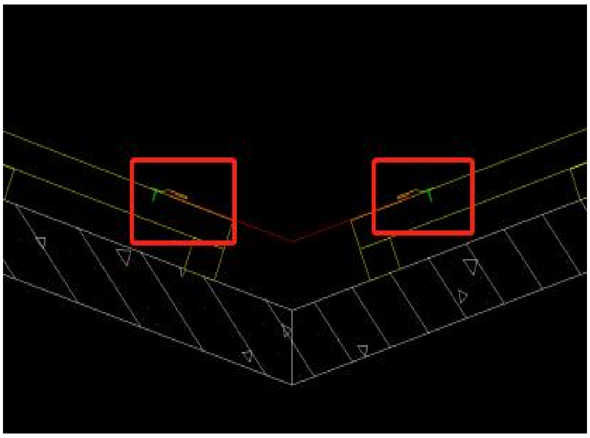
			
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**
			
Electric tin snips	**Tin snips**		

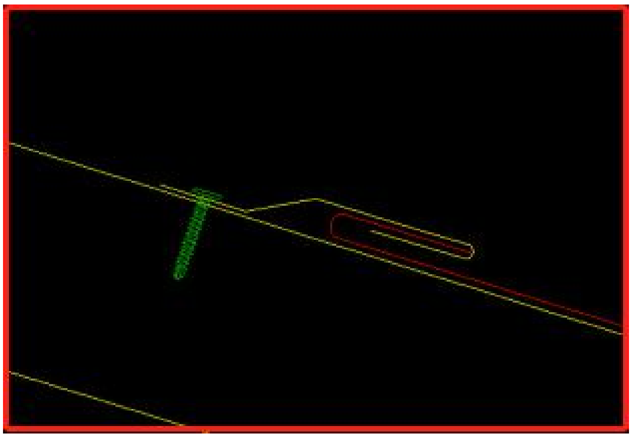
4.6.5 Installation steps



1. Cullis boards are placed and installed piece by piece from bottom to top;
2. The bottom of the first piece (located at the bottom) exceeds the cornice by 50mm;
3. Hook the flanging places on the left and right sides of the cullis board by using hook pieces, and fix the fixed hook pieces on the tile battens with countersunk head tapping screws, with a fixed distance of ≤ two tile battens.







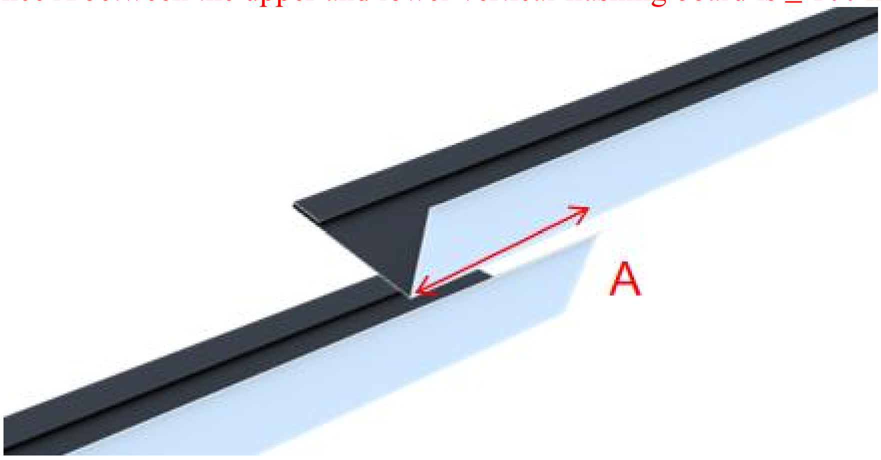
4.7 Installation of vertical flashing board

4.7.1 Introduction to procedures

A vertical flashing board is mainly used to ensure that the roof wall is not washed by rain, and to protect the waterproof layer in the rest of the roof (from water intrusion).

4.7.1 Precautions

The overlap distance A between the upper and lower vertical flashing board is ≥ 100 mm.



4.7.3 Procedure materials

				
Vertical flashing board	Butyl tape	Fixed hook piece	Countersunk head tapping screw Diameter 4*50 mm	Weatherproofing sealant
See Bill of Materials No. 9	See Bill of Materials No. 16	See Bill of Materials No. 20	See Bill of Materials No. 25	See Bill of Materials No. 26

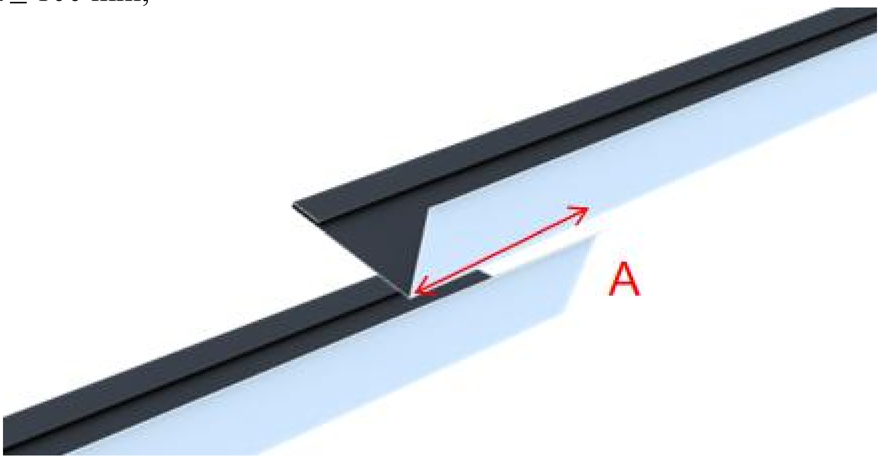
4.7.4 Using tools

			
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**
			
Glue gun	**Electric tin snips**	**Tin snips**	

4.7.5 Installation steps

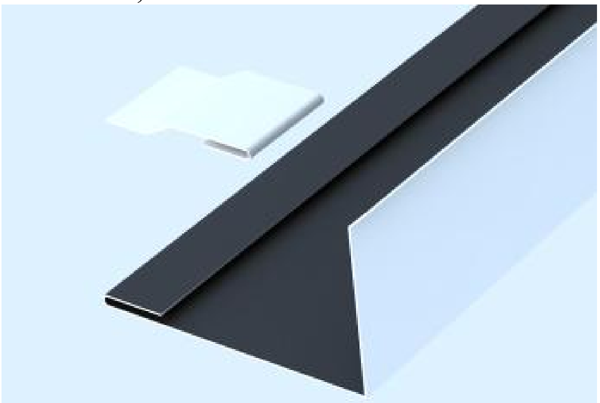
1. Cut butyl tape with the same length as the vertical flashing board and stick it on the back; ① Butyl tape, ② Back of the vertical flashing board.

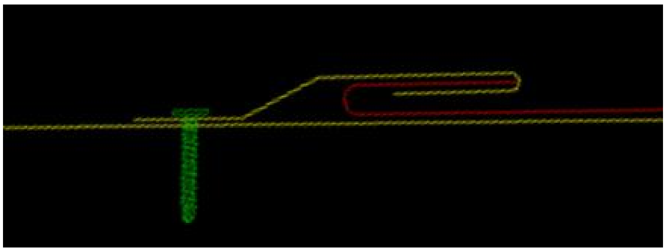
2. Vertical flashing boards shall be placed and installed piece by piece from bottom to top, with an overlapping spacing A ≥ 100 mm;



3. The bottom of the first vertical flashing board is flush with the outer opening of the cornice board;

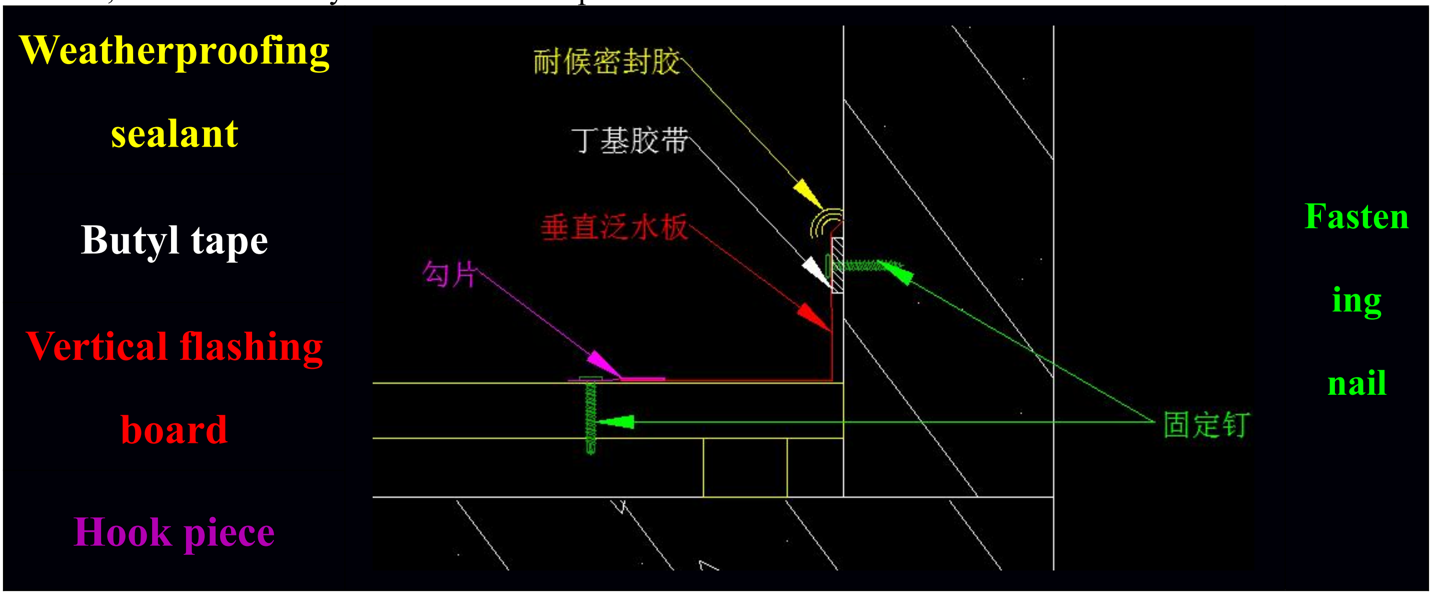
4. Hook the flanging places on the left and right sides of the cullis board by using hook pieces, and fix the fixed hook pieces on the tile battens with countersunk head tapping screws, with a fixed distance of ≤ two tile battens;





5. The flanging position is the dotted line as shown in the picture below. The position is close to the wall surface and fixed with countersunk head tapping screws, with a fixed distance of ≤ 400 mm;

6. The junction between the vertical flashing board and the external wall is sealed with weatherproofing sealant, as shown in the yellow mark in the picture below.



4.8 Installation of tiles

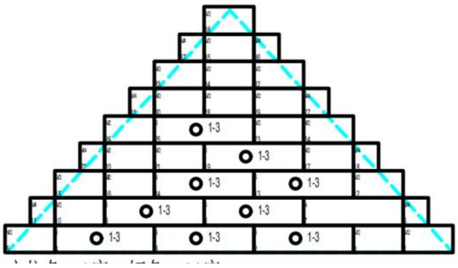
4.8.1 Introduction to procedures

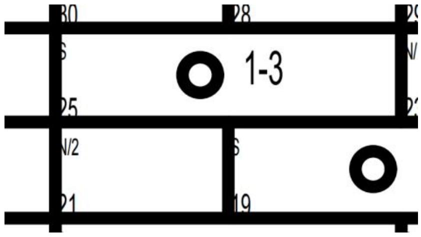
Installation instructions for photovoltaic tiles and metal tiles.

4.8.1 Precautions

1. Determine the position of cables on the roof according to the site and the roof prior to installation, and lay special photovoltaic cables on the roof in advance.

2. The marks in the layout drawings of photovoltaic tiles show that S (○) stands for photovoltaic tiles and N stands for metal tiles.

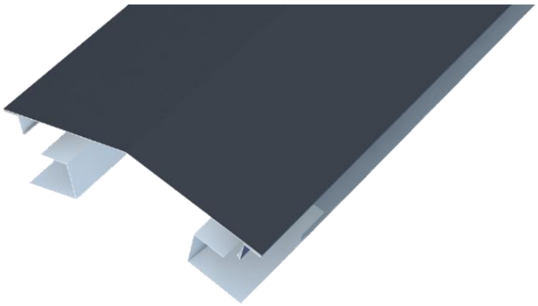




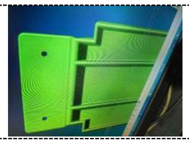
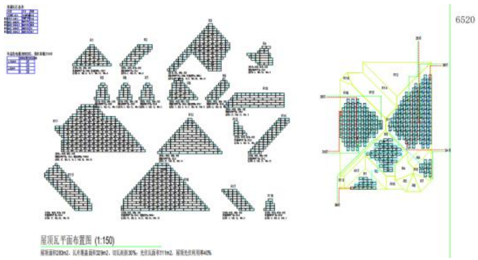
3. When installing photovoltaic tiles, use a multimeter to test whether the connection between photovoltaic tiles is effective at any time to ensure power supply. After each area is connected in series, use a multimeter to test the path to ensure power supply. After the photovoltaic tiles are arranged, start to install the flat cable, and all cables are under the tiles.

4. From the top of the roof to the flat ridge and from both sides to the sloping ridge, it is necessary to fix the U-shaped joist according to the width of the ridge tile opening before installing the ridge tile. [See 4.9.2 for fixed U-shaped joist]

5. The tiles of each roof are composed of metal tiles, photovoltaic tiles or only metal tiles. Please operate strictly according to the situation in “Notes on Installing Tiles at Nodes” in this section to avoid rework.



4.8.3 Procedure materials

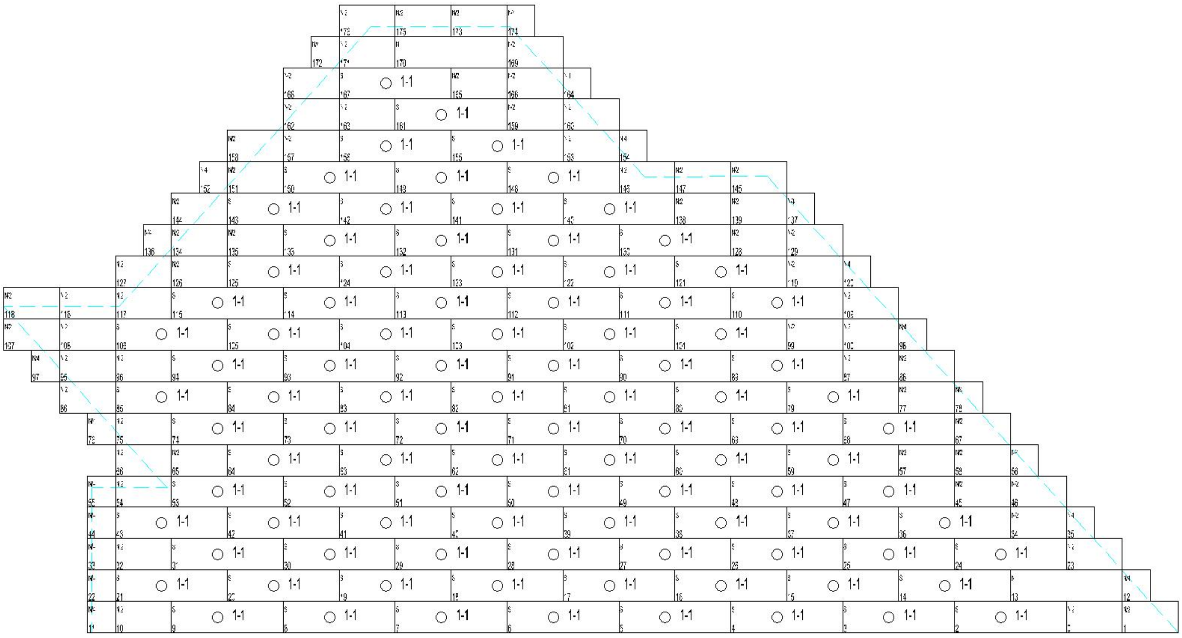
				
PLUS photovoltaic tile	Metal monolithic tile	Metal 1/2 tile	Metal 1/4 tile	Countersunk dovetail screw Diameter 4*40 mm
See Bill of Materials No. 1	See Bill of Materials No. 2	See Bill of Materials No. 3	See Bill of Materials No. 4	See Bill of Materials No. 17
				
Wind-resistant buckle	Metal tile connector TD-C-01 (Unnotched)	Metal tile connector TD-C-02 (Notched)	DC cable	MC4 connector
See Bill of Materials No. 18	See Bill of Materials No. 14	See Bill of Materials No. 15	See Bill of Materials No. 27	See Bill of Materials No. 28
		Photovoltaic layout drawings		

4.8.4 Using tools

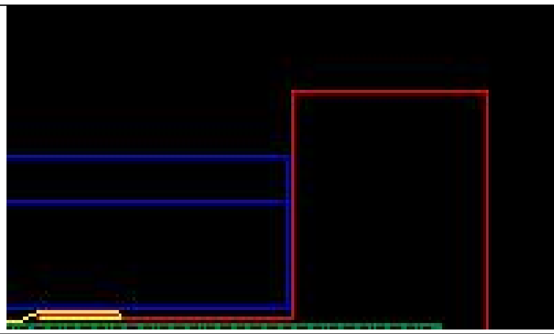
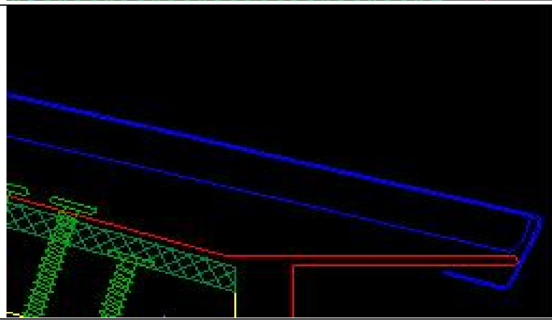
				
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**	**Flanging pliers**
				
Electric tin snips	**Tin snips**	**Multimeter**	**Wire stripping pliers (Crimping pliers)**	**Laser level**
				
Ink fountain				

4.8.5 Installation steps

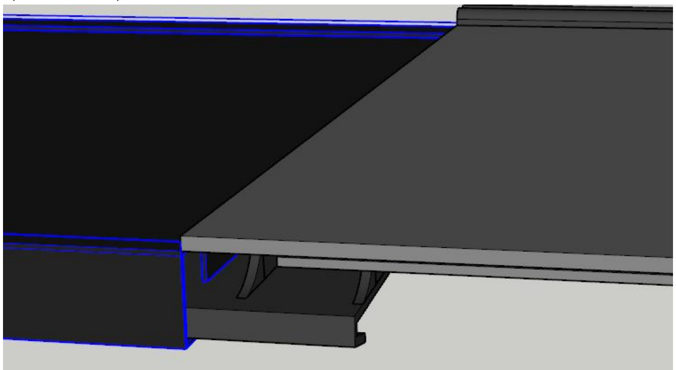
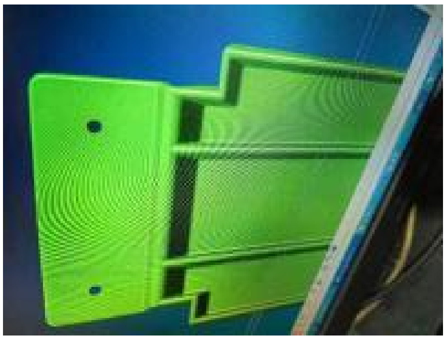
1. Arrange the tiles from the lower left corner of each roof, and install and fix them one by one;
2. Arrange the tiles according to the layout drawings of each apartment. Select the corresponding tiles according to the marks on the layout drawings (S (○) stands for photovoltaic tiles and N stands for metal tiles).



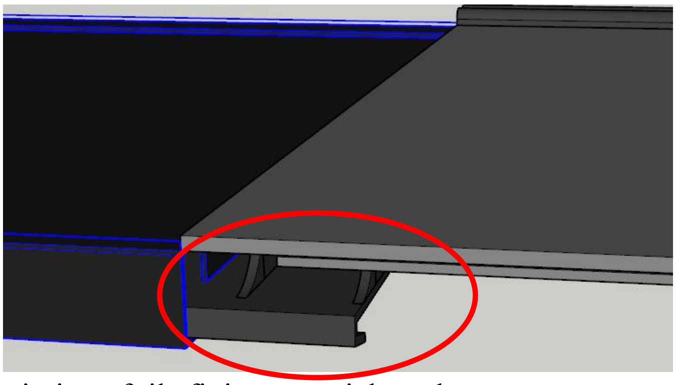
3. Notes on installing tiles at nodes:

When the side end is at the gable position: The end of the tile is close to the vertical edge of the gable board. (The picture on the left shows that blue represents metal tiles, and red represents gables)	
Metal tile and cornice joint: Hook the cornice board with the reverse edge at the bottom of the metal tile (The picture on the left shows that blue represents metal tiles, and red represents cornice boards)	
Sloping cullis	Taking the roof boundary line of 110mm as the cutting line, make a 10 mm lower flanging after cutting
Sloping ridge	Taking the roof boundary line as the cutting line, make 20mm upper flanging and install a U-shaped joist

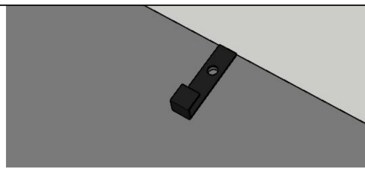
4. When metal tiles and photovoltaic tiles are installed in an overlapping way, the TD-C-02 metal tile connector (notched) is used below the tiles.

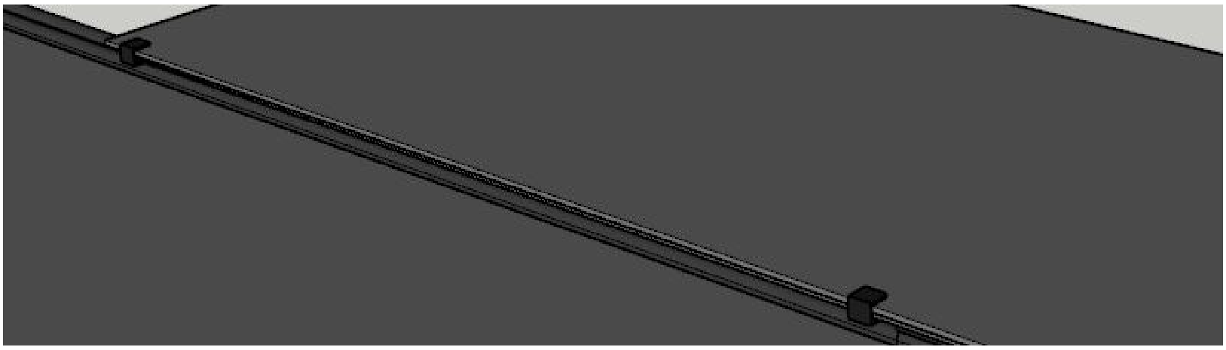
5. When metal tiles and metal tiles are installed in an overlapping way, the TD-C-01 connector (unnotched) is used below the tiles.

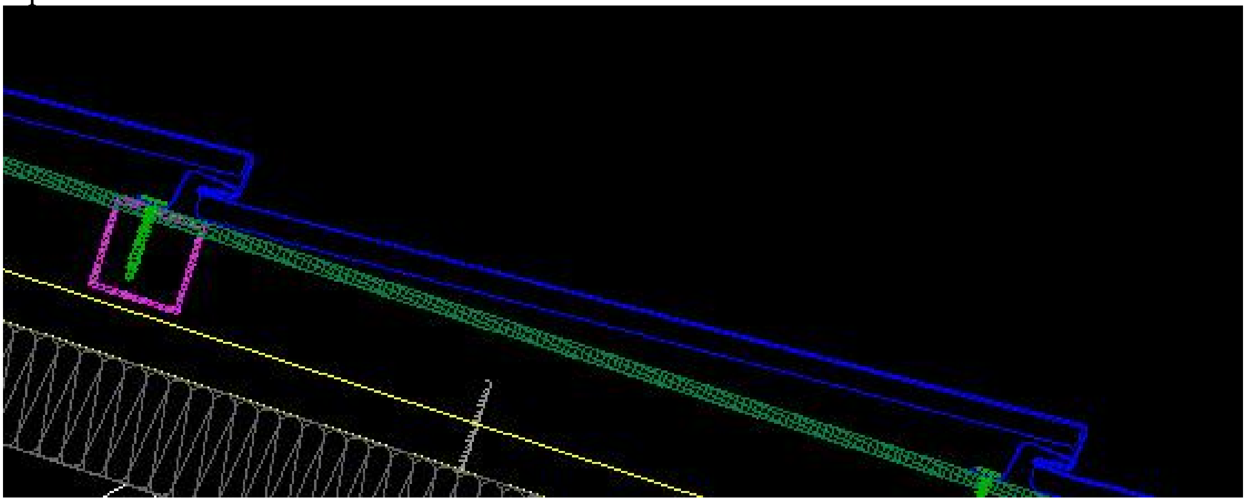
6. Description of tile fixing materials and usage:

Tile type	Fixing material	Fixed position	Wind-resistant buckle
Photovoltaic tile	Use countersunk dovetail screw as a fixing nail Diameter 4*40 mm	Fixed holes reserved on the tiles	 Each photovoltaic tile uses 3 wind-resistant buckles Each wind buckle uses one fixing nail
Metal tile		Direct penetration and fixation at the upper end Conventional fixed spacing 400 mm Due to the various specifications of metal tiles, each piece must have at least 2 fixing nails	[None]

7. Photovoltaic tiles are overlapped up and down: the bottom of the upper row of photovoltaic tiles is inserted into the groove of the lower row of wind-resistant buckles.



8. Metal tiles are overlapped up and down: the bottom of the upper row of metal tiles hooks the groove at the top of the lower row of metal tiles.



4.9 Node closing

4.9.1 Introduction to procedures

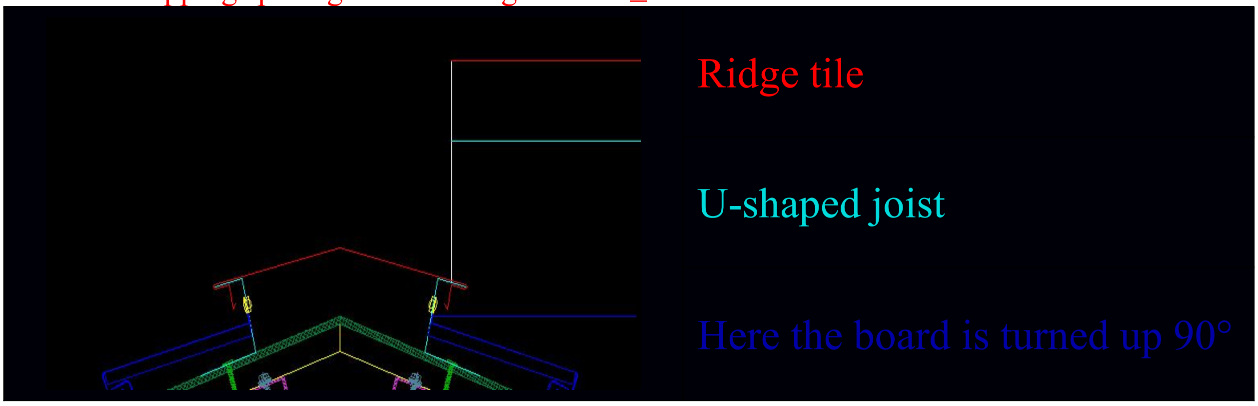
Nodes are professional architectural nodes, including cornices, gutters, parapets, flashing, roof ridges, roof facilities foundations and pipes extending out of the roof, etc.

"Closing", also called "closing edges", is to make up for the shortcomings of decorative surface decoration and increase the decorative effect by processing the edges, corners and connecting parts of the decorative surface. Closing is a crucial part of detail engineering in decoration engineering, and whether it can be closed well is related to the final effect of decoration.

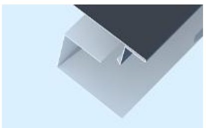
4.9.2 Ridge tile closing

4.9.2.1 Precautions

1. The overlapping spacing between the left and right sides of the U-shaped joist is 50mm.
2. The overlapping spacing between ridge tiles is ≥ 50 mm.



4.9.2.2 Procedure materials

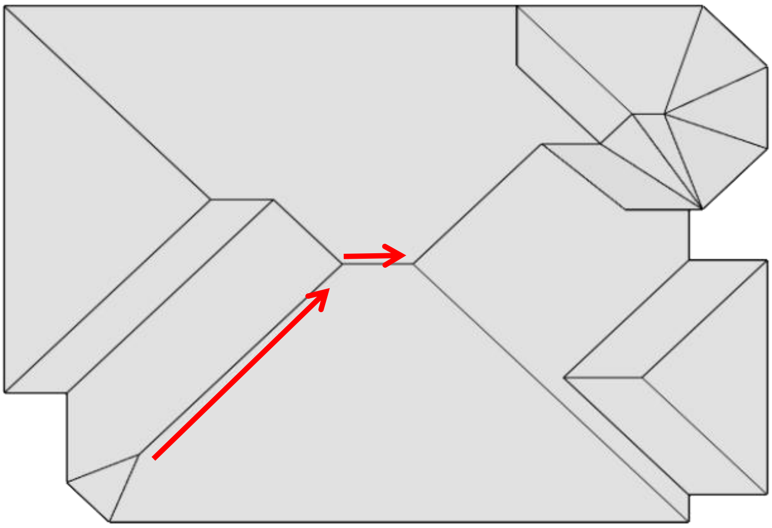
				
Ridge tile	U-shaped joist	Ridge tile head	Countersunk head tapping screw Diameter 4*50 mm	
See Bill of Materials No. 5	See Bill of Materials No. 22	See Bill of Materials No. 6	See Bill of Materials No. 25	

4.9.2.3 Using tools

				
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**	**Flanging pliers**
				
Electric tin snips	**Tin snips**	**Ink fountain**	**Laser level**	

4.9.2.4 Installation steps

1. Install from left to right at the positive ridge and from low to high at the sloping ridge.



2. The U-shaped joist is fixed at the flat ridge and sloping ridge according to the width of the ridge tile opening.

3. The first ridge tile of the flat ridge and sloping ridge is installed close to the tiles on both sides after the head is installed;

4. Hook the U-shaped joist on both sides with the flanging on both sides of the ridge tile.

4.9.3 Horizontal flashing closing

4.9.3.1 Precautions

1. The overlapping spacing between the left and right sides of the Z-shaped joist is 50mm
2. The overlapping spacing between the left and right sides of the horizontal flashing board is ≥ 50 mm.

4.9.3.2 Procedure materials

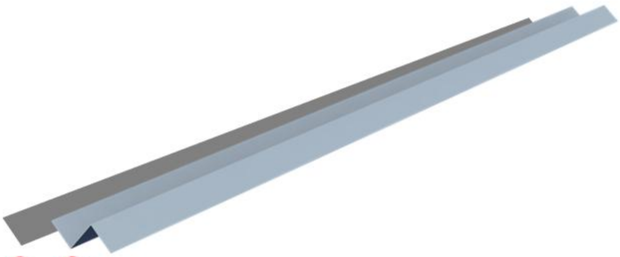
				
Horizontal flashing board	Z-shaped joist	Butyl tape	Countersunk head tapping screw Diameter 4*50 mm	Weatherproofing sealant
See Bill of Materials No. 10	See Bill of Materials No. 21	See Bill of Materials No. 16	See Bill of Materials No. 25	See Bill of Materials No. 26

4.9.3.3 Using tools

				
Pistol drill	**Cutting saw**	**Angle grinder**	**Steel tape**	**Flanging pliers**
				
Electric tin snips	**Tin snips**	**Ink fountain**	**Laser level**	**Glue gun**

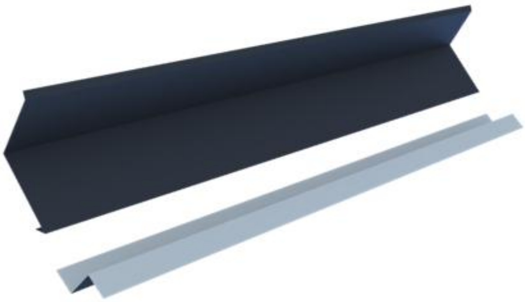
4.9.3.4 Installation steps

1. Cut butyl adhesive tape with the same length as the Z-shaped joist and stick it on the bottom of the Z-shaped joist; ② Butyl tape, ① Z-shaped joist.



② ①

2. Determine the position of the Z-shaped joist according to the width of the horizontal flashing board, and fix the Z-shaped joist with countersunk head tapping screws, with a fixed distance of ≤ 400 mm;

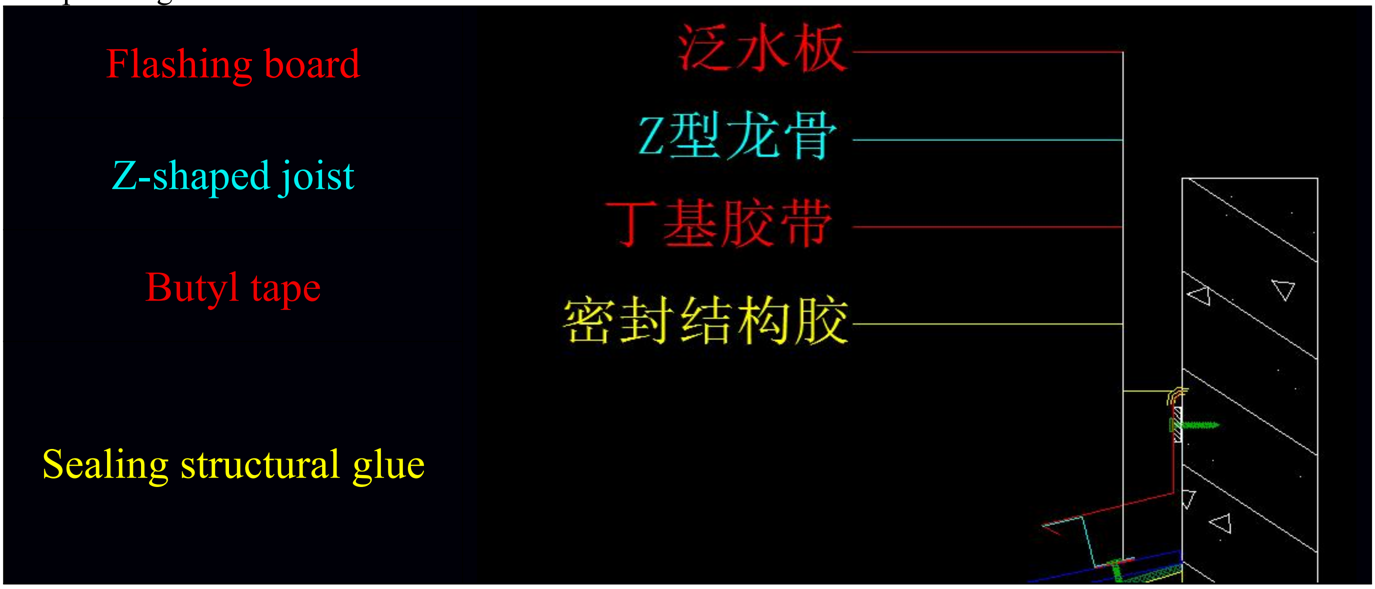


3. Cut butyl tape with the same length as the horizontal flashing board and stick it on the back;

4. Hook the Z-shaped joist with the flanging of the horizontal flashing board, and the flanging place is close to the external wall surface;

5. Fix the horizontal flashing board to the wall with countersunk tapping screws, with a fixed distance of ≤ 400 mm;

6. The junction between the horizontal flashing board and the external wall is treated with weatherproofing sealant.



4.9.4 Vertical flashing closing

4.9.4.1 Material tools

	
Weatherproofing sealant See Bill of Materials No.26	**Glue gun**

4.9.4.2 Installation steps

1. The gap between tiles and pre-installed vertical flashing boards is sealed with weatherproofing sealant, as shown in the yellow marked position in the picture below.