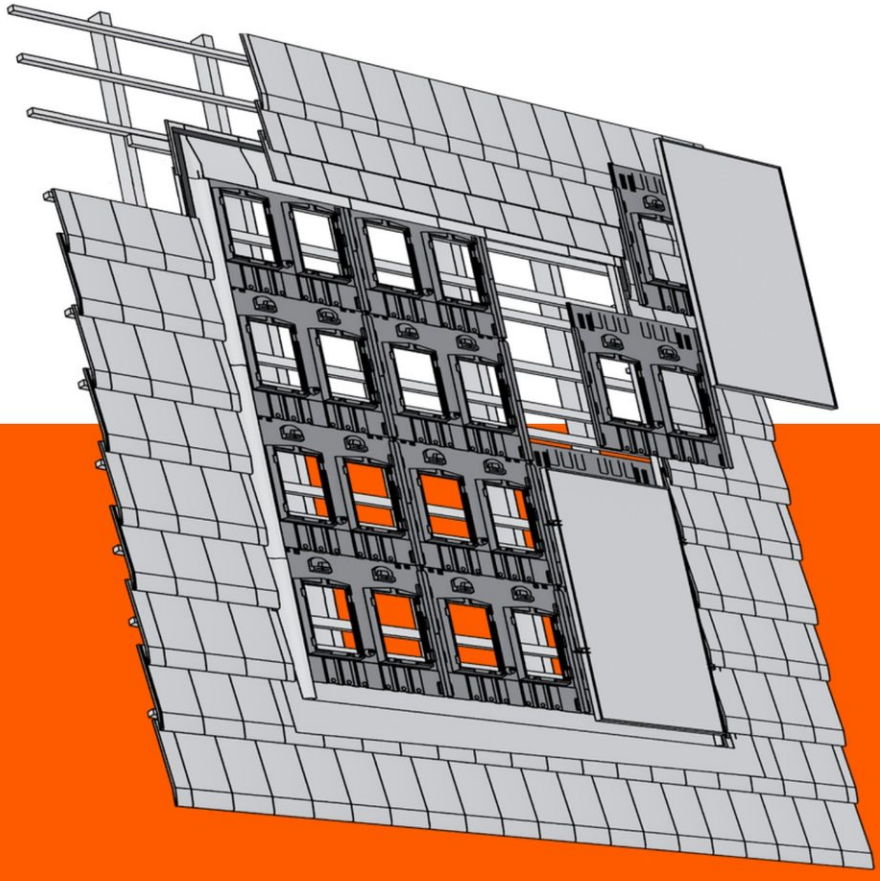
INSTALLATION
MANUAL

GSE
IN-ROOF SYSTEM PORTRAIT EVOLUTION

50mm width battens



www.gseintegration.com

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01

Introduction

Find the assembly video
and much more on CONNECTOR

INTRODUCTION

1 System presentation

The GSE IN-ROOF SYSTEM integrates photovoltaic modules into the roof covering, on new buildings and renovation projects, for small and large arrays. It is installed on timber roof structures, on a specific battening plan with **25 x 50 mm battens**. Use this manual together with the module manufacturer's instructions, particularly for cabling and electrical connections.

TWO VERSIONS **PORTRAIT EVOLUTION** | **LANDSCAPE EVOLUTION**



BATTEN
25 × 50 mm

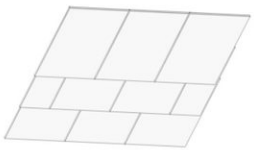


Interlocking tiles

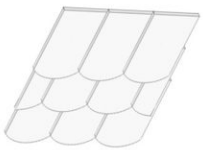


Slates

COMPATIBLE ROOF COVERINGS



Slate tiles



Flat tiles



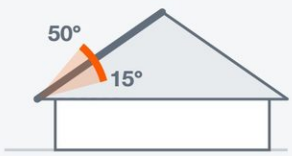
Flat tiles
interlocking tiles



Profile tiles
interlocking tiles

ROOF PITCH

15° – 50°



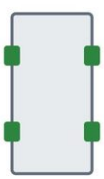
CERTIFICATION

Standard	**MCS 012**
Certificate	**KIWA00041**
Fire test	**B_{ROOF}(t4)**

COMPATIBLE MODULES

Check the module compatibility list in the **"Documents"** section of **CONNECTOR** before ordering.

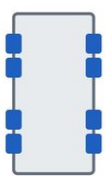
4 OR 8 CLAMPS PER MODULE: WHY?



4 clamps · standard

2.02 kN

Wind uplift resistance (MCS 012). Suitable when the project wind load stays below this value.



8 clamps · reinforced

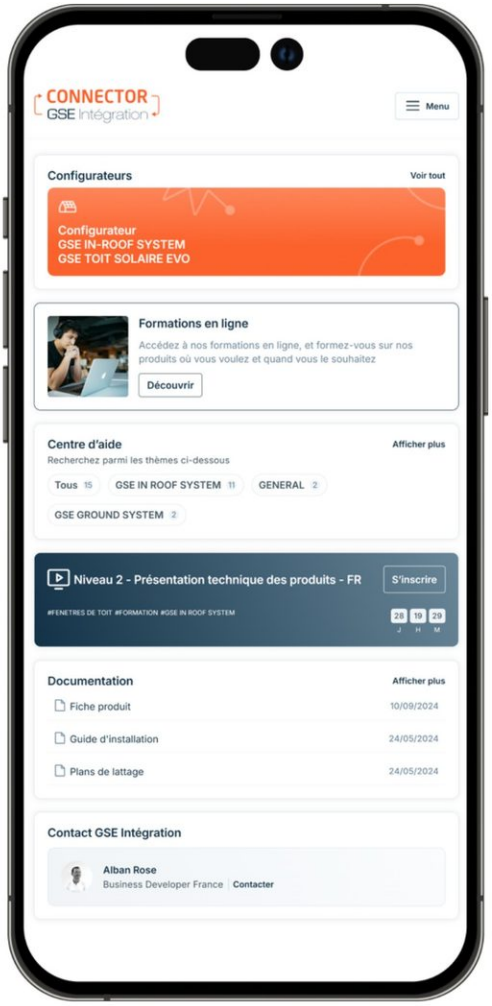
3.35 kN

Required when the wind load exceeds 2.02 kN: exposed sites, roof edges and corners, high ridges.

Wind load depends on location, altitude, terrain, ridge height, pitch and roof zone. Details in Field of use, p.09 to 10.

2 Before installation

Before starting the installation, make sure you have set up your project with CONNECTOR.



Setting up your project with CONNECTOR gives you the information you need to properly prepare the site and optimize the number of panels on your roof in one click.

- Optimize the number of modules on a given surface.
- Create the list of required materials.
- Automatically generate the system's complete configuration.
- Save time when preparing orders and quotations.

3 Training

Before undertaking any installation, you have to complete our online training module dedicated to the GSE IN-ROOF PORTRAIT SYSTEM EVOLUTION, which is available on our CONNECTOR platform as well as the in person training.

This training will enable you to:

- ✓ Understand the key installation steps in detail
- ✓ Learn best practices for quick and safe assembly
- ✓ Anticipate critical issues that may arise on site
- ✓ Reduce the risk of errors and non-compliance.

> Once qualified, it will activate the **ten-year warranty**.

3 Safety

Introduction

Safety on site is of paramount importance. Every installation technician must comply with the local regulations and use appropriate personal protective equipment.
GSE Intégration only supplies the mounting system and does not provide safety equipment.

We urge you to carefully read this manual in its entirety before commencing installation.

When installing the in-roof portrait system, pay particular attention to:

- ✓ Wearing gloves when installing metal components
- ✓ Wearing a hard hat on site
- ✓ Wearing safety goggles during cutting or drilling work
- ✓ Observing the local regulations and standards for lifting, handling and electrical connections.

02

Find the assembly video
and much more on CONNECTOR

Site Preparation

SITE PREPARATION

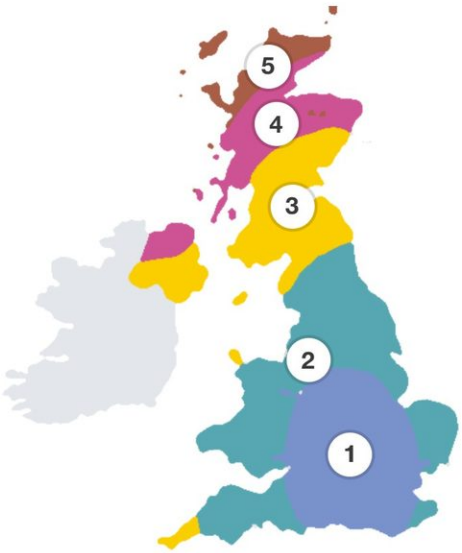
1 Field of use

The installer must proceed to a measurement work beforehand, in order to guarantee the durability and performance of the PV array installed. Climatic conditions of the project (ie. wind and snow[1]) and PV array layout should be considered according to current regulations (Eurocodes and BS 5534).

This data will help to check if the system is suitable for the project conditions. The thickness of the support battens must be adapted to the roof battens to ensure the junction with the roof covering is watertight.

Climatic conditions

Climatic load according to Eurocode 1 and BS 5534



Geographical wind zone	Wind speed (m/s)	Design wind pressure (kN/m²)
Zone 1	22	0,820
Zone 2	24	0,975
Zone 3	26	1,150
Zone 4	28	1,330
Zone 5	30	1,600

MAXIMUM DESIGN WIND UPLIFT RESISTANCE

3,44 kN/m²

According to MCS 012 KIWA00041 certificate

[1]The seismic resistance of the GSE IN-ROOF SYSTEM is validated on the whole European territory. This standard is not to be taken into account.

SITE PREPARATION

1 Field of use

Layout of the PV array

The position of the PV array on the roof affects the wind load value if it is in the centre, at the edge or at a corner. The most favourable location should be considered.



Wind uplift resistance

GSE IN-ROOF PORTRAIT SYSTEM wind uplift resistance according to MCS012 is :

- With 4 clamps per module : 2,02 kN
- With 8 clamps per module : 3,35 kN

To calculate the wind load on the PV array, you need to know the following parameters :

- **Location of the project**
- **Altitude**
- **Terrain category**
- **Distance from the shoreline**
- **Ridge height**
- **Roof pitch**
- **Roof zone (Centre, Edge, Corner)**
- **Wind zone**

Field of use

Example of cases

Project parameters

- Terrain category: **Country terrain** (including Town Terrain)
- Distance from the shoreline: **10 km**
- Battens dimension: **25 x 50 mm**

LEGEND **4 clamps** per module **8 clamps** per module required Zones: see map p.08

1st case: roof pitch = 25°

Ridge height	Location on the roof	Zone 1 Alt ≤ 250 m	Zone 2 Alt ≤ 200 m	Zone 3 Alt ≤ 130 m	Zone 4 Alt ≤ 100 m	Zone 5 Alt ≤ 50 m
6 m	Center	1,26 kN	1,38 kN	1,44 kN	1,58 kN	1,65 kN
	Edges	1,46 kN	1,60 kN	1,67 kN	1,83 kN	1,92 kN
	Corners	1,56 kN	1,72 kN	1,78 kN	1,96 kN	2,05 kN
8 m	Center	1,37 kN	1,51 kN	1,57 kN	1,72 kN	1,80 kN
	Edges	1,59 kN	1,75 kN	1,82 kN	2,00 kN	2,09 kN
	Corners	1,71 kN	1,87 kN	1,95 kN	2,14 kN	2,24 kN
10 m	Center	1,43 kN	1,57 kN	1,63 kN	1,79 kN	1,88 kN
	Edges	1,66 kN	1,82 kN	1,90 kN	2,08 kN	2,18 kN
	Corners	1,78 kN	1,95 kN	2,03 kN	2,23 kN	2,33 kN

2nd case: roof pitch = 35°

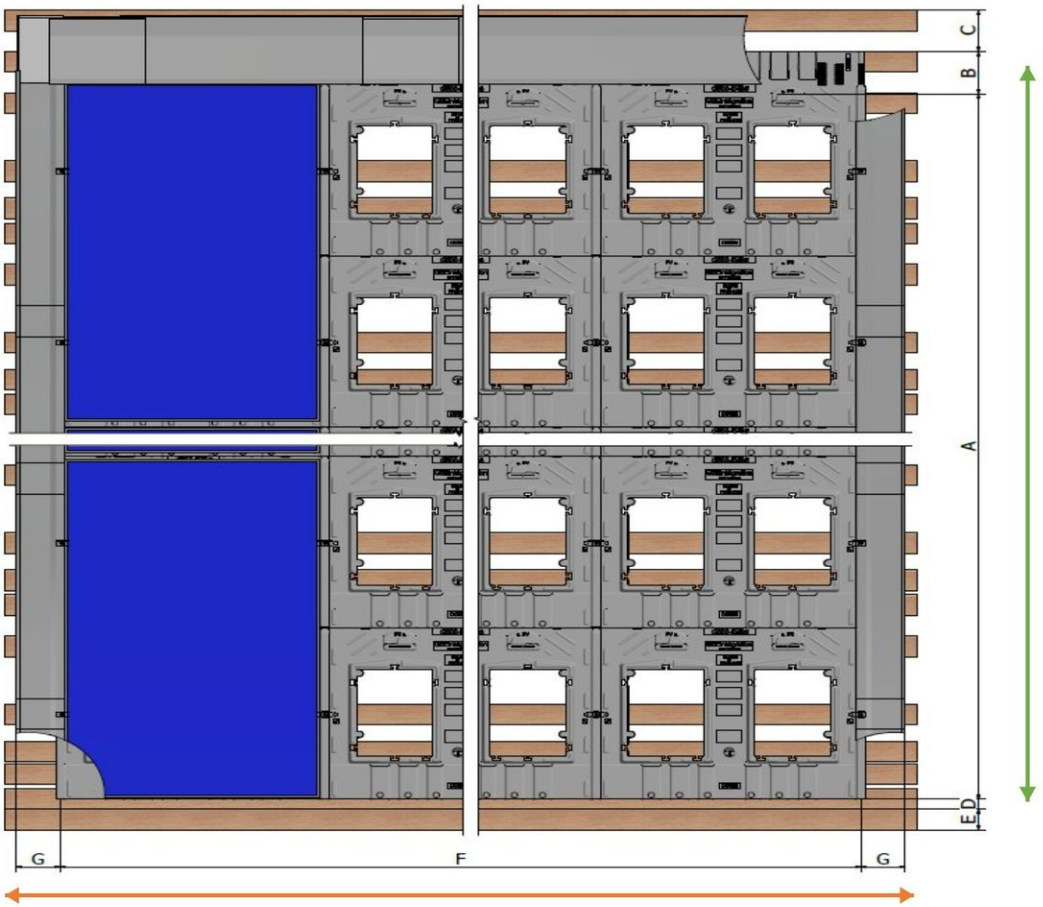
Ridge height	Location on the roof	Zone 1 Alt ≤ 250 m	Zone 2 Alt ≤ 200 m	Zone 3 Alt ≤ 150 m	Zone 4 Alt ≤ 100 m	Zone 5 Alt ≤ 50 m
6 m	Center	1,09 kN	1,19 kN	1,29 kN	1,36 kN	1,43 kN
	Edges	1,36 kN	1,49 kN	1,61 kN	1,71 kN	1,78 kN
	Corners	1,43 kN	1,57 kN	1,69 kN	1,79 kN	1,87 kN
8 m	Center	1,19 kN	1,30 kN	1,40 kN	1,49 kN	1,56 kN
	Edges	1,48 kN	1,63 kN	1,75 kN	1,86 kN	1,95 kN
	Corners	1,56 kN	1,71 kN	1,84 kN	1,95 kN	2,04 kN
10 m	Center	1,24 kN	1,36 kN	1,46 kN	1,55 kN	1,62 kN
	Edges	1,55 kN	1,69 kN	1,83 kN	1,94 kN	2,03 kN
	Corners	1,62 kN	1,78 kN	1,92 kN	2,04 kN	2,13 kN

GSE Intégration can do the calculation for you. Please contact our technical support through **contact@gseintegration.com**

SITE PREPARATION

2 Size of the PV array

The dimensions of the PV array can be calculated using the CONNECTOR tool.



Array height (mm) =

$$A + B + C + D + E^{**}$$

((Ref. Height + Graduation* + 10) x Nb. Lines) + 205 + 200 + 50 + 100² (Ref. Height + Graduation*)

*Graduation: see pages 20, 21 and 22

**If installed in the middle of the roof, add a 3rd batten (100mm wide) as an inclined batten to compensate the thickness of the tile.

Array width (mm) =

$$F + 2 \times G$$

((Ref. width + 40) x Nb. Columns) + (2 x 170)

PORTRAIT EVO FRAMES . REFERENCE DIMENSIONS

mm

Height ref	Width ref									
1650	995	1070	1100	1135	1140	1145	1160			
1840	995	1020	1030	1040	1045	1050	1070	1090	1100	1135
2030	995	1040	1050	1055	1135	1305				

03

Overview Of The System

Find the assembly video
and much more on CONNECTOR

Tools

In addition to your personal protective equipment, you will need:

Combi drill



⚠ Do not use an impact driver

⌀ 10 mm HSS drill bit



⚠ To drill the frames and flashings for the clamps fixing point

Hex bit - 8 mm



Scissors



Hammer



Tape measure



Chalk line



Flashing roller



Marking accessories



White marker, pencil, etc.

Sealant gun



For the MS polymer sealant

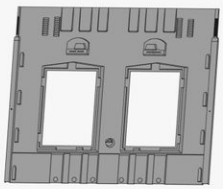
Flat-nose pliers



To form the lateral water barriers

System components

Half-frames



GSE IN-ROOF SYSTEM
Portrait Evolution frames

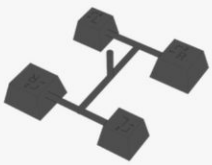
Clamps & screws



End clamps
+ EPDM wedge



Middle clamps
+ EPDM wedge



Wedges pack



GSE self-drilling screws
6.5 x 50, silver . for frames



GSE self-drilling screws
6.5 x 60, black . for clamps



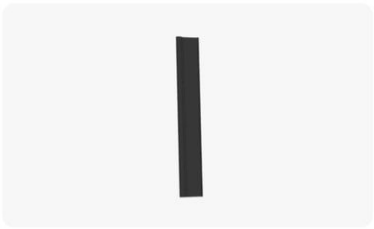
Screws for flashing hooks

⚠ Our screws have been tested for mechanical resistance and form part of the **warranty**.

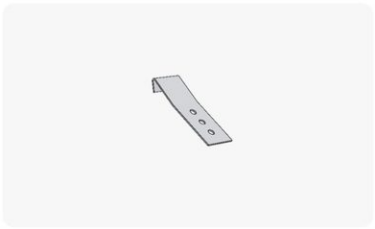
KIT PRESENTATION

2 System components

Lateral flashings



Lateral (side) flashing

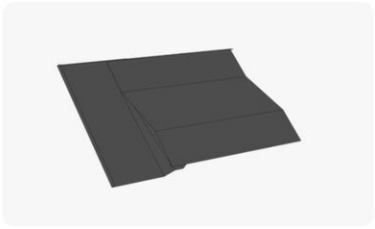


Flashing hooks with screws

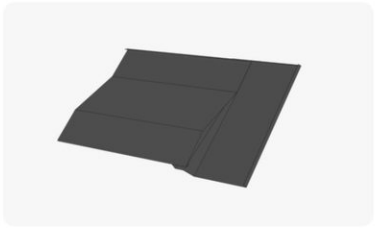
Rigid top flashings



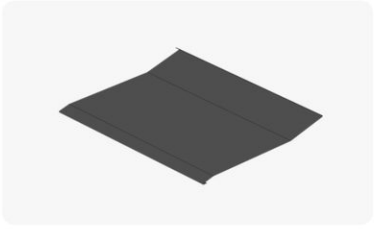
Top central flashing



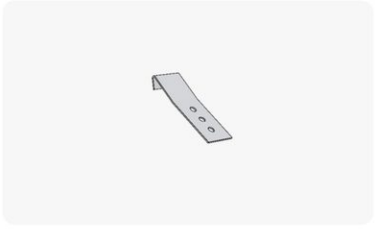
Top left corner flashing



Top right corner flashing



Top junction flashing



Flashing hook with screws

Foam



Pre-compressed foam

KIT PRESENTATION

2 System components

Bottom connection

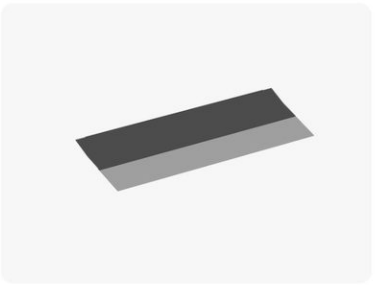


Flexible waterproofing strip

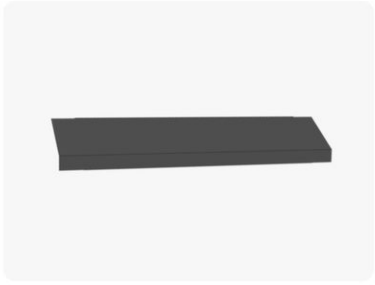
500 mm / 330 mm



Sealant



Semi-rigid flashing



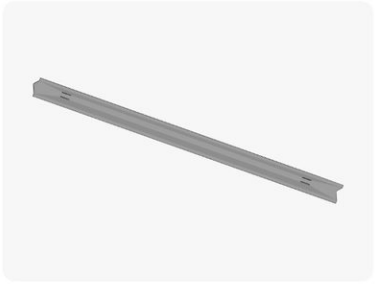
Drip flashing

Top connection with waterproofing strip



Flexible waterproofing strip

330 mm



Tile support



Tile support hook

04

Installation

Find the assembly video
and much more on CONNECTOR

04 INSTALLATION

Installation flowchart

Follow the steps from top to bottom. Where several options exist, choose the one that matches your project and go to the page shown.

1 — Support battens
Reference batten and support battens

- Interlocking tiles — p20
- OR
- Slates and flat tiles — p20

2 — Bottom connection
Choose according to tiles and array position

- OPTION 1 — Waterproofing strip — Mid roof — p24
- OR
- OPTION 2 — Semi-rigid flashing — Mid roof, pitch > 20° — p26
- OR
- OPTION 3 — Drip flashing — Gutter, pitch 25°-45° — p28

3 — Portrait half-frames
Bottom right corner

- Half-frames — p31

4 — Lateral flashings
Sides of the array

- Lateral flashings — p34
- AND
- OPTIONAL — Inter-column flashing — p35

5 — Cabling
Depending on the electrical design

- OPTION 1 — With microinverters — p37
- OR
- OPTION 2 — Without microinverters — p38

6 — PV modules
Modules and clamps

- PV modules and clamps — p40

7 — Top connection
Choose according to module thickness

- OPTION 1 — Rigid top flashing — Tiles, pitch ≥ 20°, 30 mm modules — p42
- OR
- OPTION 2 — Flexible waterproofing strip — All configurations — p43

8 — Roof covering
Foam on top and side Tiles around the array

- Connection to the roof covering — p46

Specific cases (non-rectangular arrays)

- Inner corners — p48
- Outer corners — p49

04.1

Positioning the support battens

Find the assembly video
and much more on CONNECTOR

Positioning the support battens

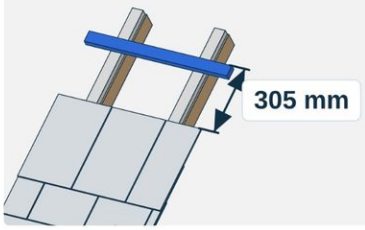
Battening plan portrait half frames 1650-XXXX

BATTEN WIDTH
50 mm

1 Fix the reference batten depending on your roof coverings

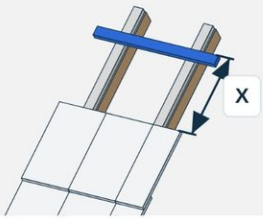
Measure from the roof edge to the top of the reference batten

A For slate

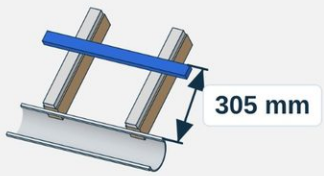


B For interlocking tiles

Roof pitch 20° to 50° **X = 435 mm**
Roof pitch 15° to 19° **X = 535 mm**

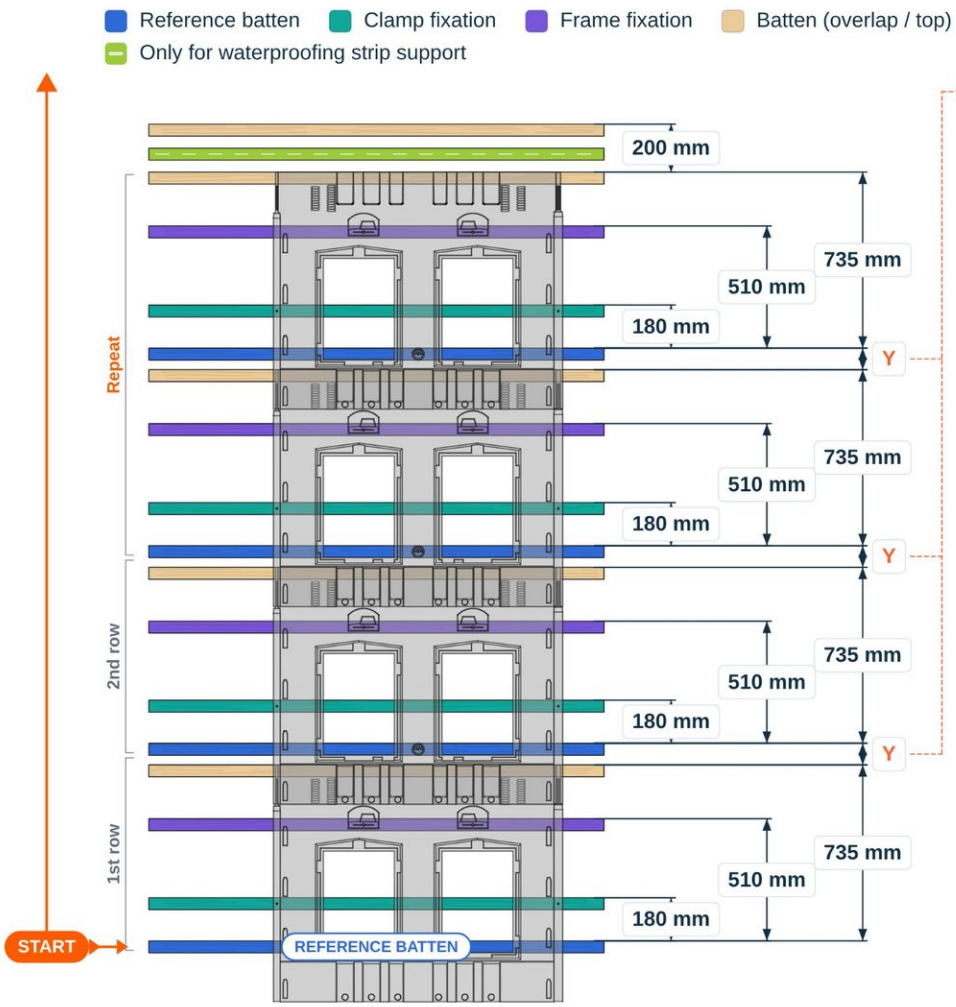


C Into gutter



2 Install the next battens

All measurements are taken from the top of the reference batten



Y TABLE

Module length	Y
1650 mm	95 mm
1660 mm	100 mm
1670 mm	105 mm
1680 mm	110 mm
1690 mm	115 mm
1700 mm	120 mm
1710 mm	125 mm
1720 mm	130 mm
1730 mm	135 mm
1740 mm	140 mm
1750 mm	145 mm
1760 mm	150 mm
1770 mm	155 mm
1780 mm	160 mm
1790 mm	165 mm
1800 mm	170 mm

Example: module 1762 mm

Y = 150 mm

(rounded to the nearest value)

GSE Intégration

Positioning the support battens

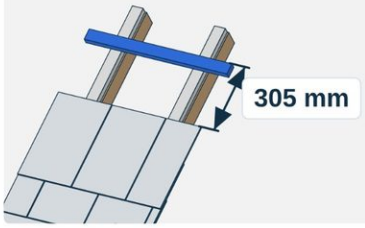
Battening plan portrait half frames 1840-XXXX

BATTEN WIDTH
50 mm

1 Fix the reference batten depending on your roof coverings

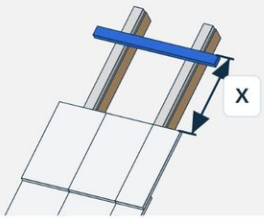
Measure from the roof edge to the top of the reference batten

A For slate

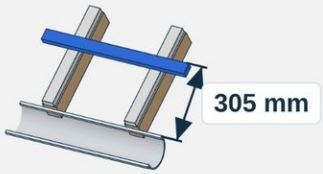


B For interlocking tiles

Roof pitch 20° to 50° **X = 435 mm**
Roof pitch 15° to 19° **X = 535 mm**

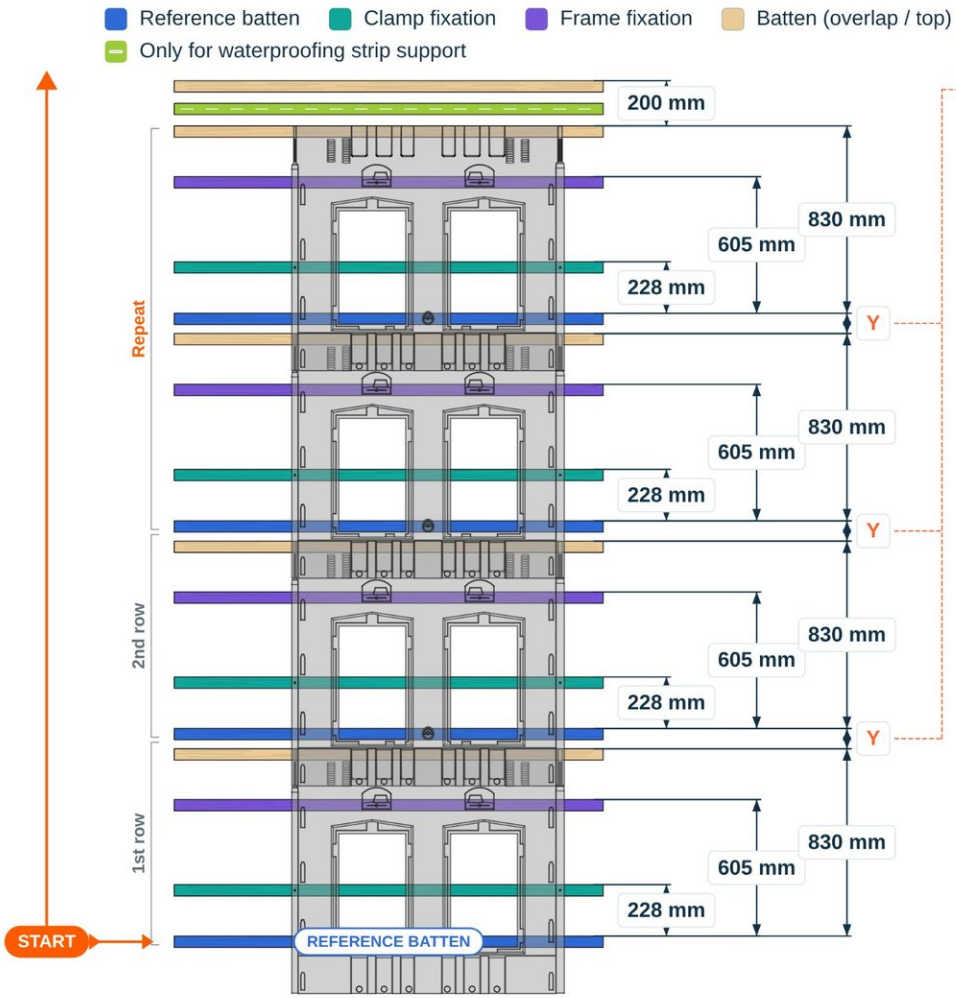


C Into gutter



2 Install the next battens

All measurements are taken from the top of the reference batten



Y TABLE

Module length	Y
1840 mm	95 mm
1850 mm	100 mm
1860 mm	105 mm
1870 mm	110 mm
1880 mm	115 mm
1890 mm	120 mm
1900 mm	125 mm
1910 mm	130 mm
1920 mm	135 mm
1930 mm	140 mm
1940 mm	145 mm
1950 mm	150 mm
1960 mm	155 mm
1970 mm	160 mm
1980 mm	165 mm
1990 mm	170 mm

Example: module 1864 mm

Y = 105 mm

(rounded to the nearest value)

GSE Intégration

Positioning the support battens

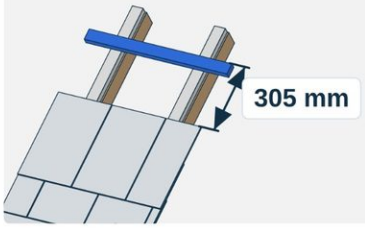
Battening plan portrait half frames 2030-XXXX

BATTEN WIDTH
50 mm

1 Fix the reference batten depending on your roof coverings

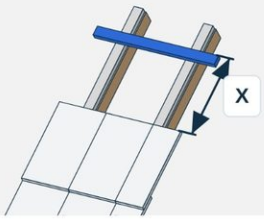
Measure from the roof edge to the top of the reference batten

A For slate

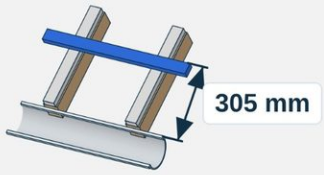


B For interlocking tiles

Roof pitch 20° to 50° **X = 435 mm**
Roof pitch 15° to 19° **X = 535 mm**

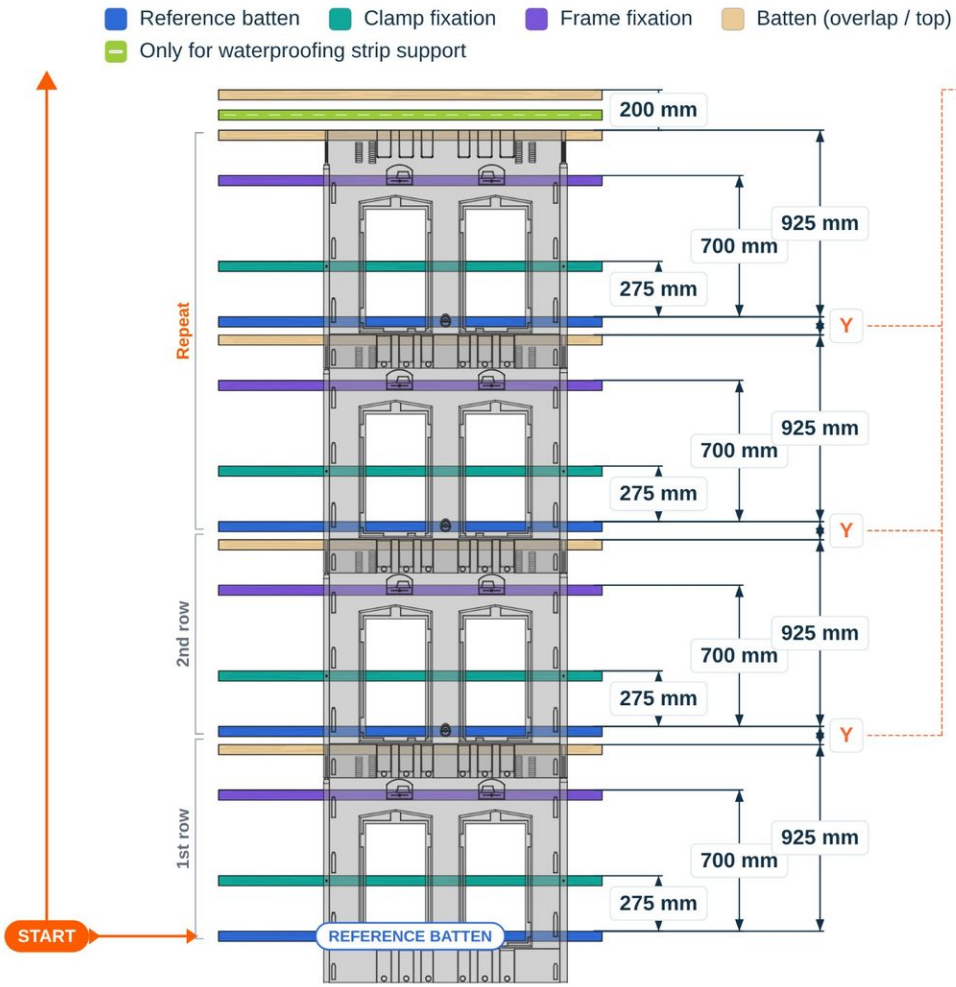


C Into gutter



2 Install the next battens

All measurements are taken from the top of the reference batten



Y TABLE

Module length	Y
2030 mm	85 mm
2040 mm	90 mm
2050 mm	95 mm
2060 mm	100 mm
2070 mm	105 mm
2080 mm	110 mm
2090 mm	115 mm
2100 mm	120 mm
2110 mm	125 mm
2120 mm	130 mm
2130 mm	135 mm
2140 mm	140 mm
2150 mm	145 mm
2160 mm	150 mm
2170 mm	155 mm
2180 mm	160 mm

Example: module 2063 mm

Y = 100 mm

(rounded to the nearest value)

GSE Intégration

04.2

Installation Of Bottom Connection

Find the assembly video
and much more on CONNECTOR

2 Flexible waterproofing strip, mid roof

3 bottom connection options are available

OPTION 1 This page
Waterproofing strip
Mid roof installation

OPTION 2 Page 26
Semi-rigid flashing
Mid roof, pitch above 20°

OPTION 3 Page 28
Drip flashing
Gutter, pitch 25° to 45°

COMPONENTS



Flexible waterproofing strip



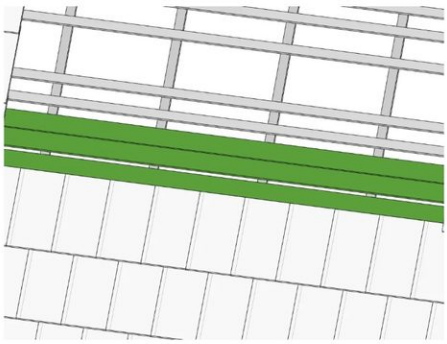
MS polymer sealant

TOOLS



Flashing roller

1 Install the support battens

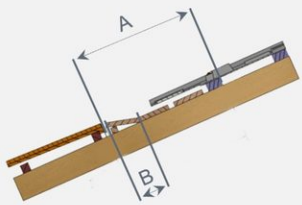


Fix **2 support battens** at least **7 mm thinner** than the system battens, plus one **inclined batten**, except on slate roofs.
For **flat interlocking tiles**, install the inclined batten flush with the tiles.

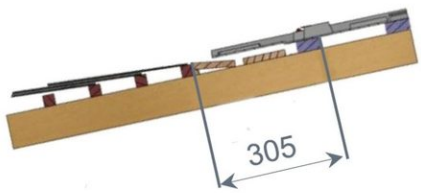
Width of the inclined batten and of the waterproofing strip

The distance A (reference batten to tiles), the minimum width of the inclined batten (B) and of the waterproofing strip depend on the roof pitch.

Roof pitch	Min. distance ref. batten to tiles	Min. width of inclined batten	Min. strip width
15° to 19°	A = 535 mm	B = 200 mm	**560 mm**
20° to 50°	A = 435 mm	B = 100 mm	**500 mm**



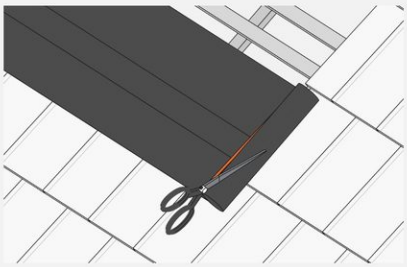
For slates, use a **330 mm** wide flexible waterproofing strip to ensure the correct overlap. **Fix 2 support battens.**



2 Flexible waterproofing strip, mid roof (continued)

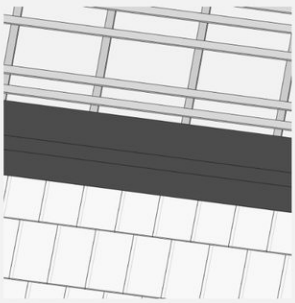
⚠ The roof covering and the substrates receiving the strip must be **clean, dry, free of grease and dust** and in good condition (no moss, no cracks).

2 Cut the strip



Cut the strip to the length of the PV array, leaving **200 mm on each side**. Where the run exceeds one roll, overlap the two strips by **100 mm minimum** and bond the overlap with **MS polymer sealant.**

3 Bond the strip



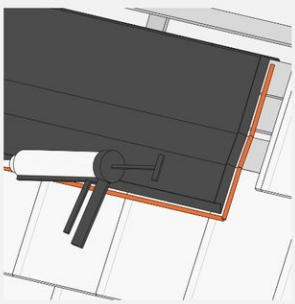
Remove the top liner and stick the strip to the support battens. Then remove the bottom liner, stick it and dress it to the tiles.

4 Fold the edges



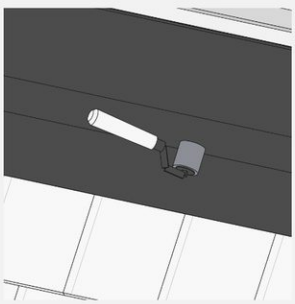
Make a fold of **20 mm** along the top and sides to prevent water ingress.

5 Apply sealant bead



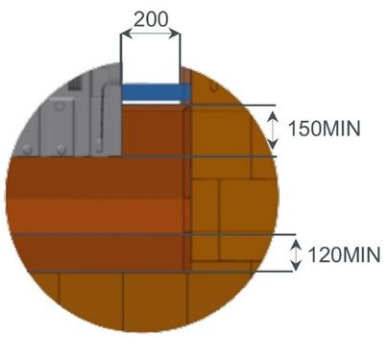
Apply MS Polymer sealant along **all edges** of the waterproofing strip.

6 Roll the strip



Roll the whole width with a flashing roller, **including the sealant bead**.

Overlaps to respect



Once the half-frames are installed (next step), check the minimum overlaps: **200 mm** beyond the frames on each side, **150 mm** of strip under the frames and **120 mm** of strip over the tiles.

2 Semi-rigid flashing, mid roof

3 bottom connection options are available

OPTION 1 Page 24
Waterproofing strip
Mid roof installation

OPTION 2 This page
Semi-rigid flashing
Mid roof, pitch above 20°

OPTION 3 Page 28
Drip flashing
Gutter, pitch 25° to 45°

⚠ This bottom connection is only possible on roof pitches **above 20°**, with **flat interlocking or low-curved tiles**.

COMPONENTS


Semi-rigid flashing


Sealant


Fixing screws

TOOLS


Flashing roller

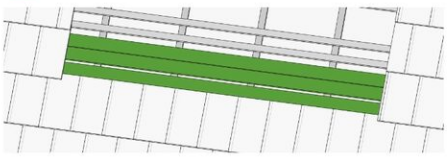

Flat-nose pliers


Scissors


Sealant gun


Combi drill

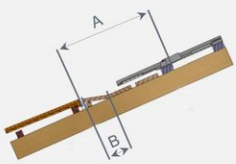
1 Install the support battens



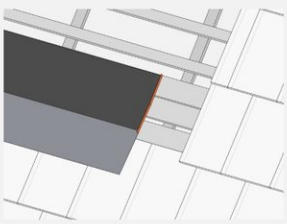
Fix **2 support battens** at least **7 mm thinner** than the system battens, plus an **inclined batten**. Position the reference batten according to the table below.

The width of the inclined batten (B) defines the distance (A) between the reference batten and the first row of tiles.

Roof pitch	Min. width of inclined batten	Min. distance ref. batten/tiles
20° to 50°	B = 100 mm	A = 435 mm

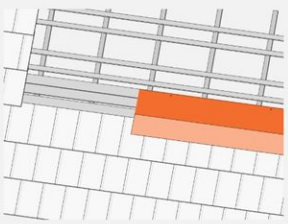


2 Form the right angle



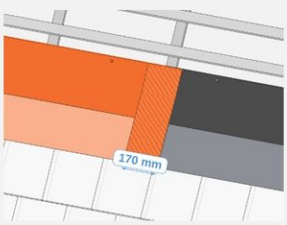
Bend the **2 cm** overhang with flat-nose pliers to form a lateral water barrier. Leave a **2–3 mm** gap: do not press it flat.

3 Position the flashings



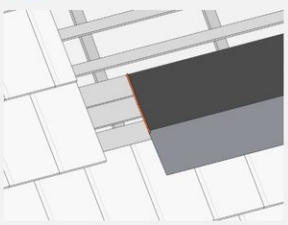
Position the flashings **from right to left**. Fix them to the support battens at their fixing lugs.

4 Seal and overlap



Apply **2 sealant beads** on the left side of the first flashing. Place the next one until the top clips touch: overlap **170 mm**.

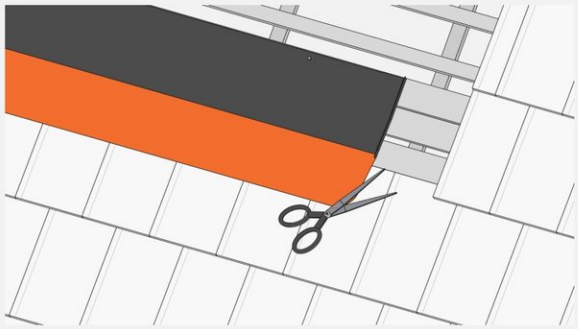
5 Create the left-hand corner



Cut the last flashing to length at the left end. Bend the edge by **2 cm** to form a lateral water barrier, leaving a **2–3 mm** gap.

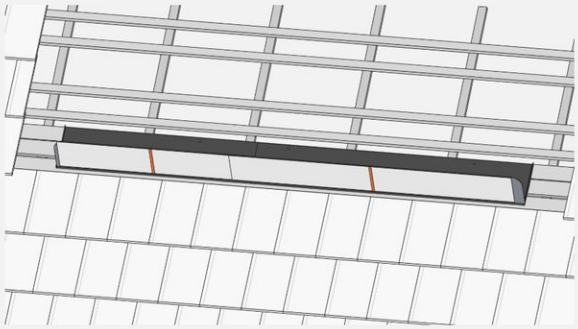
2 Semi-rigid flashing, mid roof (continued)

6 Round off the edges



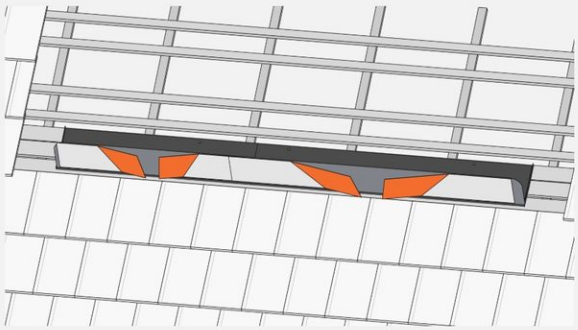
Round off each edge of the waterproofing strip with scissors.

7 Cut the protective film



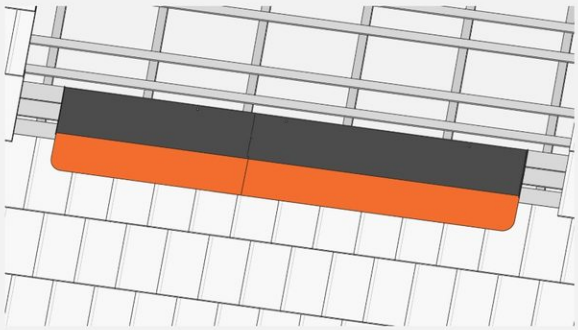
From the centre of each flashing, cut the white protective film on the back. **Be careful not to slice through the waterproofing strip.**

8 Peel off the film



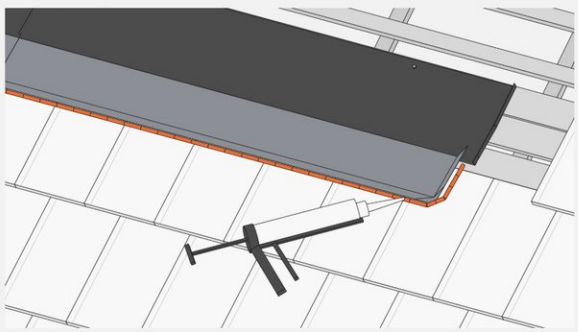
Peel the protective film off in a straight line.

9 Stick the flashing



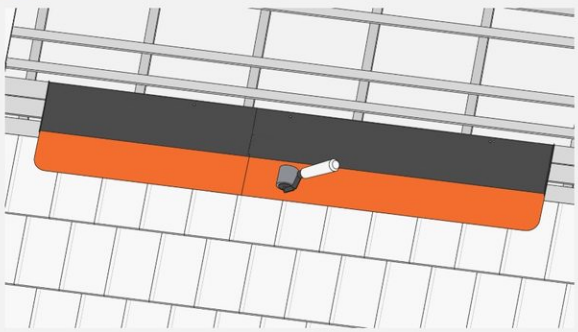
Stick the flashing onto the tiles. Tiles must be **clean, dry and dust-free**.

10 Seal the edges



Apply sealant along **all edges** of the waterproofing strip.

11 Roll the strip



Roll over the whole waterproofing strip **with a flashing roller**.

2 Drip flashing, gutter installation

3 bottom connection options are available

OPTION 1 Page 24
Waterproofing strip
Mid roof installation

OPTION 2 Page 26
Semi-rigid flashing
Mid roof, pitch above 20°

OPTION 3 This page
Drip flashing
Gutter, pitch 25° to 45°

⚠ This bottom connection is only possible on roof pitches **between 25° and 45°.**

COMPONENTS



GSE drip flashing



Flashing hooks



Fixing screws

TOOLS



Flat-nose pliers

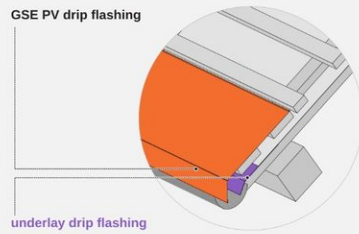


Combi drill

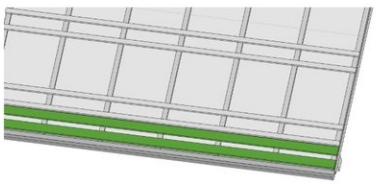
Drip flashing for a gutter installation

When the PV array is installed directly at the gutter, it is connected to the gutter with 2 drip flashings:

- **GSE drip flashing** for the PV array
- **Drip flashing for the roof underlay** (not supplied by GSE Intégration)

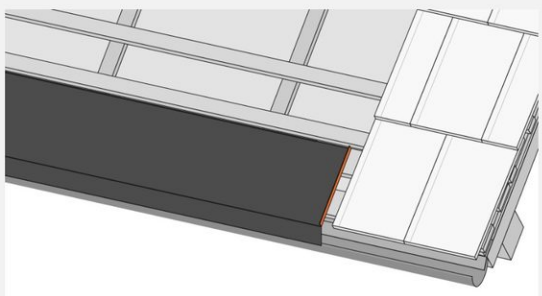


1 Install the support battens



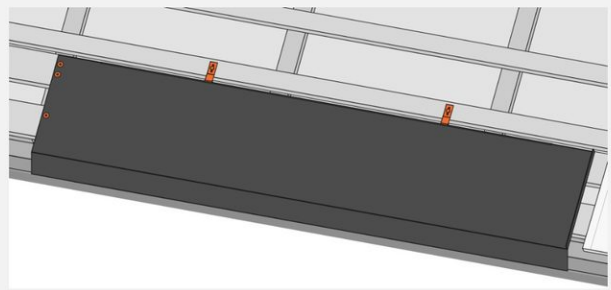
Fix **2 support battens** for the drip flashings between the **reference batten** and the **gutter**, at least **7 mm thinner** than the system battens.

2 Form the right angle



Bend the **2 cm** overhang with flat-nose pliers to form a lateral water barrier. Do not flatten it completely: leave a **2–3 mm** gap.

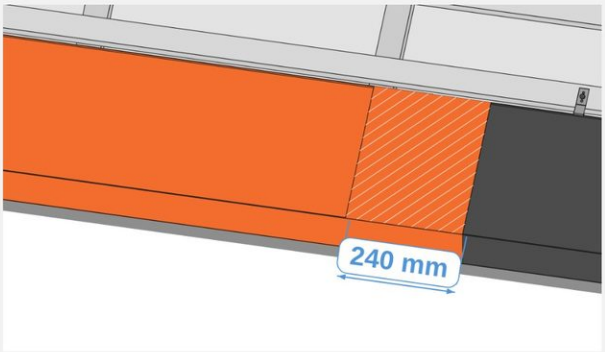
3 Position the 1st drip flashing



Place it at the **bottom right corner** of the PV array. Fix it with **3 screws** to the support battens and **2 flashing hooks**.

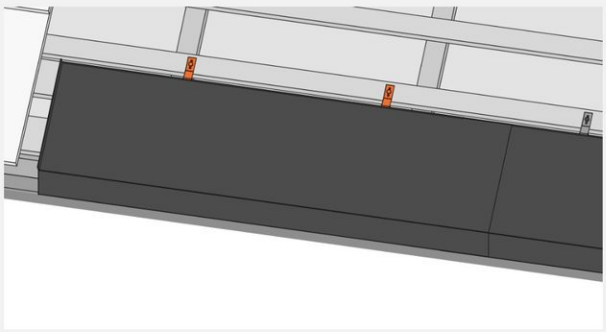
2 Drip flashing, gutter installation (continued)

4 Position the next drip flashings



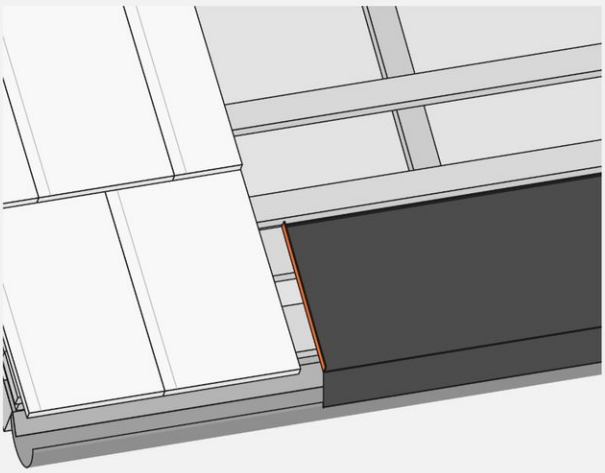
Place them side by side until the top clips touch. The overlap between 2 flashings is then **240 mm**.

5 Fix the next drip flashings



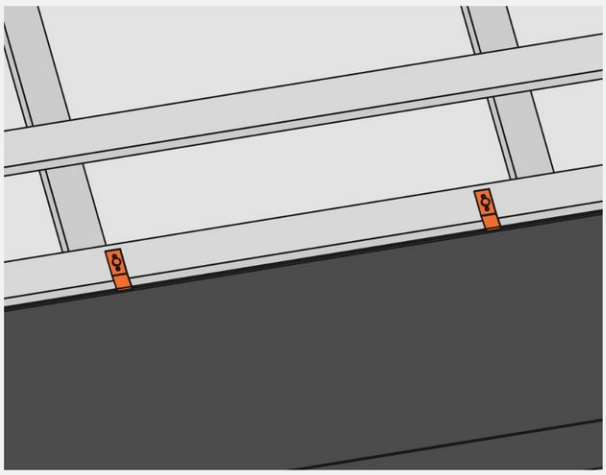
Fix each one with **3 screws** to the support battens and **2 flashing hooks**.

6 Create the left-hand corner



Cut the last flashing at the left end of the array to the required length. Make a **20 mm** side fold as a lateral water barrier.

7 Fix the last drip flashing



Fix the last drip flashing with **2 flashing hooks**.

04.3

Installation Of The Half Frames

Find the assembly video
and much more on CONNECTOR

INSTALLATION

3 Installing the portrait half-frames

COMPONENTS



Half-frame



Screws 6.5 x 50

TOOLS

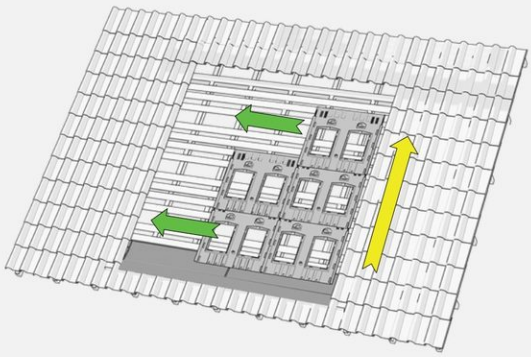


Combi drill

1

Position of the portrait half-frames

Install the half-frames **row by row**, working **right to left** and **bottom to top**. Position the first frame at the bottom right of the PV array.



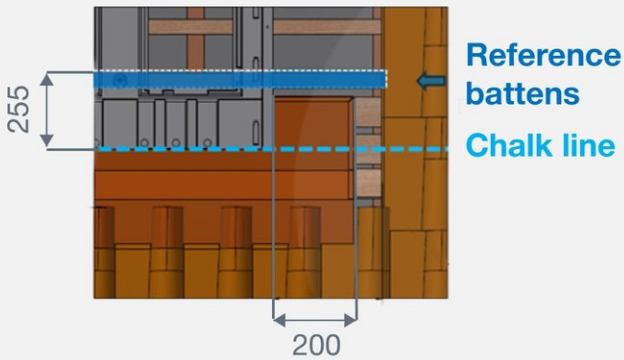
Horizontal mounting direction

Vertical mounting direction

Align it **vertically** using the reference batten: the base of the frame must be **255 mm** from the top of the reference batten,

Align it **horizontally 200 mm from the edge of the bottom connection.** Make sure that it is straight.

You can mark the bottom of the first row with a chalk line, at **255 mm from the top of the reference batten.**



3 Installing the portrait half-frames

2

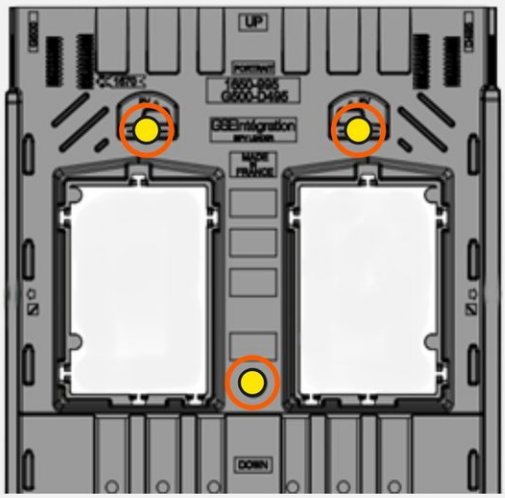
Fixing the portrait half-frames

Fix the 1st half-frame at its **three fixing points** with the GSE Intégration silver screw 50mm length.

⚠ Avoid driving the screws too far, as this may deform the frame.



⚠ Do not drill in the drainage areas or on the support pad of the half-frame. Doing so can damage the system and its watertightness.



3 fixing points per half-frame

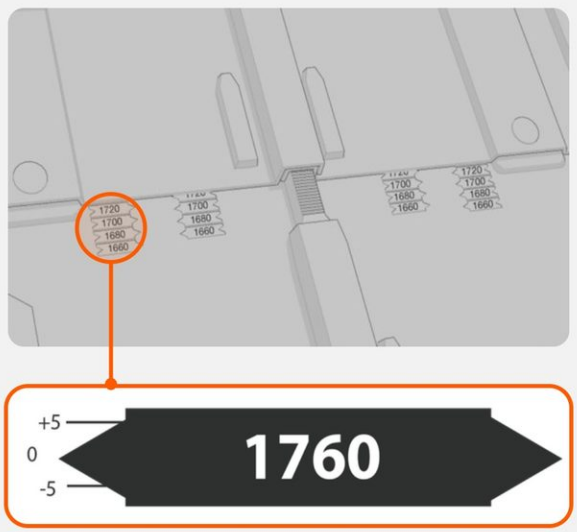
3

Connecting the half-frames

Assemble the remaining frames in the first row horizontally. Fix each frame at its three fixing points.

Assemble the half-frames of the upper rows **using the graduation marks according to the length of the PV module.**

Fix each half-frame at its three fixing points.



04.4

Installation Of Lateral Flashing

Find the assembly video
and much more on CONNECTOR

INSTALLATION

4 Installing the lateral flashings

COMPONENTS



Lateral flashing



Hooks + screws



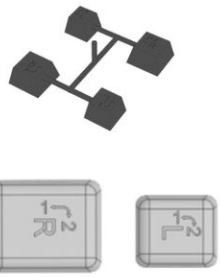
Wedges

TOOLS

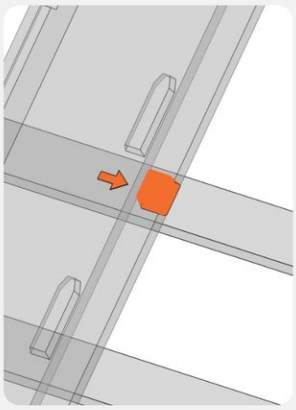


Combi drill

1 Install the wedges

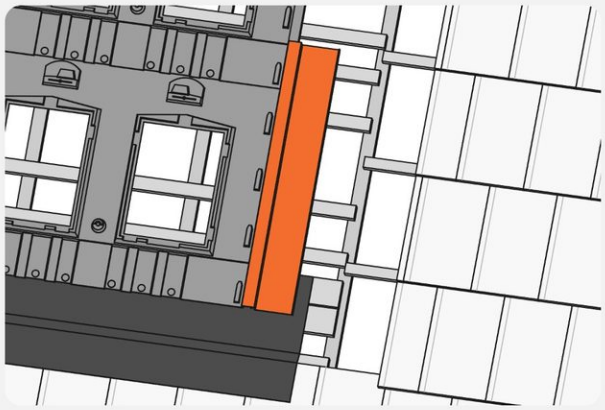


R: right edge . L: left edge



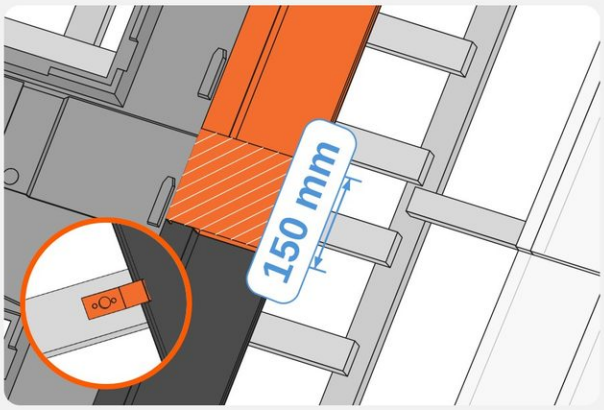
Install the wedges beneath the corrugations at the **left and right edges** of the PV array, as indicated on the half frames by the arrow.

2 Bottom position



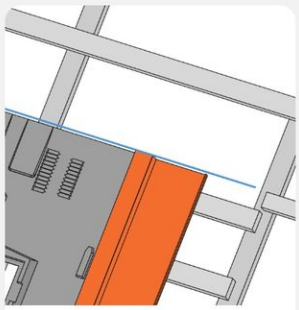
Align the lateral flashing with the **bottom of the half-frame**.

3 Position the lateral flashings

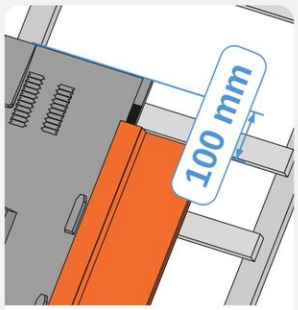


Place the lateral flashings at the right and left ends of the array, **from bottom to top**.
Overlap min. 150 mm between flashings. Fix each one with **2 hooks**.

4 Top position



Waterproofing strip



Rigid top flashing

Waterproofing strip: flush with the top of the frames.
Rigid top flashing: 100 mm from the top of the half-frame.

4 Installing the lateral flashings

COMPONENTS

Inter-column flashing

5

Inter-column flashing OPTIONAL

Place the inter-column flashings from bottom to top on the frames' corrugations. Overlap between 2 flashings is of minimum 150mm.



04.5

Cabling And PV Module Positioning

Find the assembly video
and much more on CONNECTOR

5 With microinverters

To install the PV modules, 2 options are available

OPTION 1 This page

With microinverters

Install the microinverters, do the cabling, then install and fix the PV modules

OPTION 2 Page 38

Without microinverters

Place the PV modules and do the cabling, then fix the PV modules

1 Installing the microinverters

Attach them to a batten through the central hole of the PORTRAIT EVOLUTION half-frames.
Connect the microinverters using the connection cables, which must pass **beneath the half-frames**.



⚠ Follow the inverter, microinverter, and module manufacturers' guidelines, and comply with local regulations

2 Cabling

Route all cables **beneath the half-frames** using the cable management clips, ensuring they are protected and properly secured.

5 Without microinverters

To install the PV modules, 2 options are available

OPTION 1 Page 37

With microinverters

Install the microinverters, do the cabling, then install and fix the PV modules

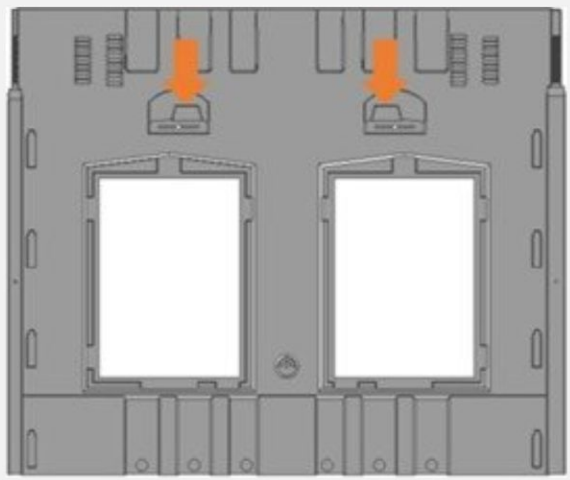
OPTION 2 This page

Without microinverters

Place the PV modules and do the cabling, then fix the PV modules

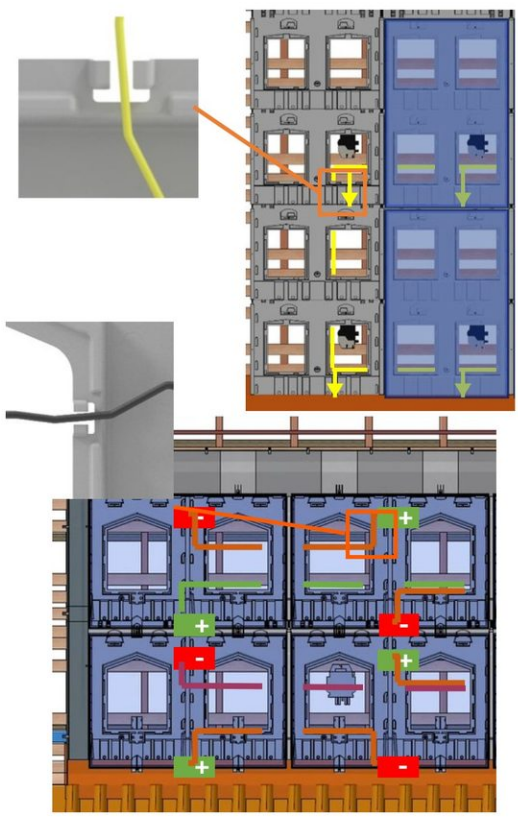
1 Positioning the PV modules

Position the modules so that **they rest on the PV hanging pods** and sit against the upper stops to prevent any slipping



2 Wiring the PV modules

To connect the PV modules, route the cables **beneath the frames** using the cable management clips.
A jumper may be needed.



⚠ Follow the inverter, microinverter, and module manufacturers' guidelines, and comply with local regulations

04.6

Installation Of PV Modules

Find the assembly video
and much more on CONNECTOR

6 Installation of the PV modules

COMPONENTS



End clamps



Middle clamps



Screws 6.5 x 60

TOOLS



Combi drill

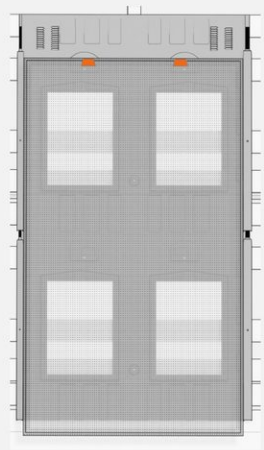


Ø10 mm HSS drill bit

1

Positioning the PV modules

Position the modules so that **they rest on the PV hanging pods** and sit against the upper stops to prevent any slipping



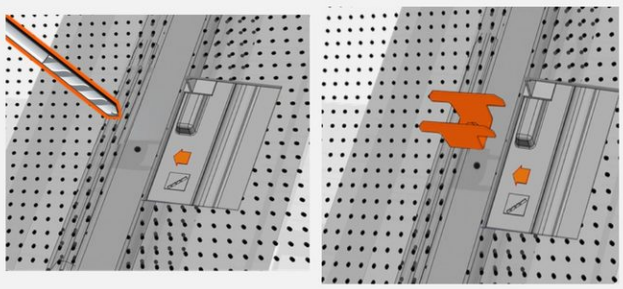
2

Place the clamps (end clamps or middle clamps) in its intended position as identified on the half frames by the arrow, and **mark the drilling point.**

Drill with a **Ø10mm** HSS Drill bit

⚠ Depending of your site you may use 8 clamps

⚠ Ensure the PV modules are properly centered horizontally between the two half-frames.

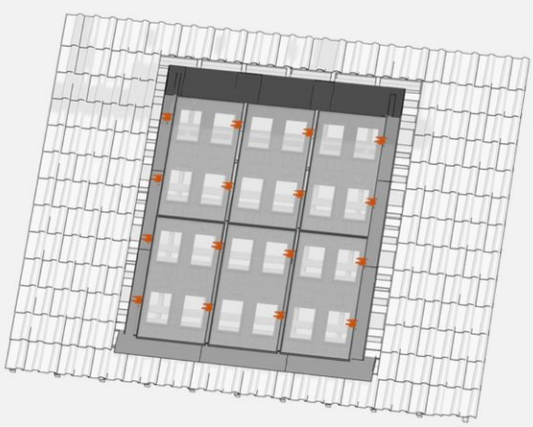


3

Clamp fixing

Fix the clamps using the **GSE black 60 mm screws**, tightening until the clamp touches the frame of the PV module.

⚠ **DO NOT** use an impact driver to fix the clamps. Use a standard combi drill (with adjustable speed and torque) to ensure the clamps remain securely in place over time.



04.7

Installation Of Top Connection

Find the assembly video and much more on CONNECTOR

7 Rigid top flashing, 30 mm PV modules

2 top connection options are available

OPTION 1 Described on this page

Rigid top flashing

For PV modules **30 mm** thick

OPTION 2 Page 43

Waterproofing strip

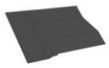
Flexible strip over the top of the frames

⚠ Only possible **on tiles**, on roof pitches **≥ 20°**, with PV modules **30 mm** thick.

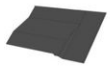
COMPONENTS



Top central flashing



Top left corner



Top right corner



Junction piece



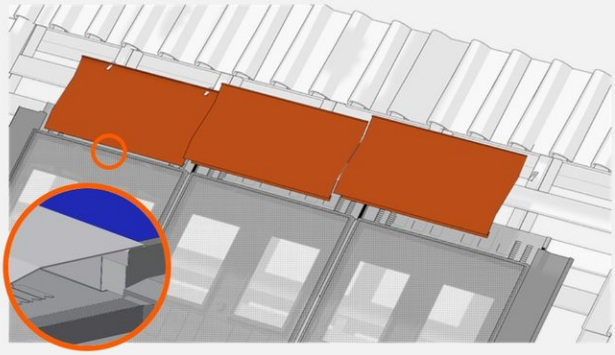
Flashing hook

TOOLS



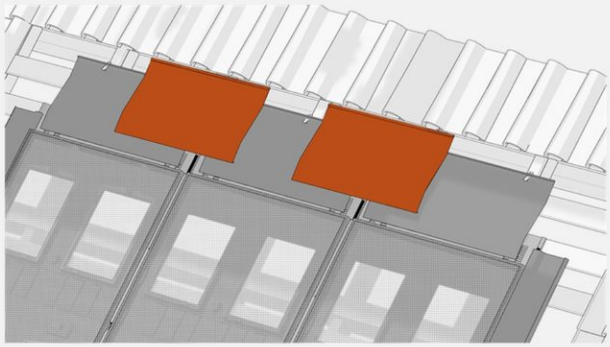
Combi drill

1 Position the top flashings



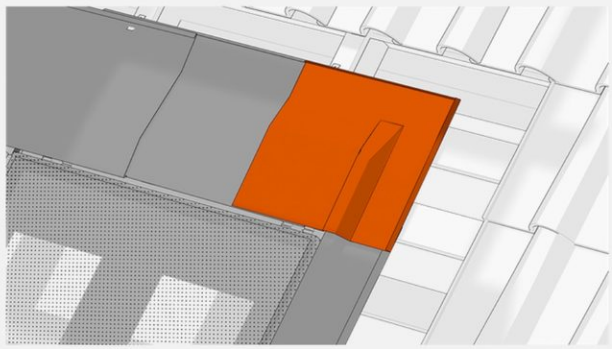
Position **one top flashing per half-frame** on the top row and interlock it with the PV module.

2 Position the junction pieces



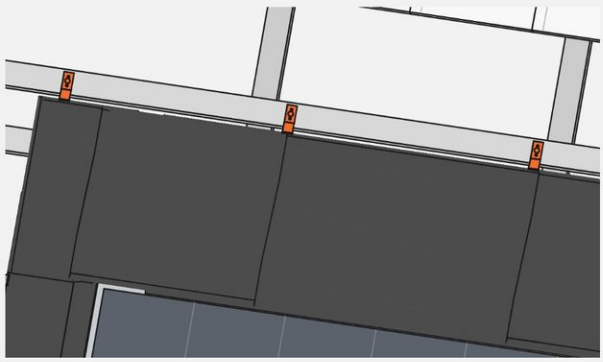
Slide the junction pieces into the central flashings.

3 Position the corner flashings



Place the corner flashings on the lateral flashings and slide them into the folds of the central flashings at the edges of the PV array.

4 Secure the flashings



Secure all the flashings with at least **2 hooks** on each of the overlaps.

7 Flexible waterproofing strip, top of the array

2 top connection options are available

OPTION 1 Page 42

Rigid top flashing

For PV modules **30 mm** thick

OPTION 2 Described on this page

Waterproofing strip

Flexible strip over the top of the frames

COMPONENTS



Waterproofing strip 330 mm



Tile support



Tile support hook

TOOLS



Scissors

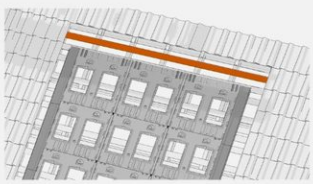


Flashing roller



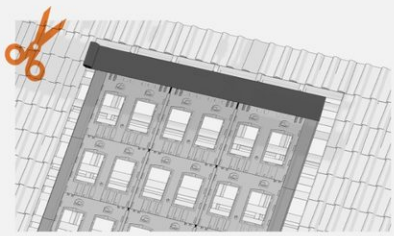
Combi drill

1 Add the support batten



Fix the support batten **between the 2 last battens**, to support the waterproofing strip.

2 Unroll, cut and stick the strip

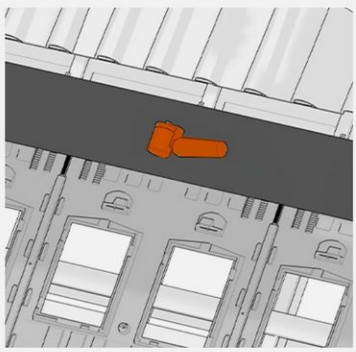


Unroll, cut and stick the flexible waterproofing strip on the support battens and the frames at the top of the array.

Minimum **under-tile overlap of 100 mm**, increased to 120 mm for curved tiles.

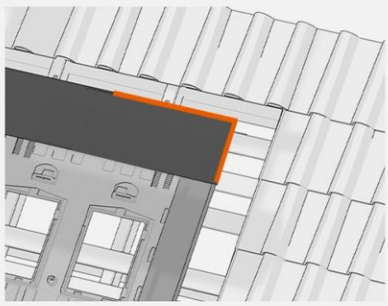
150 mm vertical overlap of the strip at the top of the frames.

3 Remove the film and roll



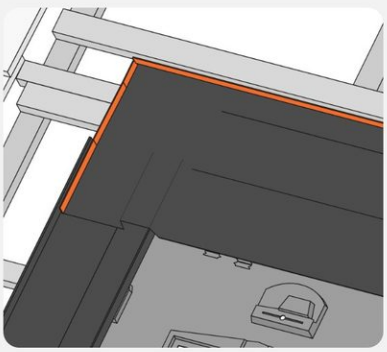
Remove the plastic film from the butyl and smooth the strip with a **roller**.

4 Fold the edges



Fold the strip **20 mm** at the top and on both sides to prevent water ingress by capillary action.

5 Fold into the lateral flashing



Fold the waterproofing strip **inside the lateral flashing**.

7 Flexible waterproofing strip, top of the array

The tile support is **mandatory** on a flexible waterproofing strip, except for slates.

COMPONENTS



Tile support



Tile support hook



Fixing screws

TOOLS

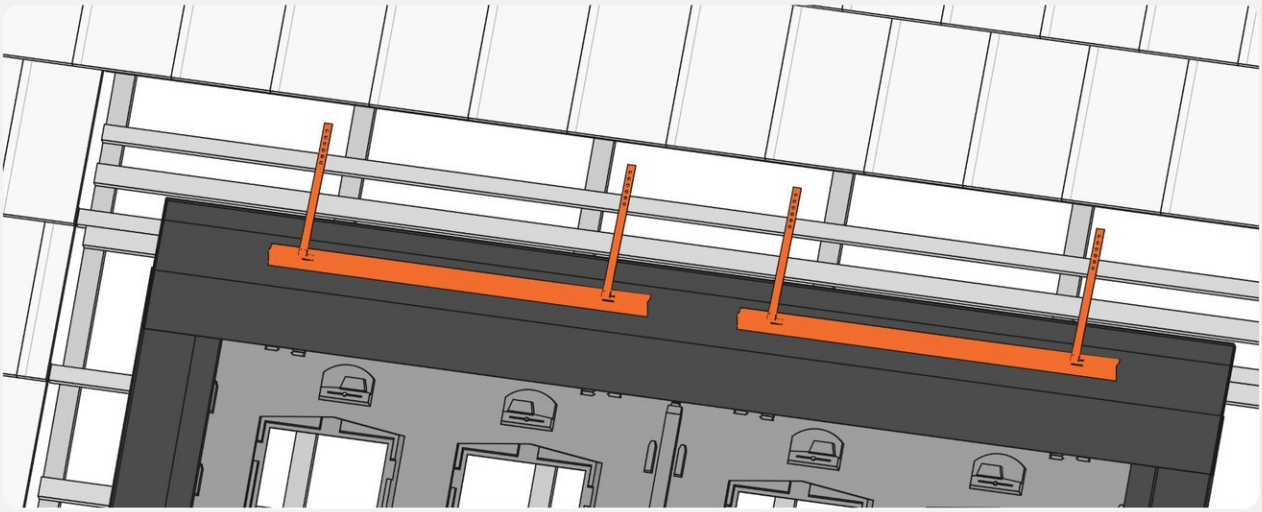


Combi drill

All interlocking tiles
Tile support required

Slates
Not compatible, no tile support

6 Install the tile supports



1. Place **one tile support per half frame** on the waterproofing strip, under the nose of the first row of tiles.

2. Hold it with **2 tile support hooks.**

3. Fix each hook **with a screw on the batten** above.

04.8

Connection To The Roof

Find the assembly video
and much more on CONNECTOR

INSTALLATION

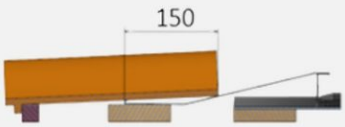
8 Connection to the roof covering

COMPONENTS

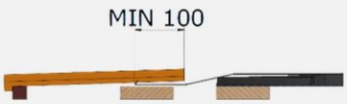


Pre-compressed foam

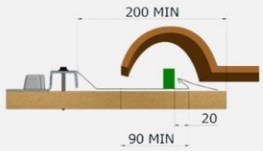
Overlaps to respect



Curved tiles
Top overlap min. **150 mm**



Other tiles and slates
Top overlap min. **100 mm**



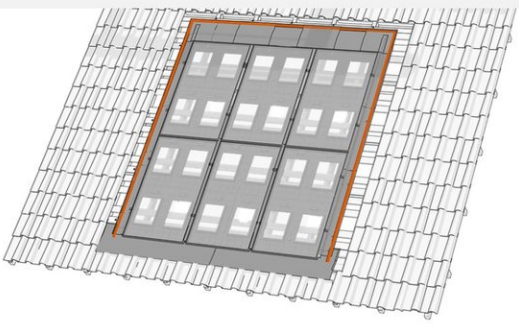
Side
Overlap min. **90 mm**

The upper part of the tile must rest on the top flashing with sufficient overlap to meet local standards and building regulations.

1 Pre-compressed foam installation

Place the pre-compressed foam on the flashings around the **sides and top** of the array, **20 mm** from the edges of the flashings.

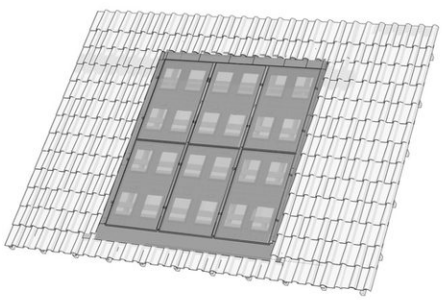
The seal must reach the bottom connection to prevent particles passing underneath the tiles.



2 Installation of the roof coverings

Reposition the side and top roofing elements to create a **continuous connection** with the roof.

Tiles may need to be cut to ensure an effective covering. All cut elements must be **mechanically fixed** as required by local standards and building regulations.



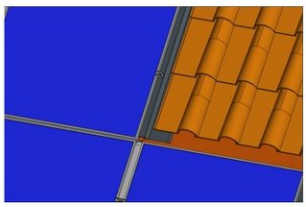
04.9

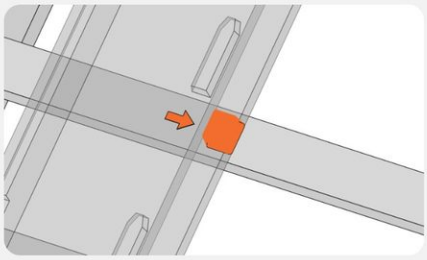
Find the assembly video
and much more on CONNECTOR

Specific Cases

9 Inner corner (L-shaped)

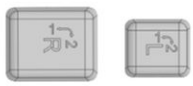
In the case of a non-rectangular PV array, the inner corners must be connected to the roofing using **a flexible waterproofing strip**.





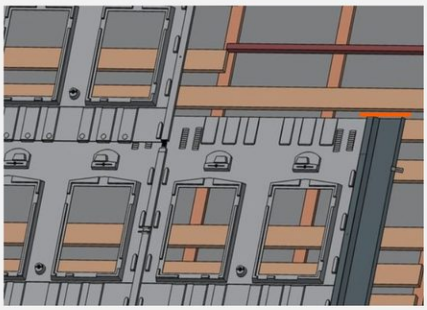
1 Install the wedges

Install the wedges beneath the corrugations at the edges of the frames, **before the lateral flashing**, as shown previously.



R: right . L: left

2 Install the lateral flashing



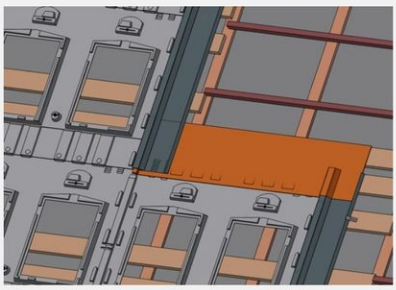
Align the lateral flashing **flush to the top of the frame**. A support batten may be required to support the waterproofing strip.

3 Install the waterproofing strip



Install the waterproofing strip.

4 Install the top lateral flashing



Install the lateral flashing on the top side.

5 Install the tile support

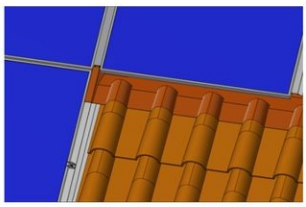


Install the tile support.

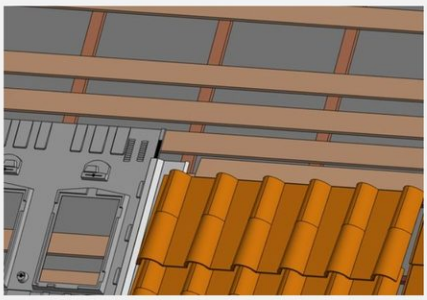
⚠ You must use tile support on a flexible waterproofing strip, **except for slates**.

9 Outer corner (T-shaped)

In the case of a non-rectangular PV array, the outer corners must be connected to the roofing using **a flexible waterproofing strip**.

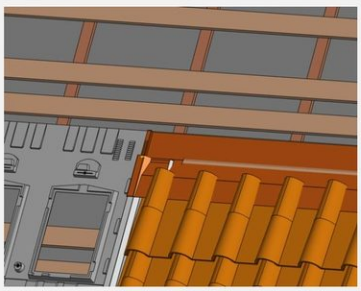


1 Install the battens



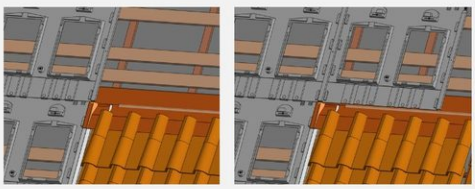
Add a support batten and an inclined batten (except for slates), as shown previously.

2 Install the waterproofing strip



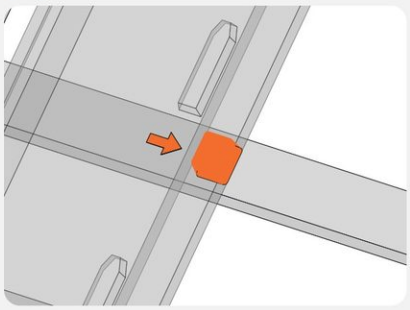
Install the waterproofing strip, smooth it to the tiles and add sealant, as shown previously.

3 Install the next row of frames



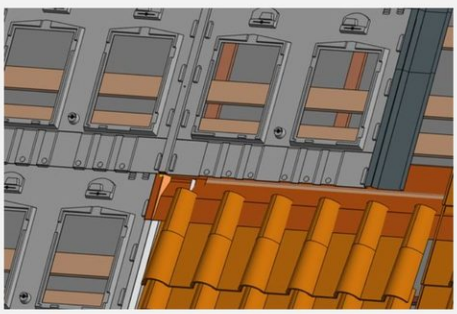
Install the next row of frames.

4 Install the wedges





Install the wedges beneath the corrugations at the edges of the frames, **before the lateral flashing**, as shown previously.



5 Install the lateral flashing

Install the lateral flashing.

05

Maintenance & Servicing

Find the assembly video
and much more on CONNECTOR

MAINTENANCE & SERVICING

1 Verification

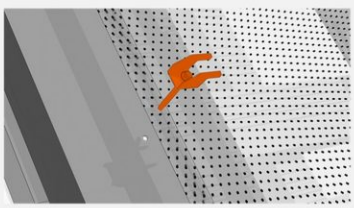
Once a year, check whether leaves or other elements have accumulated beneath the photovoltaic unit or between the panels. You may use a **compressed-air blower** to remove any debris that has settled beneath the unit. **Do not use solvents** to clean any surfaces.

We recommend having a **maintenance contract** that includes an annual inspection of the production system, electrical components, panels, panel supports, fixings, pre-compressed foam and flexible waterproofing strips.

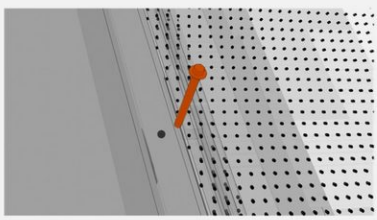
11 Module replacement

Disconnect the PV array from the AC box and proceed as follows:

1 **Unscrew the clamps.**



2 Screw one **GSE screw** at the location of the old hole, having placed beforehand a new wedge under the corrugation if it is located on an array edge.

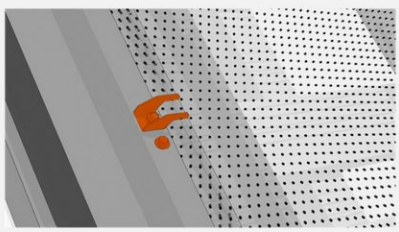


3 Make a new hole with a **Ø10 mm drill bit** close by the previous hole.



Add an **extra batten underneath the frames** if you can't tighten the GSE screws.

4 Place the module and attach the new assemblies (**fixing clamp + EPDM foam + GSE screw**).



06

Find the assembly video
and much more on CONNECTOR

Training

TRAINING

1 Training sessions

GSE Intégration offers a dedicated training program, including an **installer certification pathway**. To become certified, installers must watch all training videos on **CONNECTOR** and attend an **in-person practical session**.

For more information, contact your sales manager or distributor.

GSE Intégration
TRAINED INSTALLER

Training is a requirement to install our system.
See article 2.1 of our General Terms and Conditions, in the “Documents” section of the Connector tool.

CERTIFICATION PATHWAY

1 Online learning
ON CONNECTOR

Watch the training videos, then pass two short multiple-choice knowledge checks (**Portrait & Landscape**).

2 In-person training
PARTNER CENTRE / DISTRIBUTOR

Once the online training is completed, book a hands-on session. Rig or roof practice where possible, **groups of 7 to 8 max**.

3 Certification
END OF SESSION

A short multiple-choice assessment. Successful participants receive the **GSE Intégration Trained Installer** certificate, valid **12 months**.

4 Refresher training
AFTER 12 MONTHS

Installers are invited to complete refresher training and knowledge checks to keep their certificate.

This program builds a consistent, high-quality installer base and gives training centres and distributors a certified, recognised learning pathway.

07

Support
Warranty

Find the assembly video
and much more on CONNECTOR

SUPPORT & WARRANTY

1 Technical assistance & warranty

Technical assistance

Available from your **technical business developer** and from our team directly in France.

EMAIL
contactuk@gseintegration.com

Warranty

10 YEARS

GSE IN-ROOF PORTRAIT EVOLUTION is guaranteed for **10 years** when installed in accordance with this manual and our certifications.

For more details, refer to our General Terms and Conditions in the "Documents" section of the Connector tool.