

EASY ROOF EVOLUTION

In roof mounting system

For module 60 cells - 6" LANDSCAPE

INSTALLATION INSTRUCTIONS

Applicable to instructions marked with "M-1"



For :
Residential, Commercial, Public building, Agricultural and Industrial roofs

Document validated by NEW TECHNICAL SURVEY No. L17CC0137-1

The EASY ROOF system is insured provided that the modules have approvals IEC 61215 and IEC 61730.



See the module on compatibility at www.irfts.com

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Information et visuels non contractuels. Sous réserve de modifications techniques sans préavis.

User advice sheet: Use, maintenance and repairs

SMQ-F0-13-180724

Congratulations, you have become the proud owner of an EASY ROOF EVOLUTION system!

With EASY ROOF EVOLUTION you have chosen a practical, reliable and aesthetic solution for your roof photovoltaic project.

For an optimal use of the system, please read and keep the following cleaning and maintenance instructions:

All photovoltaic systems must be regularly monitored and cleaned. To this end, your installer can provide you with a maintenance contract. If you are interested please ask him for details.

All maintenance and repair operations on IRFTS products must be carried out by qualified technicians trained by IRFTS. These operations require electrical and roofing skills.

System maintenance or repair operations must be carried out in compliance with work regulations and, in particular, regulations for work at height. To avoid putting direct weight onto the modules, do not walk on them. Putting weight on the clamps and fixing brackets is acceptable.

In the case of a maintenance or repair operation that requires the removal of a photovoltaic module, the electric disconnection and reconnection procedure applicable for the replacement of a module must be adhered to.

- **Photovoltaic field maintenance**

At least once a month (before summer to optimise electricity production) as part of the roof maintenance:

- ✓ The photovoltaic modules must be cleaned with a hosepipe (without using pressure or a concentrated stream of water)
- ✓ Visual inspection, spotting damage
- ✓ Waterproofing check: check the condition of the different waterproofing parts and that the water runs freely through the flashing channels
- ✓ Check the wiring
- ✓ Check the fixing points: check that all the screws and bolts are present and properly fixed in place

- **Electrical maintenance**

If, once the real amount of sunshine has been taken into account, a measurable reduction in yearly production from one year to the next is observed, the inverter and the individual modules should be checked to see if they are working properly.

- **Module replacement**

If the glass of the photovoltaic panel or the panel itself is damaged, please follow this procedure:

1. Disconnect the inverter (s) from the network by opening the AC circuit breaker located between the inverter (s) and the meter.
2. Disconnect the photovoltaic field by opening the DC switch/breaker located between the modules and the inverter. If the system is equipped with micro-inverters they automatically disconnect the photovoltaic field after step 1.
3. Dismantle the parts of the assembly system in reverse installation order to gain access to the module's wiring. Never withdraw the connectors in the rain.
4. Assemble the new module in compliance with its installation instructions (see *Installation instructions*)
Reconnect the equipotential connection to the new installed module.
5. Check that the modules concerned are working properly:
 - a. Measure their open-circuit voltage range
 - b. Check the compatibility of this range with the inverter's input range
6. Reconnect the photovoltaic field by closing the DC switch/breaker (except if there are micro-inverters), then the AC circuit breaker.

1) Installation guide for building integration system Easy-Roof IRFTS

1.1)

Parts provided in the kit

Number	Description	Item Number
1	Frame M-1 Evolution	P001MV40 ... (*)
2	Left flashing M-1 Evolution	P002MV40 ... (*)
3	Right flashing M-1 Evolution	P003MV40 ... (*)
4	Top Deflector M-1 Evolution ⁽⁶⁾	P004MV40 ... (*)
5	Simple fixing clamp Evolution	A001V40
6	Double fixing clamp Evolution ⁽¹⁾	A002V40
7	Double (large) fixing clamp Evolution ⁽¹⁾	A009V40
8	Double Bracket Evolution	A004V40
9	Single bracket Evolution	A003V40
10	Stainless steel rounded end screw 6x40 - A2	V003V02
11	clamp screw M6 x 40 stainless steel - A2 (module from 40 to 50) ⁽²⁾	V013V02
12	clamp screw M6 x 30 stainless steel - A2 (module from 30 to 40) ⁽²⁾	V012V02
13	EASY ROOF mounting tool M-1	OUT0P00766AA

Optional Parts

14	Double fixing black clamp Evolution ⁽¹⁾	A002V40N
15	Double (large) black fixing clamp Evolution ⁽¹⁾	A009V40N
16	Simple fixing blackclamp Evolution	A001V40N
17	Simple black bracket Evolution	A003V40N
18	Lateral frieze 30/15	F001V40
19	EASY GROUNDING	PRT0P00340AA
20	Flashing aluminium Right (not provided)	PRT0P00555AA
21	Flashing aluminium Left (not provided)	PRT0P00554AA

* : Coding changes according to chosen material

1.2)

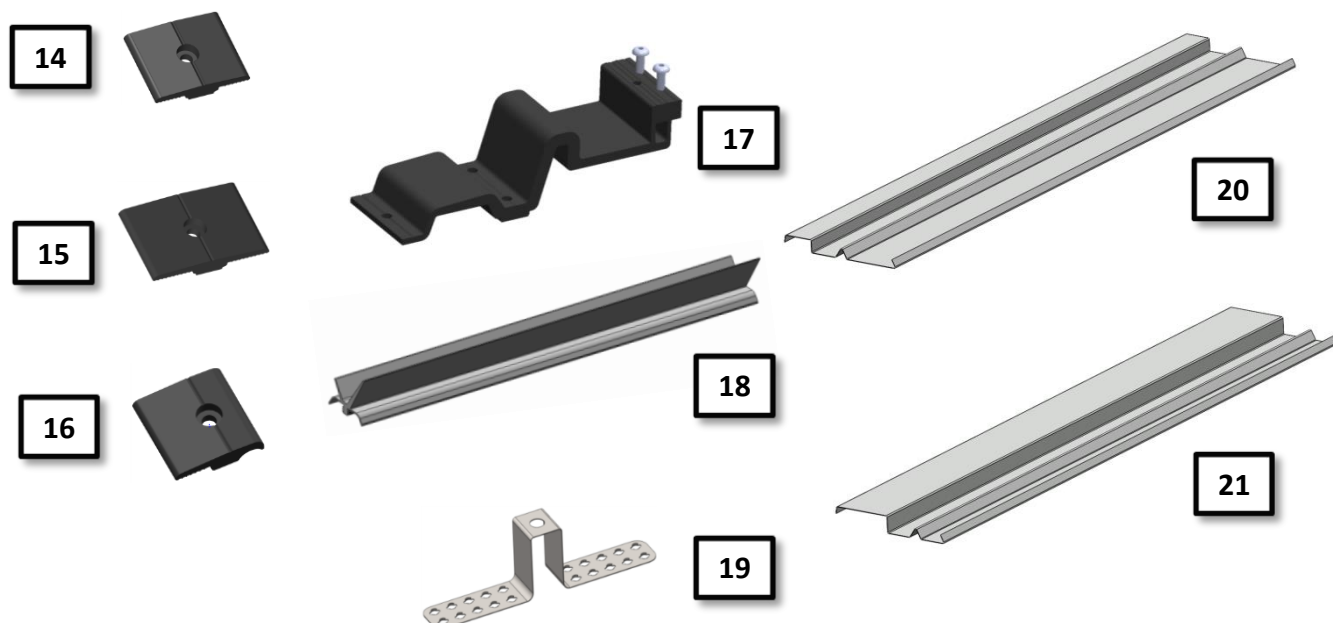
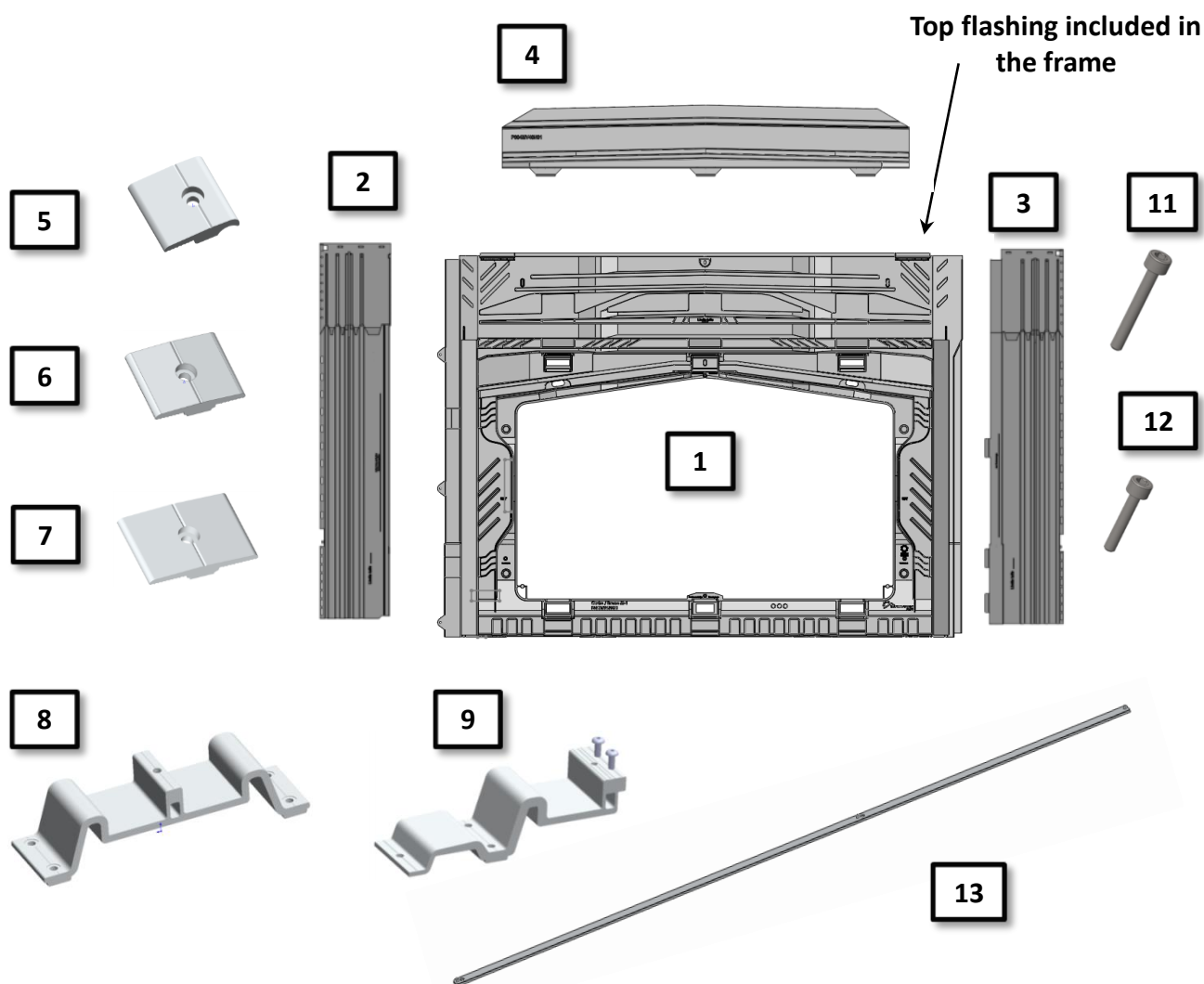
Parts not supplied in the kit

Number	Description
a	Countersunk Screw six lobes 5x60 Stainless Steel A2 (wood)
b	Counter sunk Head Screws six lobes 5x30 Stainless Steel A2 (flashings)
c	Bottom flashing/Skirt
d	Batten 250x27 ⁽³⁾
e	Batten 30x27 ⁽³⁾
f	Batten40x15 (create a belever) ⁽⁴⁾
g	Batten 150x18 ⁽⁴⁾
k	Batten 180x18 (solin) ⁽⁴⁾
m	Bottom metal sheet ⁽⁵⁾

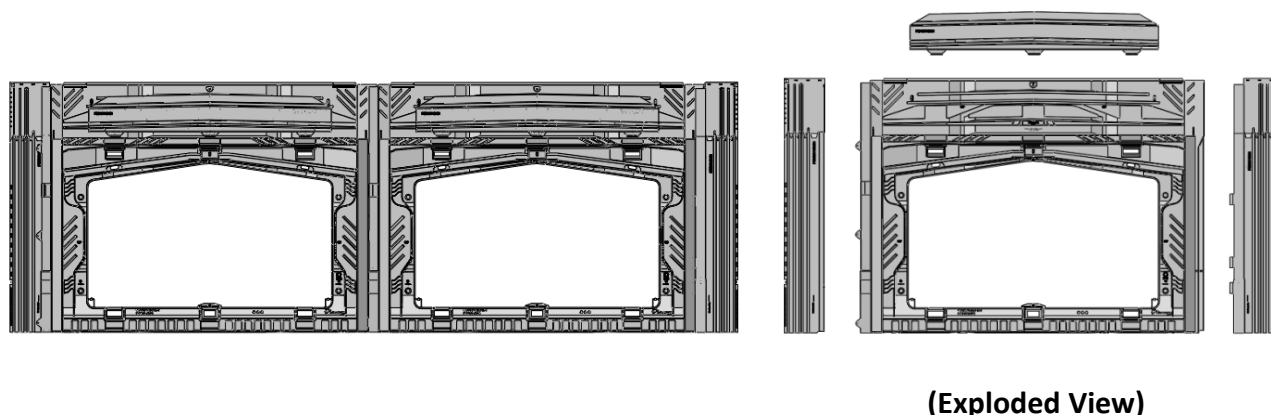
- (1) See module compatibility list with M-1 format.
- (2) Choose the length of screw to be used according to the PV module thickness .
- (3) Dimensions of these support batten can vary according to the design of the roof structure and the geographical zone of the building site, see table p. 17 to 19. These support batten will have to be same thickness as the tiles batten .
- (4) Dimensions of this bottom flashing batten can vary according to the roof slope , see table p. 14.
- (5) For installation at the gutter.
- (6) From 2m slope above the pv field.

1.3)

Representation of parts



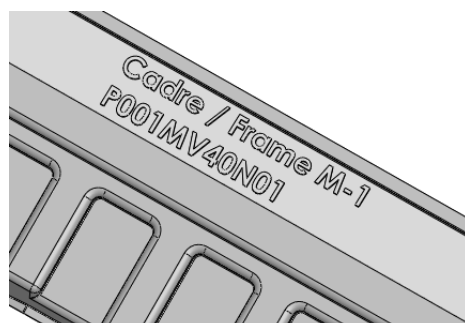
1.4) 1 lateral flashing by frame height



2) Part markings

P001MV40... (*)	frame
P002MV40... (*)	Left flashing
P003MV40... (*)	Right flashing
P004MV40... (*)	Top deflector

* : Codification can change according to the choice of the material



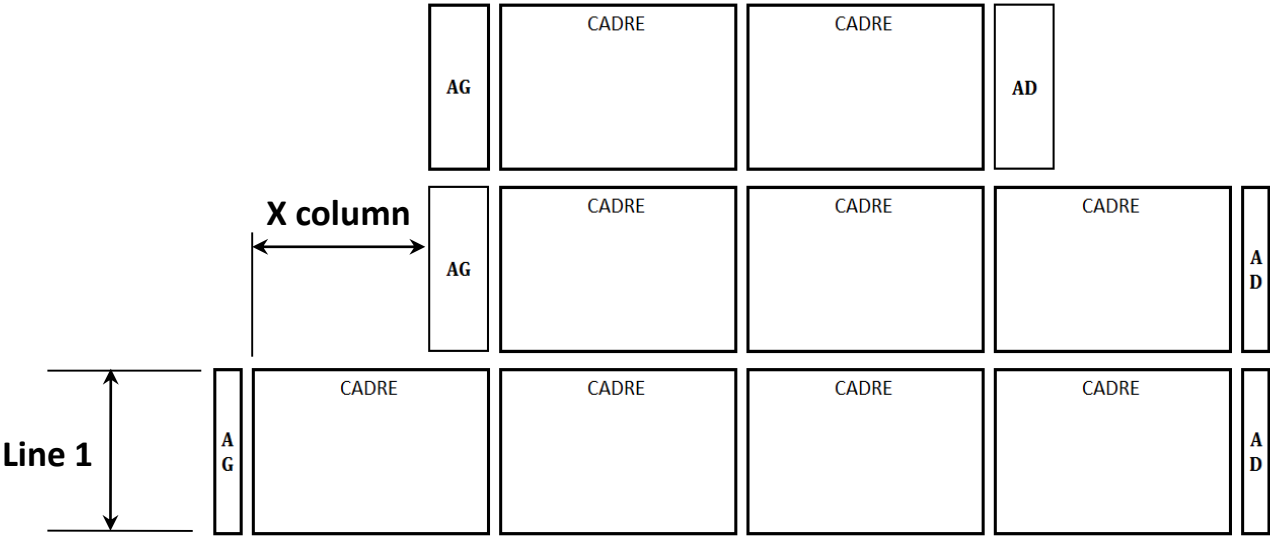
3) Roofing felt / Roofing underlay

We impose the installation of a roofing felt / roofing underlay before the installation of the system of integration EASY ROOF.

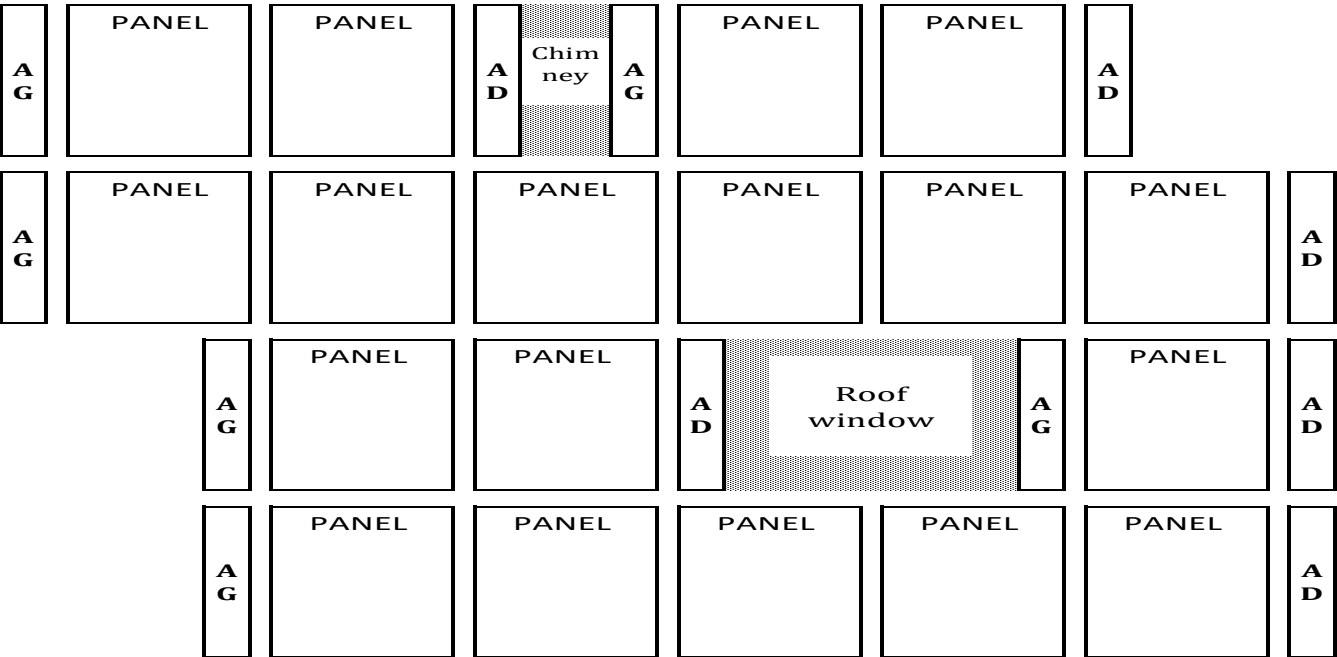
This roofing felt/roofing underlay must comply with local regulation

Assemble the lengths of underlay with self-adhesive strips

4)Use different flashings depending on the configuration of the PV field

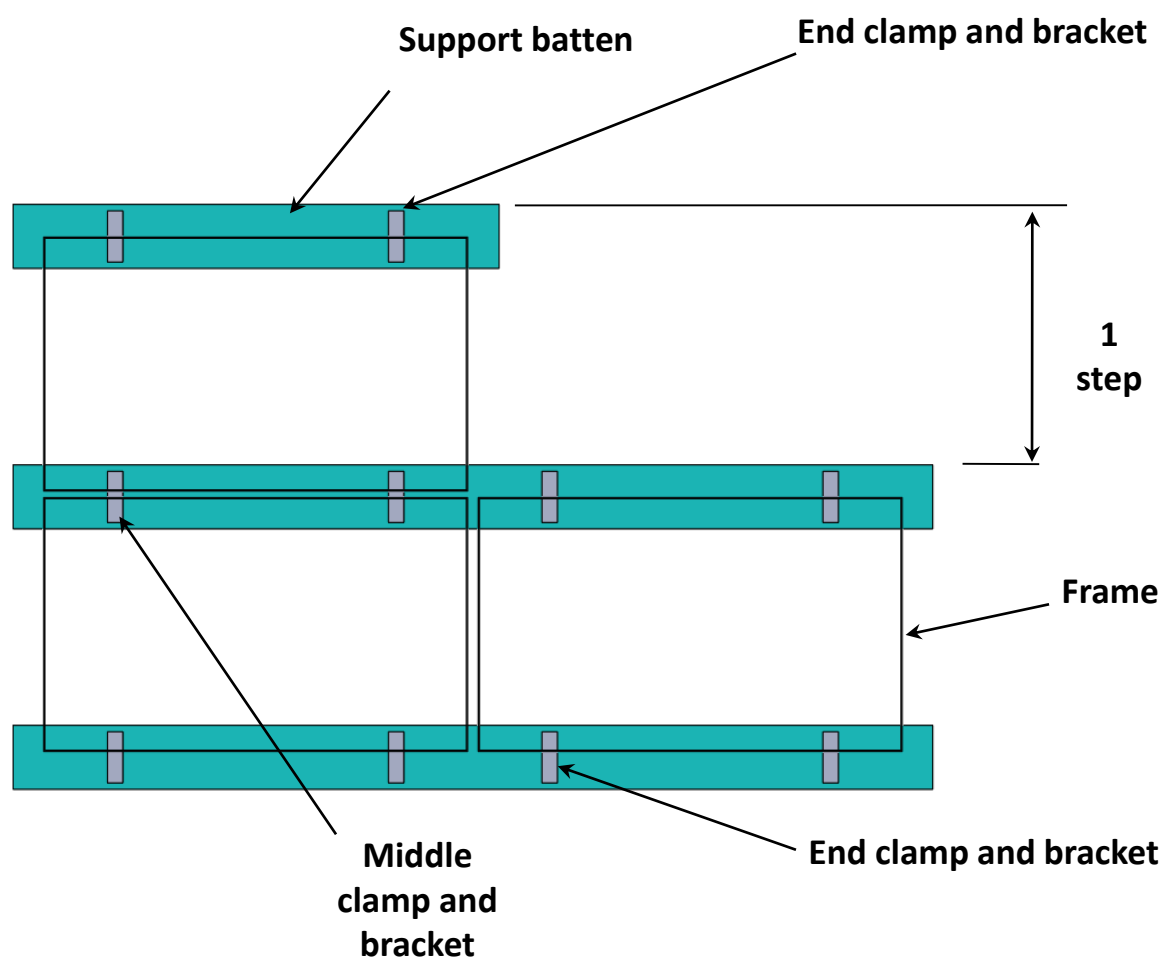


Multiple combination for clearing the roof window or chimney

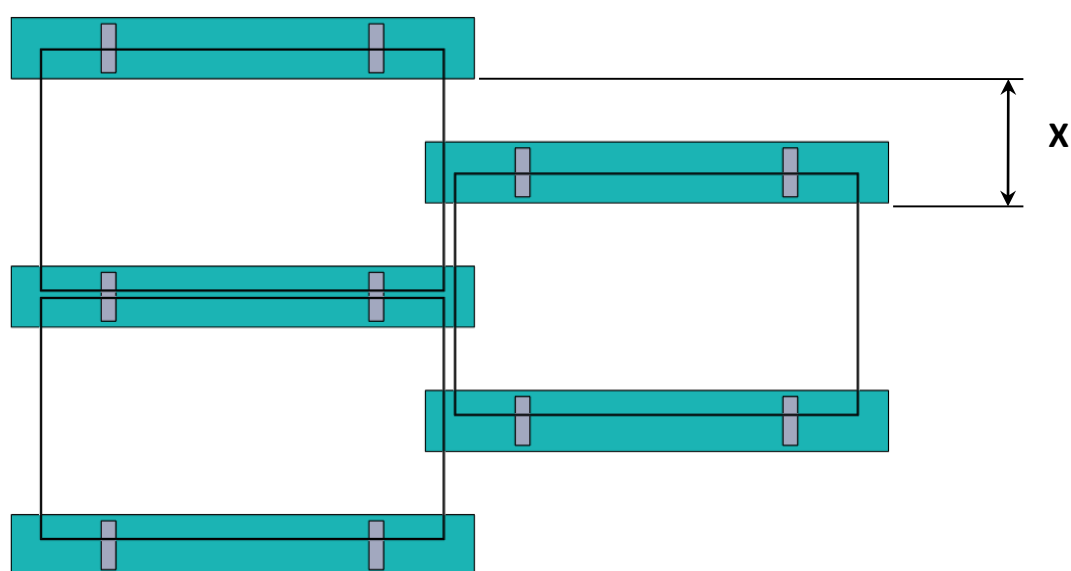


4.1) Possible shift of panels vertically

Shift with constant step



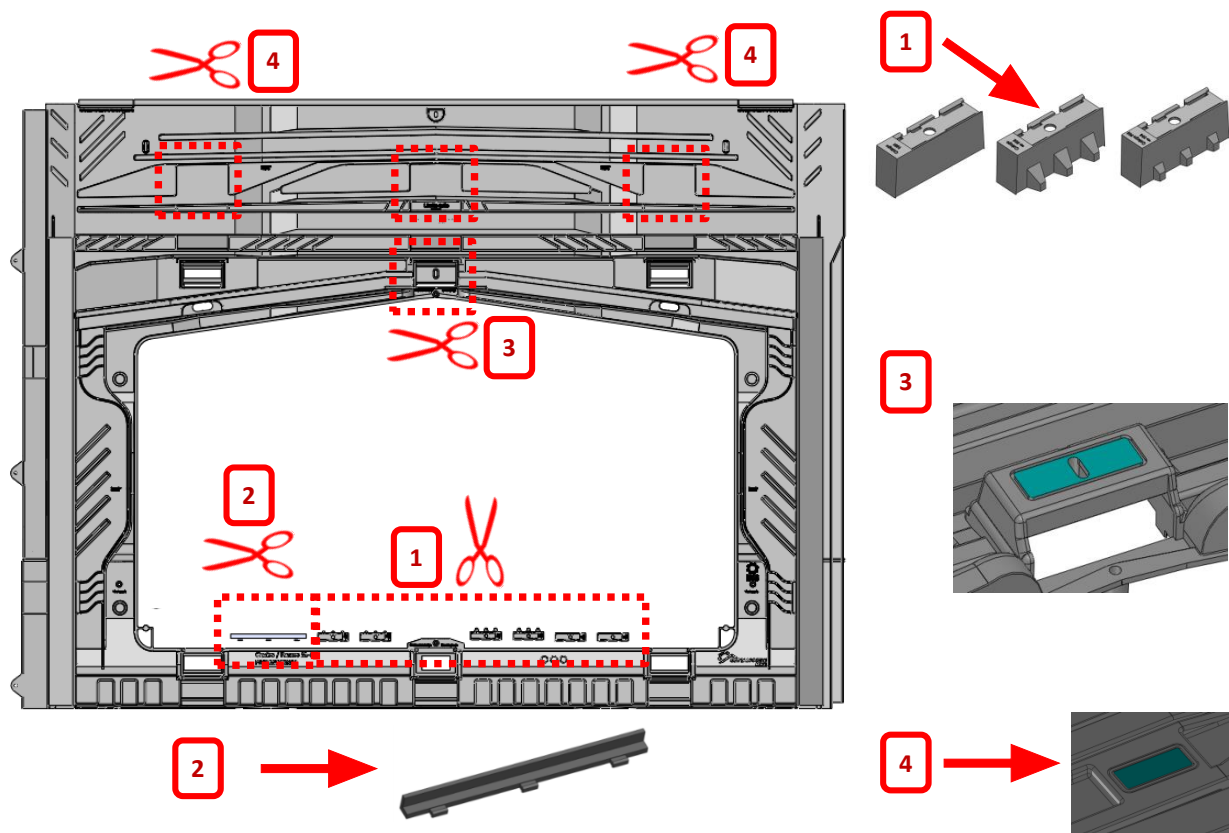
Variable shift



5) Parts to prepare before assembling the kit

1) Preparation of frames

- 1) Remove the six centering wedge which are located within the frame.
- 2) Remove the high frieze support which is indimension the frame.
- 3) For an installaiton with 6-bracket per module, remove the plug in the center of the frame.
- 4) For all frames except those placed on top of the PV field, remove the plug for the middle bracket passage.

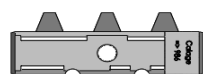


2) Middle clamp preparation.

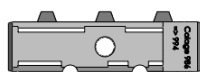
Pre-mount a centering wedge in the slides of each middle clamp (6).

Select the model of module centering wedge according to the module width.

For a PV module length \leq or equal to 992 mm, LARGE middle clamp must be used.



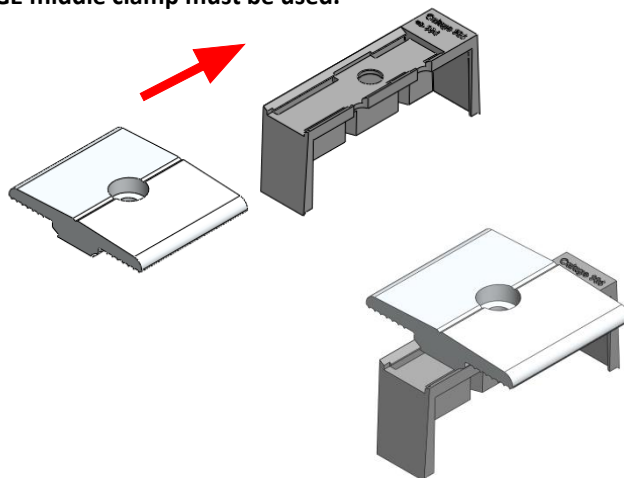
PV module width ≤ 985



$986 \leq$ PV module width ≤ 994



$995 \leq$ module width ≤ 1002



6) Grounding preparation for the PV modules

To ground the PV module, several solutions are possible:

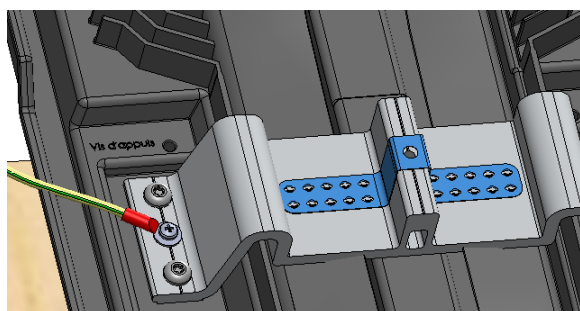
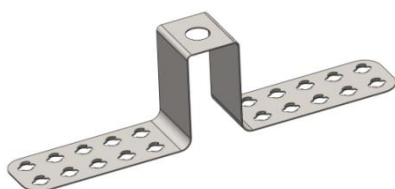
a) Connect the ground wire directly to the PV module.



b) Connect the ground wire to one middle bracket (8) for two PV modules.

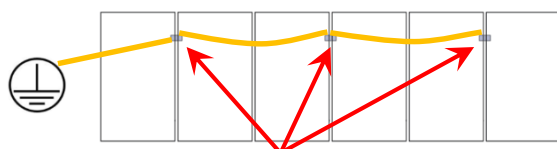
b1) Method 1

It is possible to ground both the PV module and the double mounting bracket (8) by using an EASY GROUNDING (www.irfts.com)



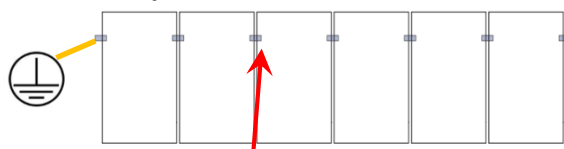
There are two ways of wiring the PV field earth, depending on the regulations in force in the country.

Possibility 1 (France)



one earthing part every two modules

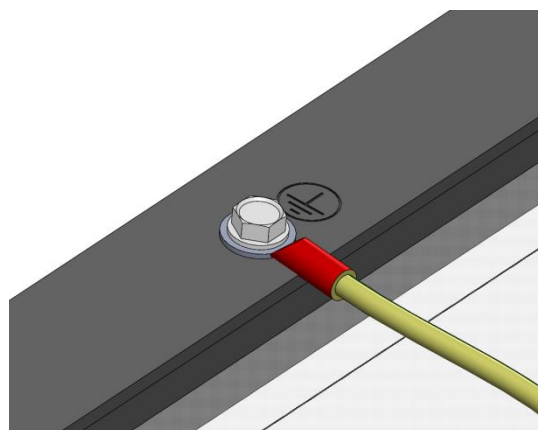
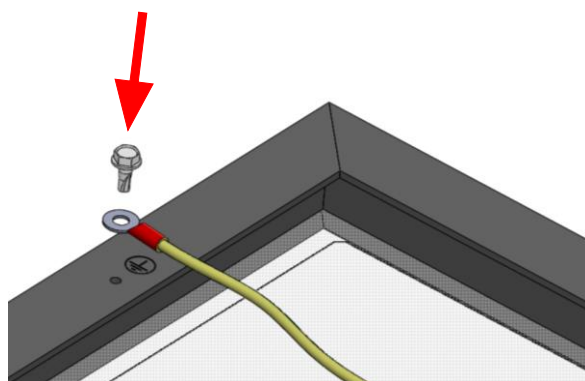
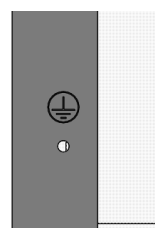
Possibility 2



one earthing part on every module

b2) Method 2

Link the PV module directly to the grounding wire using the holes provided by the constructor underneath the module.



(View with local section)

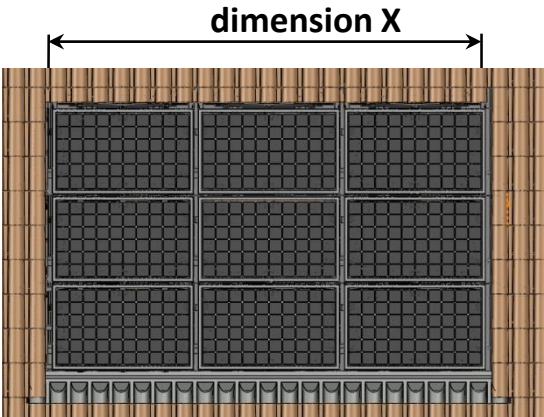
7)

Dimensions of the PV field
(Visible part of installation)

1) Calculate the width of the visible field

Dimension of the photovoltaic field	
Field width (mm)	
PV field centered on rake direction	$X = 1701 \times N_{bx} + (2 \times 43)$
Lateral eave installation	$X = 1701 \times N_{bx} + (2 \times 55)$

Nbx : Number of columns of PV module



a) Common installation (with tiles on both side)

E.g.: $(1701 \times 12) + (2 \times 43) = 12280$

Number of modules in width with standard lateral flashings																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
X size	1787	3488	51116	68126	8591	10292	11993	13694	15395	17096	18797	20498	22199	23900	25601	16360

a1) Find the position of the PV field

With profiled tiles dimension B must be positioned on hollow tiles.

b) Edge installation (no tiles on each side)

E.g.: $(1701 \times 12) + (2 \times 55) = 20522$

Number of modules in width with assembly to lateral edges																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
X MINI size	1811	3512	5213	6914	8615	10316	12017	13718	15419	17120	18821	20522	22223	23924	25625	27326

NOTE: see drawings
page 57

7)

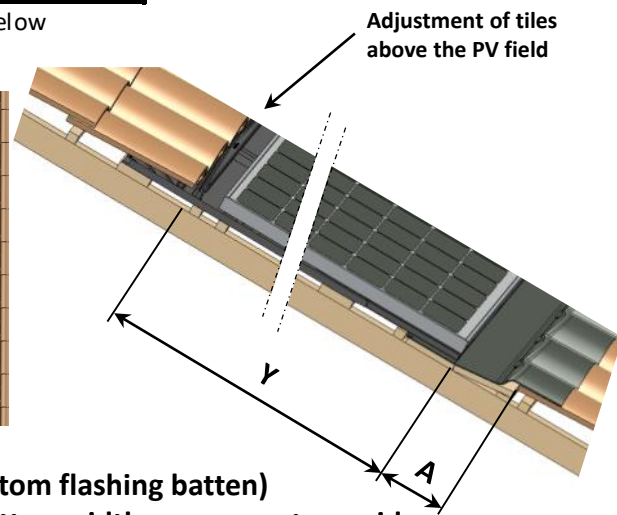
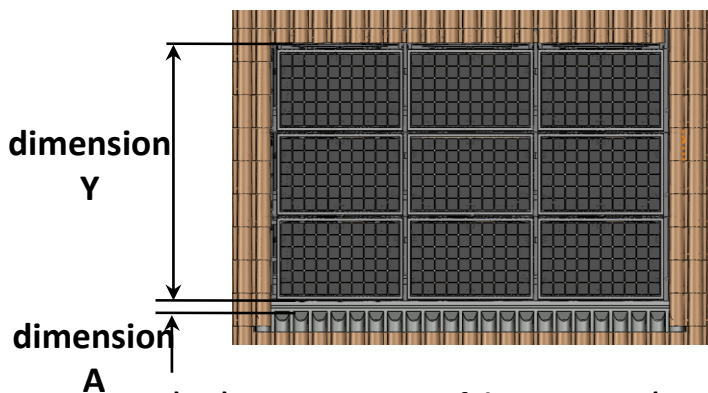
Dimensions of the PV field (Visible part of installation)

2) Calculate the height of the visible field

Dimension of the photovoltaic field		
Field height (mm)		
PV field centered on rake direct	Y = Step x (Nby-1) + 956 + 102	
Gutter / eave installation		

Step : Step of the system in rake direction, see table below

Nby : Number of line of PV module

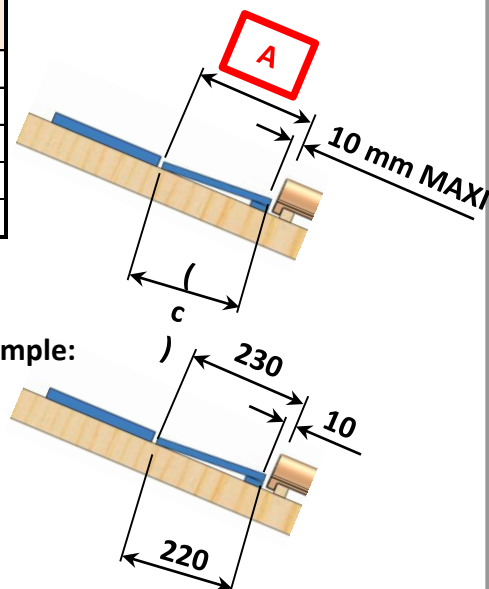


a) a) Determination of dimension A (Bottom flashing batten)

The « C » dimension is the Minimum batten width necessary to avoid reverse slope on the bottom flashing. It's possible to use a wider batten, this will simply raise up the PV field

Roof inclination (°)	Minimum batten width C dimension (mm)	Mini A dimension (mm)
10 to 12	250	260
13 to 16	220	230
17 to 19	180	190
20 to 24	150	160
25 to 50	120	130

NOTE: For adjusting the tiles above the PV field, it may be necessary to increase dimension A to raise the field (see Annexe 3 on p. 57-58).



b) Determination the dimension Y

Warning : Please check the PV module compatibility list on : www.irfts.com

System vertical step		1020
		Dimension Y
Number of modules in height	1	1058
	2	2078
	3	3098
	4	4118
	5	5138
	6	6158
	7	7178

E.g.: (1020 x (3-1)) 956 102 = 3098

**Dimension of the visible field
= dimension Y + dimension A**

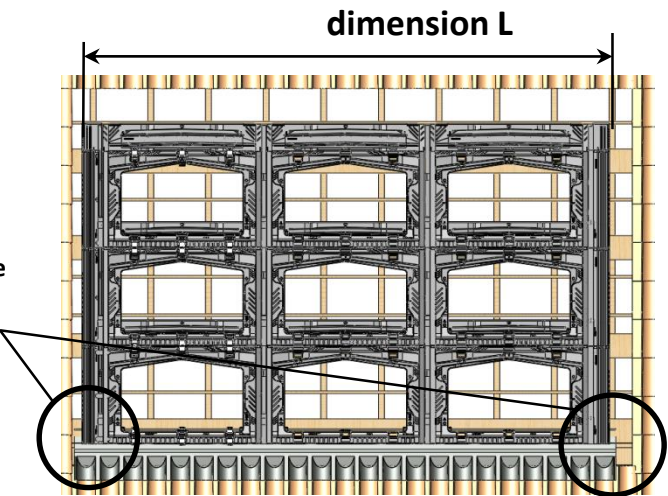
7.1) Dimensions of Easy Roof system (with flashings)

1) Calculate the width of system dimensions to be installed

Dimension of the photovoltaic field	
Field width (mm)	
PV field centered on rake direction	$L = 1701 \times N_{bx} + (2 \times 194)$
Lateral eave installation	$L = 1701 \times N_{bx} + (2 \times 25)$

Nbx : Number of columns of PV module

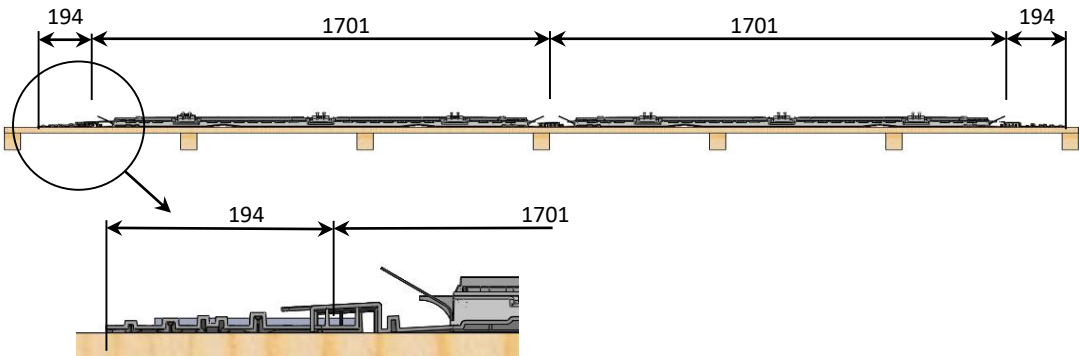
The length of the support batten d* is equal to the dimension L + a sufficient length on each side to lean on the rafter exterior to the frame.



a) Common installation (with tiles on both side)

E.g.: $(1701 \times 12) + (2 \times 194) = 20800$

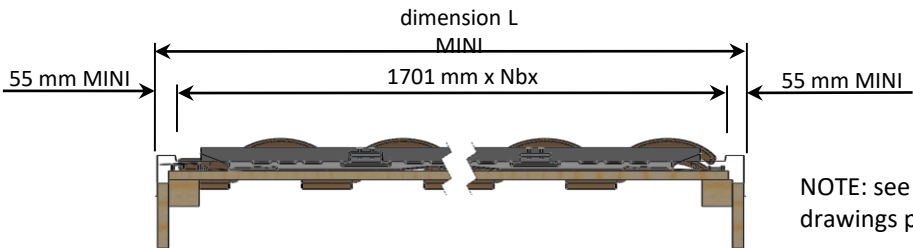
Number of modules in width with standard lateral flashings																
L size	2089	3790	5491	7192	8893	10594	12295	13996	15697	17398	19099	20800	22501	24202	25903	27604



b) Edge installation (no tiles on each side)

E.g.: $(1701 \times 12) + (2 \times 55) = 20522$

Number of modules in width with assembly of lateral edges																
L MINI size	1811	3512	5213	6914	8615	10316	12017	13718	15419	17120	18821	20522	22223	23924	25625	27326



NOTE: see drawings page 57

* Reference nomenclature

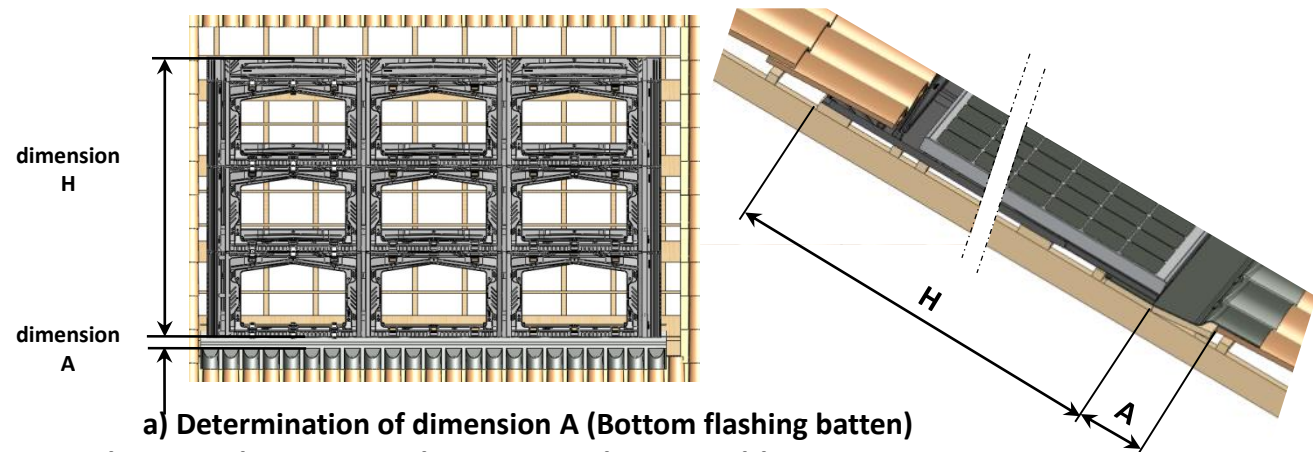
7.1) Dimensions of Easy Roof system (with flashings)

2) Calculation of the overall height of the installed system

Dimension of the photovoltaic field	
Field height (mm)	
PV field centered on rake direct	$H = \text{Step} \times (\text{Nby}-1) + 956+335$
Gutter/ eave installation	$H = \text{Step} \times (\text{Nby}-1) + 956+335$

Step : Step of the system in rake direction, see table below

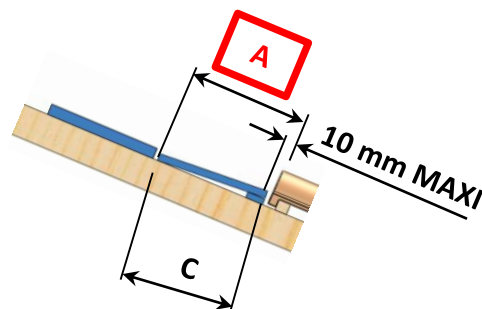
Nby : number of line of PV module



a) Determination of dimension A (Bottom flashing batten)

The « C » dimension is the Minimum batten width necessary to avoid reverse slope on the bottom flashing. It's possible to use a wider batten, this will simply raise up the PV field.

Roof inclination (°)	Minimum batten width C dimension (mm)	Mini A dimension (mm)
10 to 12	250	260
13 to 16	220	230
17 to 19	180	190
20 to 24	150	160
25 to 50	120	130



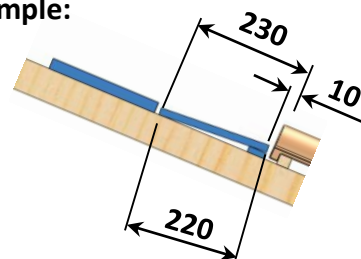
b) Determination of dimension H

Warning : Please check the PV module compatibility list on : www.irfts.com

System vertical step		1020
		H size
Number of modules in height	1	1291
	2	2311
	3	3331
	4	4351
	5	5371
	6	6391
	7	7411

E.g.: $(1020 \times (3-1)) 956 335 = 3331$

Example:



field size with flashings = dimension H + dimension A

NOTE: For a PV field positioned at the ridge, it is possible to shorten the upper frames of 80 mm MAXI row. (See Appendix p. 59)

8)

Technical definition

FIELD OF USE

Installation:

- Rural non-polluted, normal or heavy industrial or marine environments.
- On insulated or non-insulated buildings, exclusively on a cold roof
- Only in places with low or intermediate humidity, in a healthy environment.
- Seismic zone (up to Zone 4 for Occupancy Category II)
- Whole or partial roof installation.
- The length between the bottom of the PV field and the roof ridge must not be more than 12m (discontinuous roofing).
- An upper deflector is mandatory if there is more than 2 metres of slope above the PV field.

PERFORMANCE IN DIFFICULT WEATHER CONDITIONS

- The photovoltaic panel structure does not contribute to the stability of the building
- Only the EASY ROOF system (with filling that retains its shape) is appropriate for wind zone 4 and for an altitude of less than 900m for snow loads. The system is valid for normal to 1600 Pascal wind loads and normal to 2400 Pascal snow loads.
- Moreover, it is the installer's responsibility to ensure that the photovoltaic module used is appropriate for the climate loads.
- Any modifications to loads for renovation projects must be studied by a specialist design office in compliance with current calculation regulations. In any event, the solidity of the existing structure must be tested by a certified testing body or by a specialist design office.

ELECTRICAL SAFETY OF THE PHOTOVOLTAIC FIELD

- The electrical standards in force must be complied with. In particular, in France, standards NF C15-100 and NF C-712 are mandatory
- The documentation supplied with the different modules makes it possible to check that they comply with French standards EN 61 215 and EN 61 730 (guaranteed electric and thermal performances: category A according to French standard NF EN 61 730 up to 1000 V DC).
- Some technical data sheets from module manufacturers mention that the characteristics of the parts can be changed without prior notice. It is the installer's responsibility to ensure that the panels are always category A.
- The photovoltaic modules are equipped with detachable connectors, classed IP65 and category A
- So as to guarantee the safety of the roof-integrated photovoltaic field, we recommend the use of PV modules equipped with junction boxes that comply to standard CEI 62790:2014
- Bearing in mind the mention made in the technical data sheets, it is the installer's responsibility to make sure that the category of the equipment and the protection rating are A and IP65 respectively.

8) (Technical definition)

The selection and sizing of support battens (wood reinforcements) of the EASY-ROOF system is based on the type of roof structure. The EASY ROOF system only installs on roofs with slopes ranging from 10 ° to 50 °, buildings must be closed (closed roof).

Using the following tables, define the dimensional values of the support battens you can use for assembly. Define the wood and number of brackets / table of depression " by 8.1 and 8.2 ". Verified against the snow zones " by 8.3 ".

The number of bracket points for PV panels may vary from 4 to 6 depending on the boards that have been selected for the Installation of the PV field and/or the implantation field (roof edge, sea side...)

The values in the table below apply only to geographic zones 1 through 4 of the snow and wind regulation according to standard NF EN 1991-1-4 and for an altitude of less than 900m. For zone 5, a technical and feasibility study must be carried out on a case by case basis. It is important to follow these dimension instructions.

The maximum admissible loads are :

Upward :

With 4 brackets per module : 3700 Pa

With 6 brackets par module : 5540 Pa

downward :

With 4 brackets per module : 3900 Pa

With 6 brackets par module : 5850 Pa

Note that the warranty can only be applied if the Installation was carried out in accordance with procedures prescribed in this manual and various annexe rules to which it could refer.

In the case of a PV field of more than 12 m in height in the direction of the slope, it is mandatory to place horizontal deflectors (perpendicular to slope) between the PV modules (max 15m).

COMPATIBILITY MODULE

Ensure that the model of PV module selected for installation is in the compatibility list established by IRFTS (www.irfts.com).

For the installation of the EASY ROOF system on a building housing an intensive livestock or located on the sea side, it is mandatory that the type of PV module is validated according to standard NF EN 61701.

TRAINING

IRFTS offers "installation training " provided by itself or a service provider.

SAFETY NOTICE

Before any work installation, it is necessary to implement appropriate security for stakeholders working at heights: safety devices necessary to prevent accidents with CPS or use of PPE for each stakeholder.

QUALIFICATION OF INSTALLERS

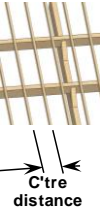

In order to become an installer of the Easy roof system, you must be a professional and have expertise in roofing and electricity.

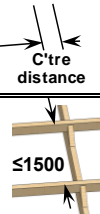
(Technical definition)

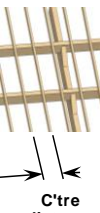
8.1) Normal zone, common and eave and angle installation

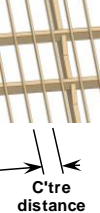
(1) : 2 Screws / intersection if metallic structure

Depression Normal Site

Common part		Centre distance ≤ 600 Rafter centre distance horizontal support battens	4	22	250	2	4	22	250	2	4	22	250	2	4	22	250	3	5x70/32	5x50/32
			4	27	250	2	4	27	250	2	4	27	250	2	4	27	250	3	5x80/32	5x60/32
			4	40	250	2	4	40	250	2	4	40	250	2	4	40	250	3	5x90/32	5x70/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	22	250	2	6	22	250	3	6	22	250	0	6	22	250	3	5x70/32	5x50/32
			4	27	250	2	4	27	250	3	4	27	250	0	4	27	250	3	5x80/32	5x60/32
4	40		250	2	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Rafter ≤ 1500 horizontal support battens	4	30	250	3	4	30	250	3	4	30	250	0	4	30	250	3	5x80/32	5x60/32		
	4	40	250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
	≤1500	C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	4	27	250	3	4	27	250	3	4	27	250	0	4	27	280	3		5x70/32
			4	40	100	3	4	40	100	3	4	40	120	0	4	40	120	3		5x80/32
		C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	4	30	180	3	4	30	180	3	4	30	190	0	4	30	220	3	5x80/32	5x60/32
			4	40	100	3	4	40	100	3	4	40	110	0	4	40	120	3	5x90/32	5x70/32

Gutter / Eave		Centre distance ≤ 600 Rafter centre distance horizontal support battens	4	22	250	2	4	22	250	2	4	22	250	0	4	22	250	3	5x70/32	5x50/32
			4	27	250	2	4	27	250	2	4	27	250	0	4	27	250	3	5x80/32	5x60/32
			4	40	250	2	4	40	250	2	4	40	250	0	4	40	250	3	5x90/32	5x70/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	22	250	2	6	22	250	3	6	22	250	0	6	22	250	3	5x70/32	5x50/32
			4	27	250	3	4	27	250	3	4	27	250	0	4	27	250	3	5x80/32	5x60/32
4	40		250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Rafter ≤ 1500 horizontal support battens	4	30	250	3	4	30	250	3	4	30	250	0	4	30	250	3	5x80/32	5x60/32		
	4	40	250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	6	27	180	3	6	27	180	3	6	27	180	0	6	27	200	3		5x70/32		
	4	40	110	3	4	40	120	3	4	40	120	0	4	40	140	3		5x80/32		
C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	6	30	180	3	6	30	180	3	6	30	180	0	6	30	180	3	5x80/32	5x60/32		
	4	40	100	3	4	40	100	3	4	40	120	0	4	40	140	3	5x90/32	5x70/32		

Lateral edge		Centre distance ≤ 600 Rafter centre distance horizontal support battens	4	22	250	2	4	22	250	2	4	22	250	0	4	22	250	3	5x70/32	5x50/32
			4	27	250	2	4	27	250	2	4	27	250	0	4	27	250	3	5x80/32	5x60/32
			4	40	250	2	4	40	250	2	4	40	250	0	4	40	250	3	5x90/32	5x70/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	22	250	3	6	22	250	3	6	22	250	0	6	22	250	3	5x70/32	5x50/32
			4	27	250	3	4	27	250	3	4	27	250	0	4	27	250	3	5x80/32	5x60/32
4	40		250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Rafter ≤ 1500 horizontal support battens	4	30	250	3	4	30	250	3	4	30	250	0	6	30	250	3	5x80/32	5x60/32		
	4	40	250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	6	27	250	3	6	27	250	3	6	27	250	0	6	27	250	3		5x70/32		
	4	40	110	3	4	40	120	3	4	40	140	0	4	40	160	3		5x80/32		
C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	4	30	250	3	4	30	250	3	4	30	250	0	6	30	250	3	5x80/32	5x60/32		
	4	40	100	3	4	40	120	3	4	40	140	0	4	40	160	3	5x90/32	5x70/32		

Angle		Centre distance ≤ 600 Rafter centre distance horizontal support battens	6	22	250	2	6	22	250	3	6	22	250	0	6	22	250	3	5x70/32	5x50/32
			4	27	250	2	4	27	250	3	4	27	250	0	6	27	250	3	5x80/32	5x60/32
			4	40	250	2	4	40	250	3	4	40	250	0	6	40	250	3	5x90/32	5x70/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	22	250	3	6	22	250	3	6	22	250	0	6	22	250	3	5x70/32	5x50/32
			4	27	250	3	4	27	250	3	4	27	250	0	6	27	250	3	5x80/32	5x60/32
4	40		250	3	4	40	250	3	4	40	250	0	6	40	250	3	5x90/32	5x70/32		
C'tre Dist Rafter ≤ 1500 horizontal support battens	4	30	250	3	4	30	250	3	6	30	250	0	6	30	250	3	5x80/32	5x60/32		
	4	40	250	3	4	40	250	3	4	40	250	0	4	40	250	3	5x90/32	5x70/32		
C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	6	27	240	3	6	27	240	3	6	27	240	0	6	27	250	3		5x70/32		
	4	40	110	3	4	40	140	3	4	40	160	0	4	40	180	3		5x80/32		
C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	4	30	250	3	4	30	250	3	6	30	200	0	6	30	200	3	5x80/32	5x60/32		
	4	40	120	3	4	40	140	3	4	40	160	0	4	40	180	3	5x90/32	5x70/32		

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(Technical definition)

8.2) Seadimension zone, standard part installation, low dimension, lateral dimension and roof angle.

(1) : 2 Screws by intersection
if steel frame

Depression Site Seaside

10° to 50° exposed site (category 0) 2 sides																Screwing on silt and counter-slat/Stainless Steel countersunk screw A2 lg mini if connecting bolts wooden frame or Etanco screws 6.3 x lpx if metal frame	Roof mounting with screwing directly on chevron/Stainless Steel countersunk screw A2 lg mini if connecting bolts wooden frame or Etanco screws 6.3 x lpx
Wind Zone 1				Wind Zone 2				Wind Zone 3				Wind Zone 4					
Number of brackets	h: Tile batten thickness	b : Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b : Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b : Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b : Width mini support batten	Number of Screws/intersection (1)		
6	22	250	2	6	22	250	3	6	22	250	3	6	22	250	3	5x70/32	5x50/32
4	27	250	2	4	27	250	3	4	27	250	3	4	27	250	3	5x80/32	5x60/32
4	40	250	2	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	22	270	3	6	22	270	3	6	22	270	3	6	22	270	3	5x70/32	5x50/32
4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	250	3	6	30	250	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	30	180	3	6	30	180	3	6	30	190	3	6	30	220	3		5x70/32
4	40	120	3	4	40	140	3	4	40	160	3	4	40	200	3		5x80/32
6	30	180	3	6	30	180	3	6	30	190	3	6	30	220	3	5x80/32	5x60/32
4	40	120	3	4	40	140	3	4	40	160	3	4	40	190	3	5x90/32	5x70/32
6	22	250	3	6	22	250	3	6	22	250	3	6	22	250	3	5x70/32	5x50/32
4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	22	310	3	6	22	310	3	6	22	310	3	6	22	310	3	5x60/32	5x50/32
4	27	250	3	4	27	250	3	4	27	250	3	6	27	250	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	250	3	6	30	250	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	30	200	3	6	30	200	3	6	30	220	3	6	30	250	3		5x70/32
4	40	130	3	4	40	160	3	4	40	190	3	4	40	220	3		5x80/32
6	30	200	3	6	30	200	3	6	30	240	3	6	30	250	3	5x80/32	5x60/32
4	40	130	3	4	40	160	3	4	40	190	3	4	40	220	3	5x90/32	5x70/32
6	22	250	3	6	22	250	3	6	22	250	3	6	22	250	3	5x70/32	5x50/32
4	27	250	3	4	27	250	3	4	27	250	3	4	27	220	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	100	3	5x90/32	5x70/32
6	27	250	3	6	27	250	3	6	27	250	3	6	27	210	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	150	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	250	3	6	30	280	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	250	3	6	30	280	3		5x70/32
4	40	150	3	4	40	170	3	6	40	150	3	6	40	160	3		5x80/32
6	30	230	3	6	30	230	3	6	30	260	3	6	30	280	3	5x80/32	5x60/32
4	40	150	3	6	40	130	3	6	40	150	3	6	40	160	3	5x90/32	5x70/32
6	22	260	3	6	22	260	3	6	22	260	3	6	22	260	3	5x70/32	5x50/32
4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	3	5x80/32	5x60/32
4	40	250	3	6	40	250	3	6	40	250	3	6	40	100	3	5x90/32	5x70/32
6	27	250	3	6	27	250	3	6	27	250	3	6	27	230	3	5x80/32	5x60/32
4	40	250	3	6	40	250	3	6	40	250	3	6	40	110	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	300	3	6	30	300	3	5x80/32	5x60/32
4	40	250	3	4	40	250	3	4	40	250	3	4	40	300	3	5x90/32	5x70/32
6	30	250	3	6	30	250	3	6	30	280	3	6	30	300	3		5x70/32
4	40	160	3	4	40	190	3	6	40	160	3	6	40	170	3		5x80/32
6	30	250	3	6	30	250	3	6	30	280	3	6	30	300	3	5x80/32	5x60/32
4	40	160	3	6	40	140	3	6	40	150	3	6	40	170	3	5x90/32	5x70/32

(Technical definition)

8.3) Normal snow pressure zone and seadimension, installation of all roof fields.

(1) : 2Screws/intersection if
if steel frame

Normal Site Pressure

10° to 50° exposed site (category 0) 2 sides															
Wind Zone 1				Wind Zone 2				Wind Zone 3				Wind Zone 4			
Snow Zone E				Snow Zone D				Snow Zone D				Snow Zone A2			
Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection (1)	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection (1)
6	22	270	3	6	22	270	3	6	22	270	3	6	22	270	2
4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	2
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	2
6	27	250	3	6	27	250	3	6	27	250	3	6	27	250	3
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3
6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3
4	40	170	3	4	40	170	3	4	40	170	3	4	40	170	3
6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3
4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3
6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3
4	40	170	3	4	40	180	3	4	40	180	3	4	40	180	3

Screwing on slat and counter-slat/Steel
countersunk screw A2 lg mini if connecting bolts wooden
frame or Ebanco screws 6.3 lg if metal frame

Any roof area		Centre distance ≤ 600 Rafter centre distance horizontal support battens	6	22	270	3	6	22	270	3	6	22	270	3	6	22	270	2	5x70/32
			4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	2	5x80/32
			4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	2	5x90/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	27	250	3	6	27	250	3	6	27	250	3	6	27	250	3	5x80/32
			4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32
		C'tre Dist Rafter ≤ 1500 horizontal support battens	6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3	5x80/32
			4	40	170	3	4	40	170	3	4	40	170	3	4	40	170	3	5x90/32
		C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3	5x80/32
			4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3	5x90/32
		C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	6	30	270	3	6	30	270	3	6	30	270	3	6	30	270	3	5x80/32
			4	40	170	3	4	40	180	3	4	40	180	3	4	40	180	3	5x90/32

(1) : 2Screws/intersection if
steel frame

Depression Site Seaside

10° to 50° exposed site (category 0) 2 sides															
Wind Zone 1				Wind Zone 2				Wind Zone 3				Wind Zone 4			
Snow Zone E				Snow Zone D				Snow Zone D				Snow Zone A2			
Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection	Number of brackets	h: Tile batten thickness	b: Width mini support batten	Number of Screws/intersection
6	22	280	3	6	22	280	3	6	22	280	3	6	22	280	3
4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	3
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3
6	27	250	3	6	27	250	3	6	27	250	3	6	27	250	3
4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3
6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3
4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3
6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3
4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3
6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3
4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3

Screwing on slat and counter-slat/Steel
countersunk screw A2 lg mini if
connecting bolts wooden frame or Ebanco
screws 6.3 lg if metal frame

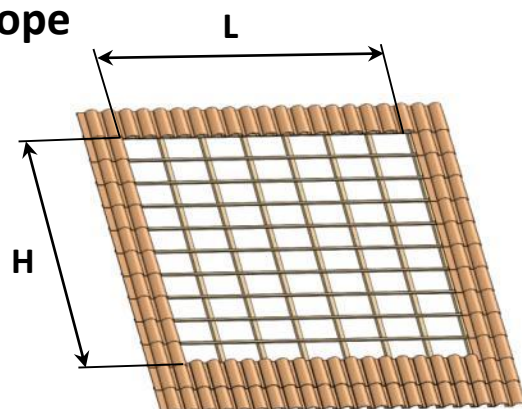
Any roof area		Centre distance ≤ 600 Rafter centre distance horizontal support battens	6	22	280	3	6	22	280	3	6	22	280	3	6	22	280	3	5x70/32
			4	27	250	3	4	27	250	3	4	27	250	3	4	27	250	3	5x80/32
			4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32
		600 < C'tre dist ≤ 900 Rafter centre distance horizontal support battens	6	27	250	3	6	27	250	3	6	27	250	3	6	27	250	3	5x80/32
			4	40	250	3	4	40	250	3	4	40	250	3	4	40	250	3	5x90/32
		C'tre Dist Rafter ≤ 1500 horizontal support battens	6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3	5x80/32
			4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3	5x90/32
		C'tre Dist Beam ≤ 1500(1) Sarking Vertical support battens	6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3	5x80/32
			4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3	5x90/32
		C'tre Dist ≤ 1500 Wood or metal structure Vertical support battens	6	30	280	3	6	30	280	3	6	30	280	3	6	30	280	3	5x80/32
			4	40	180	3	4	40	180	3	4	40	180	3	4	40	180	3	5x90/32

9) Installation Instructions for the Easy-Roof System

9.1.1) PV field centered on the slope

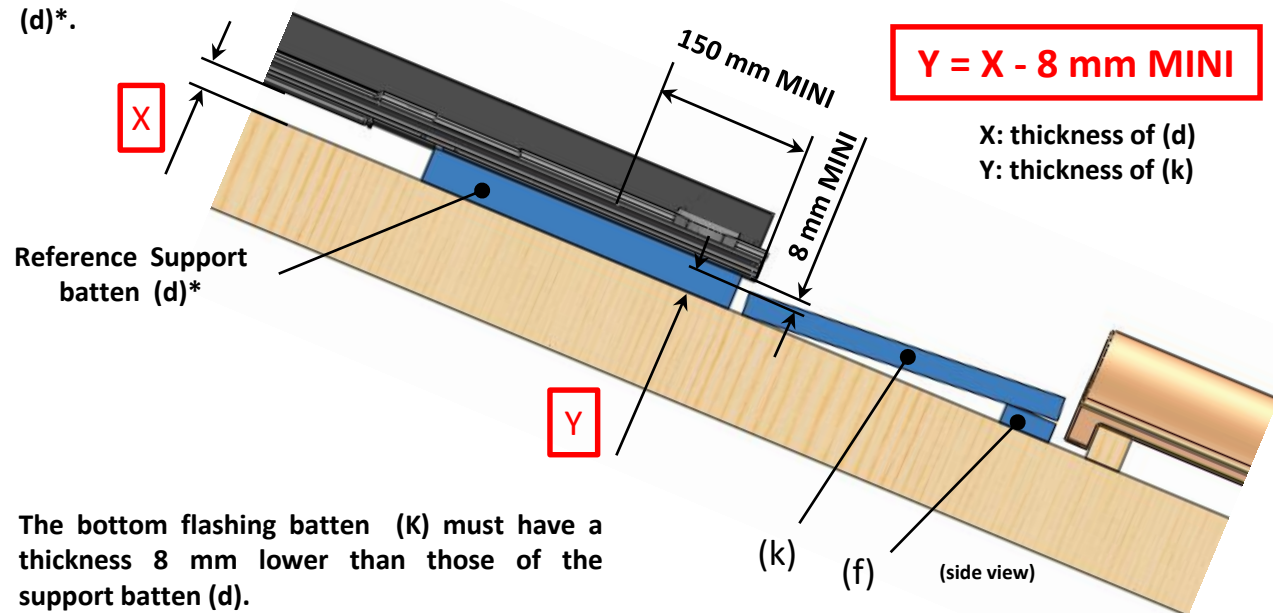
This section of the manual applies only to the installation of the PV field at the center of the slope. For installations on the eave/gutter, go directly to page 23 of this document

Remove the tiles of the photovoltaic field, for L and H to see page 12 and 13



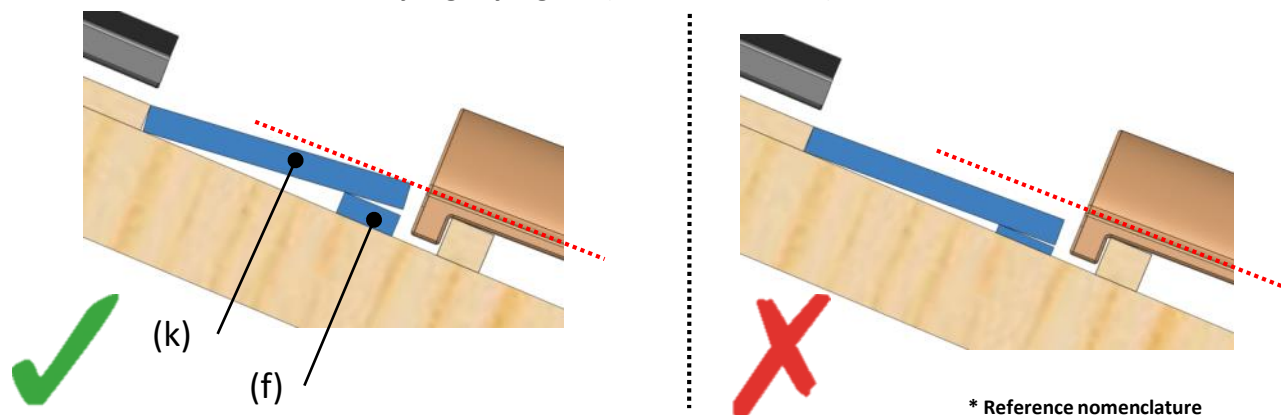
9.1.2) Definition of bottom flashing support batten

1) Define the thickness of the bottom flashing batten according to the thickness of the support batten (d)*.



The bottom flashing batten (K) must have a thickness 8 mm lower than those of the support batten (d).

2°) Position the batten (F) in order to have the top of the bottom flashing batten (H) flush with the water flow of the tile, eventually slightly higher (a few millimeters).



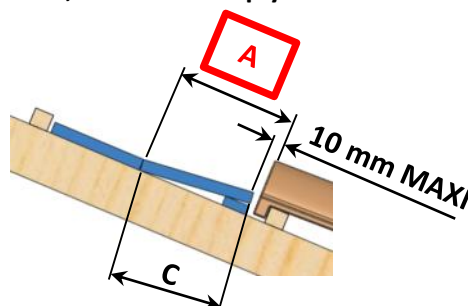
PV field centered on the slope

9.1.3) Installation of the bottom flashing support batten and the reference support batten.

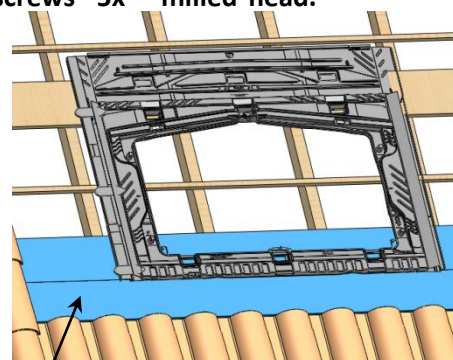
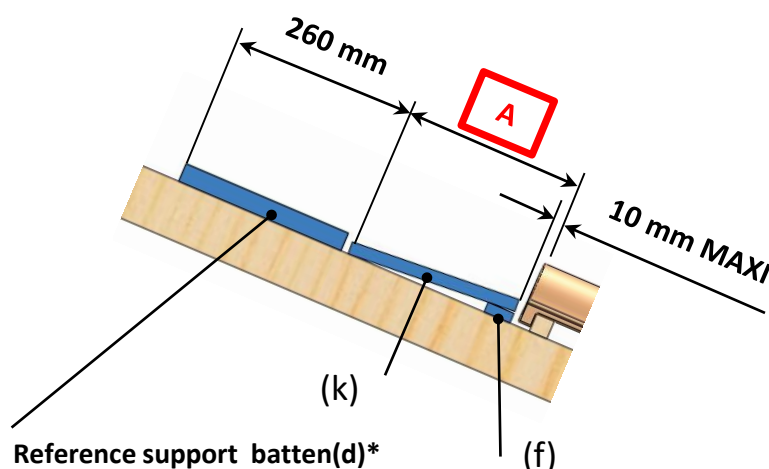
1°) Determination of dimension A (Bottom flashing batten)

The « C » dimension is the Minimum batten width necessary to avoid reverse slope on the bottom flashing. It's possible to use a wider batten, this will simply raise

Roof inclination (°)	Minimum batten width C dimension (mm)	Mini A dimension (mm)
10 to 12	250	260
13 to 16	220	230
17 to 19	180	190
20 to 24	150	160
25 to 50	120	130



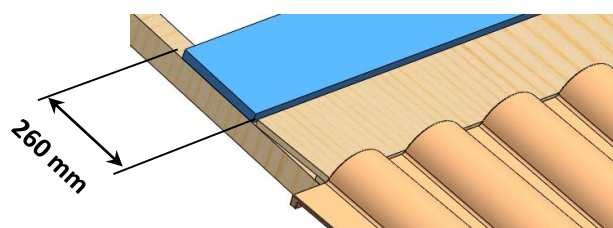
2°) Set up the bottom flashing batten at 10 mm MAXIMUM to the top of the tile . Use the wood (f) and (k) defined in the preceding operation. Screw with stainless screws 5x** milled head.



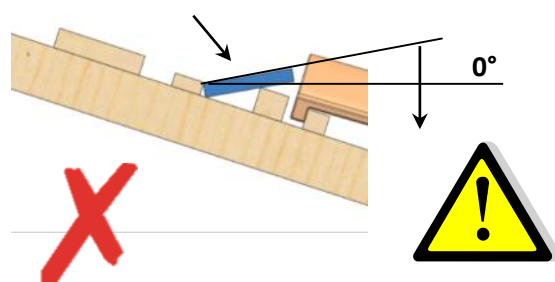
The bottom flashing batten and the bottom flashing itself will have to be 2 tiles longer on each side of the PV field.

3°) Set up the first reference support batten d*. Position this support batten 260 mm to the break of the bottom flashing flooring, for support batten wider than 250mm leave a gap of 10mm between the Reference support batten (d) and (k).

Screw the support batten following the recommendations page 19 to 20 to know the type and the number of screws to be used.



Reverse slope FORBIDDEN



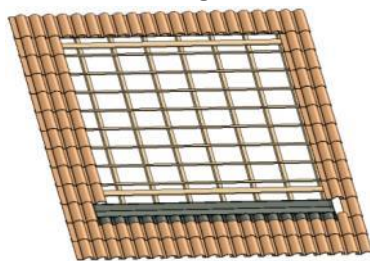
* Reference nomenclature

PV field centered on slope direction

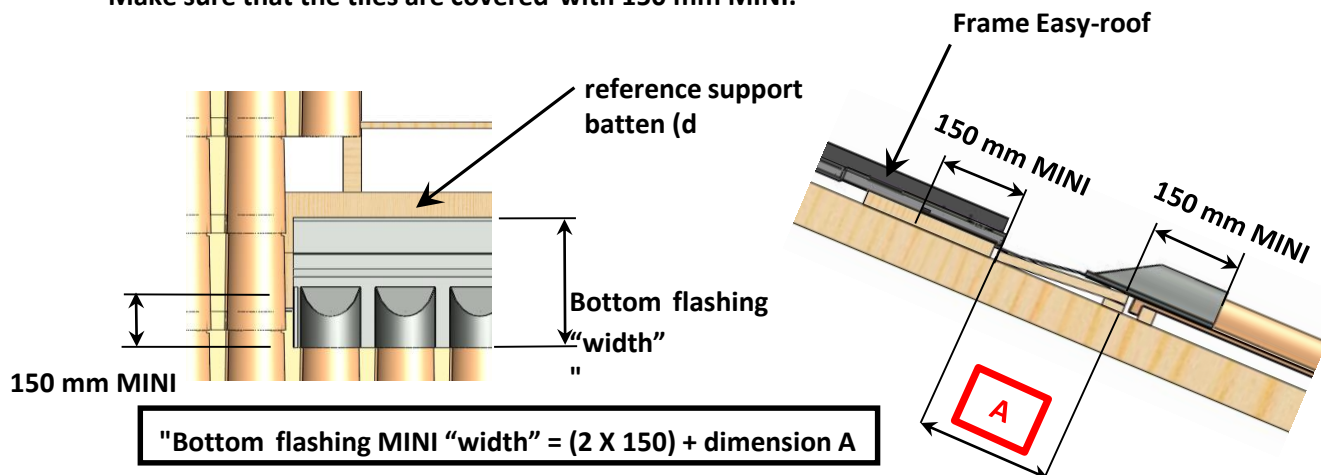
9.1.4) Installation of the bottom flashing

Set up the bottom flashing. Attention not to stick the ends and the higher edge, in order to be able to flip over the ends.

The overlap on the tiles will be made according to the tiles model.



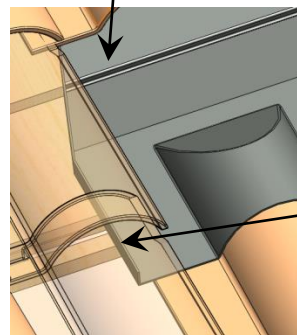
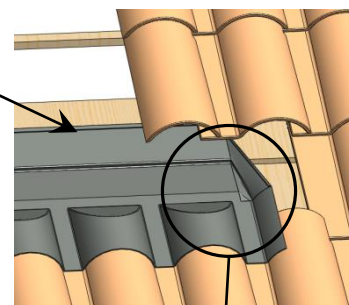
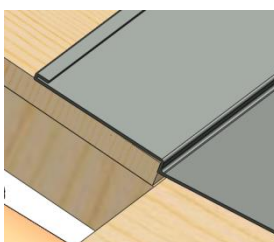
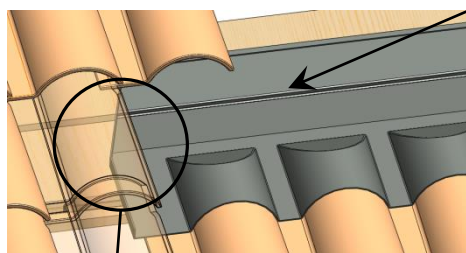
Make sure that the tiles are covered with 150 mm MINI.



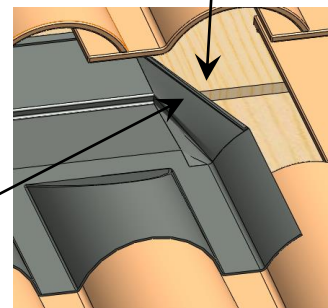
Make a flip over from 10 to 15 mm on the higher edge of the bottom flashing over all the width of the PV field

(Left side of PV field)

(Right side of PV field)



Make a flip over from 10 to 15 mm on the right and left side of the bottom flashing on all the height

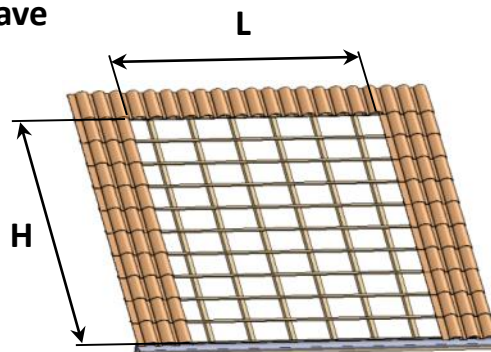


* Reference nomenclature

PV field positioned at the gutter/eave

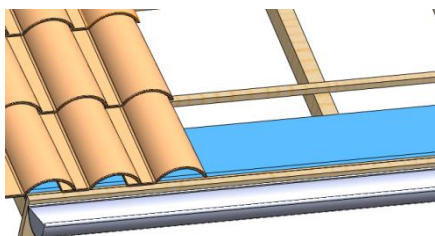
9.2.1) PV field positioned at the gutter/eave

This section of the assembly guide relates only to the installations of PV field positioned at the gutter/eave



Remove the tiles of the photovoltaic field, for L and H to see page 14 and 15

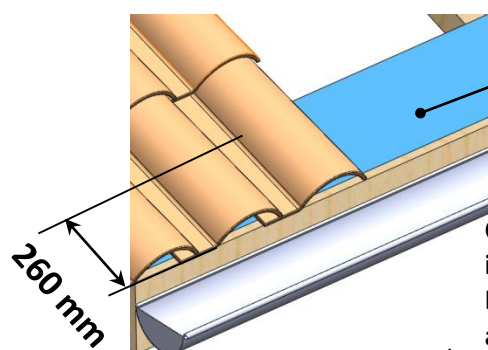
9.2.2) Positioning of the flooring at the gutter/eave



Set up the first support batten at 260mm from the eave batten (tilting lath).

For support batten wider than 250mm leave a 10mm gap with the eave batten (tilting lath) and do a chalk line at 260mm from the eave batten (tilting lath) to create a reference line.

Screw the support batten following the recommendations page 18 to 20 to know the type and the number of screws to be used.



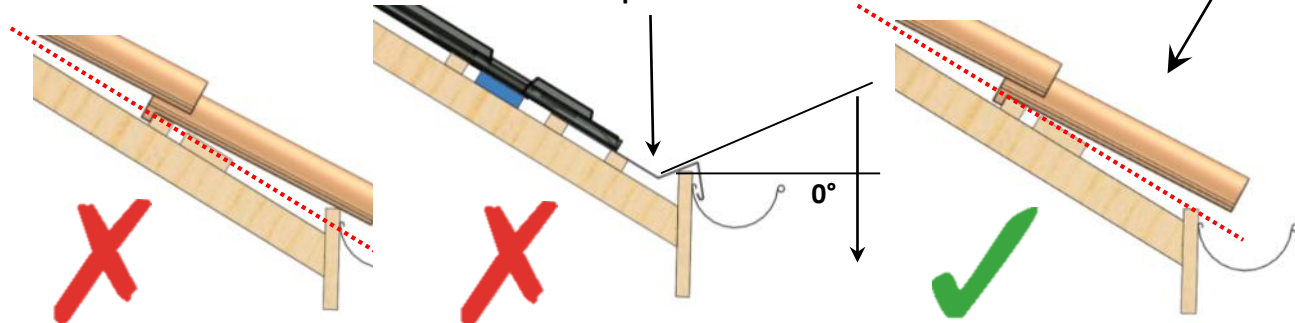
Reference support batten (d)*

* Reference nomenclature



CAUTION: The low part of PV field (with the gutter) must imperatively be on the same plan as the flooring of the system. In the contrary case the dimension of 260 mm is not applicable any more. It is necessary to move up the PV field in the slope direction. The dimension of positioning must be redefined, see page 22.

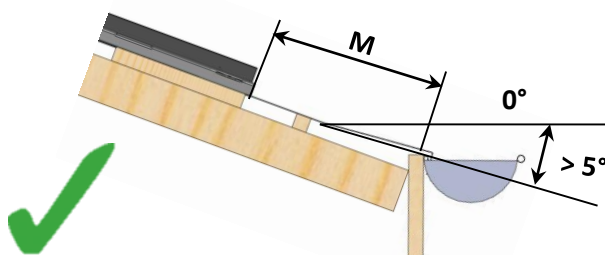
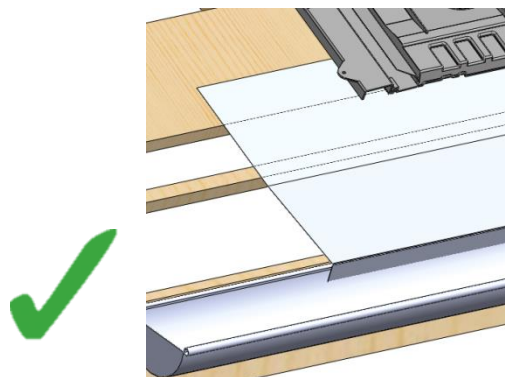
Reverse slope **FORBIDDEN**



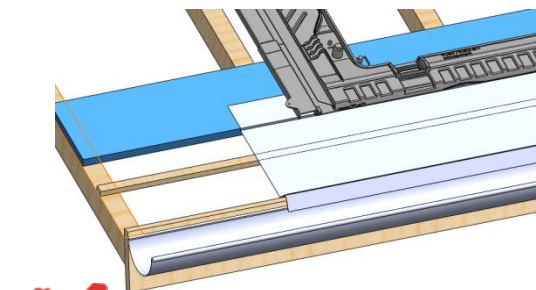
PV field positioned at the gutter/eave

9.2.3) Specific position of the reference support batten for PV field at the gutter/eave

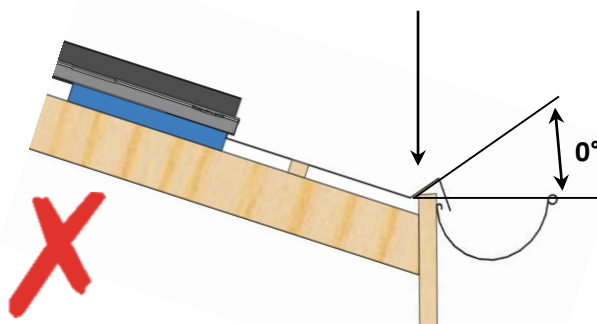
The low part of PV field (with the gutter) must imperatively be on the same plan as the flooring of the system. In the contrary case the dimension of 260 mm is not applicable any more. It is necessary to move up the PV field in the slope direction. The dimension of positioning must be redefined.



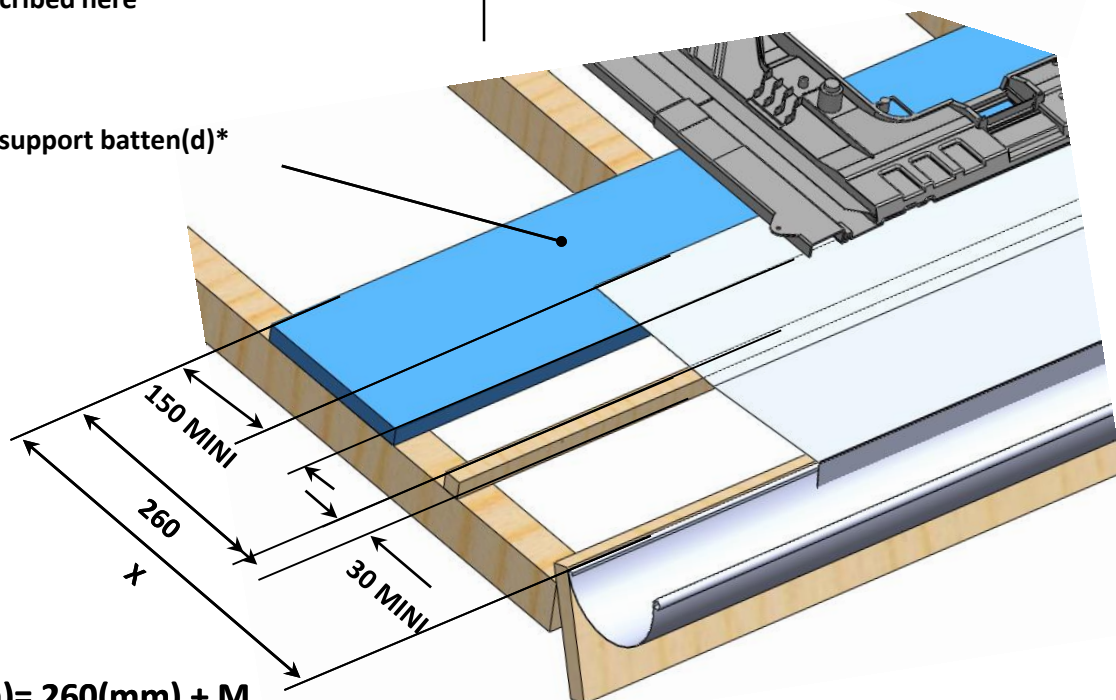
« M » to be measured on the roof by observing the conditions described here



Reverse slope FORBIDDEN



Reference support batten(d)*

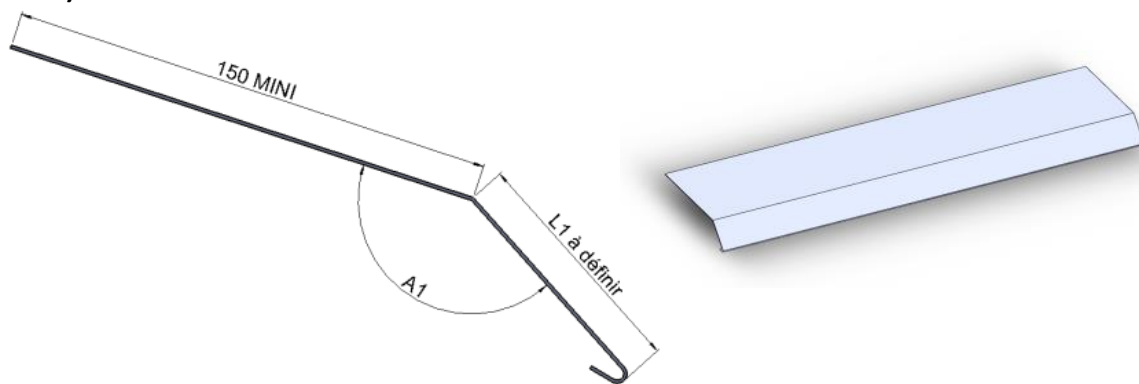


$$X \text{ (mm)} = 260 \text{ (mm)} + M$$

* Reference nomenclature

PV field positioned at the gutter/eave

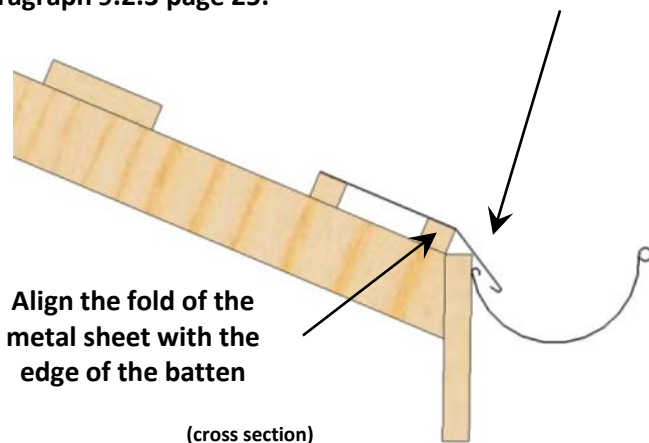
9.2.4) Installation of the bottom metal sheet



To realize the bottom metal sheet, the A1 angle is equal to $115^\circ +$ the angle of inclination of the roof.
Example: $A1 = 115^\circ + 30^\circ = 145^\circ$

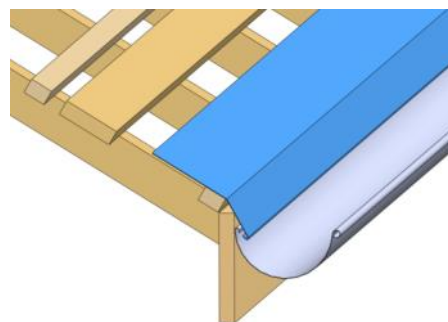
the L1 dimension is defined by the position of the gutter. Define L1 so that the low end of the metal sheet is at least 20 mm in the sewer.

NOTE: this kind of metal sheet is applicable only for the PV field positioned at the gutter/eave. See paragraph 9.2.3 page 25.



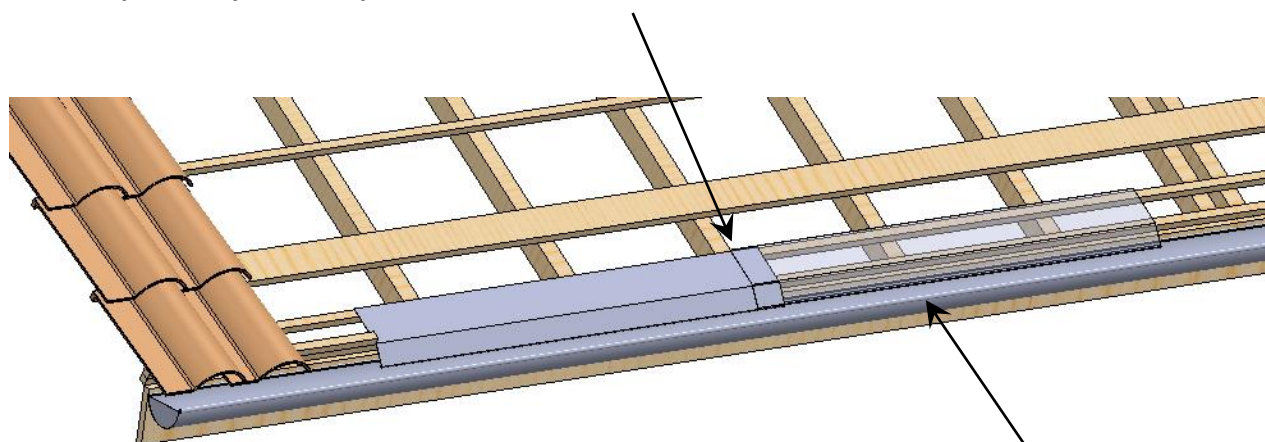
Align the fold of the metal sheet with the edge of the batten

(cross section)



(cross section)

The length of the metal sheet can be variable. If it is needed to use several metal sheets, those will have imperatively to overlap of 100 mm MINI.



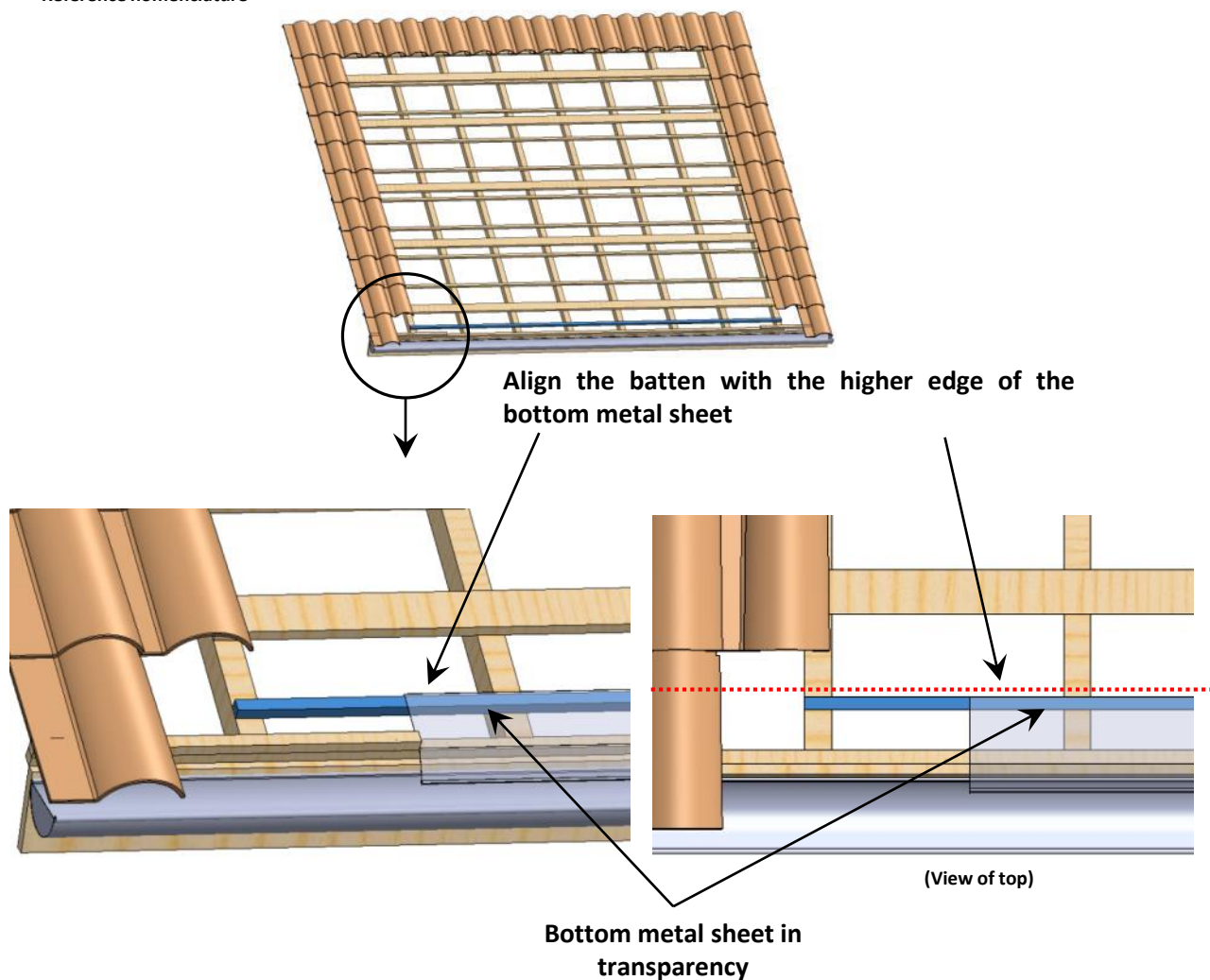
Metal sheet in transparency

PV field positioned at the gutter/eave

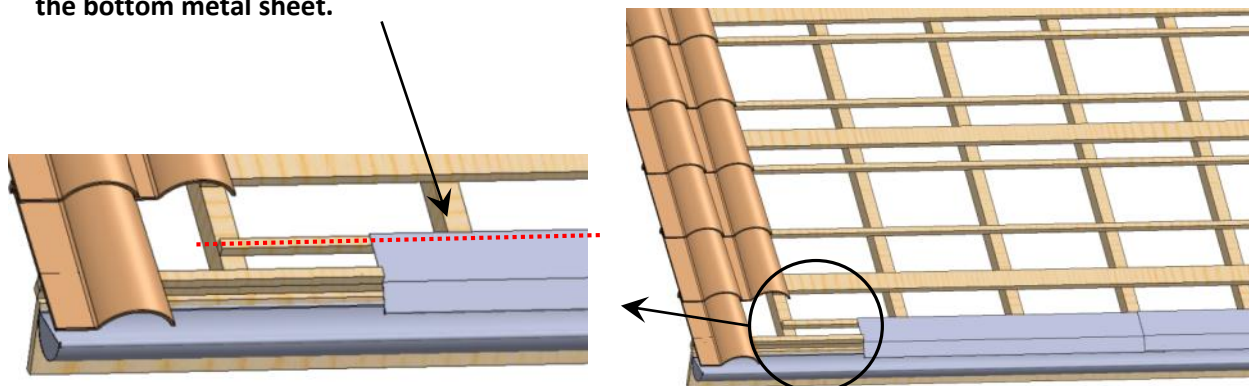
9.2.4) Installation of the bottom metal sheet

Add a batten or a support batten under the bottom metal sheet to support this one. This batten will at least make all the width of the PV field. The thickness of this batten will be identical to the thickness of the support batten (d)*.

* Reference nomenclature

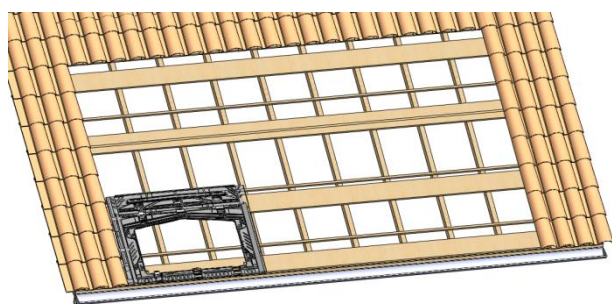


Set up and fasten the bottom metal sheet all over the width of the PV field. Fasten only the top part of the bottom metal sheet.

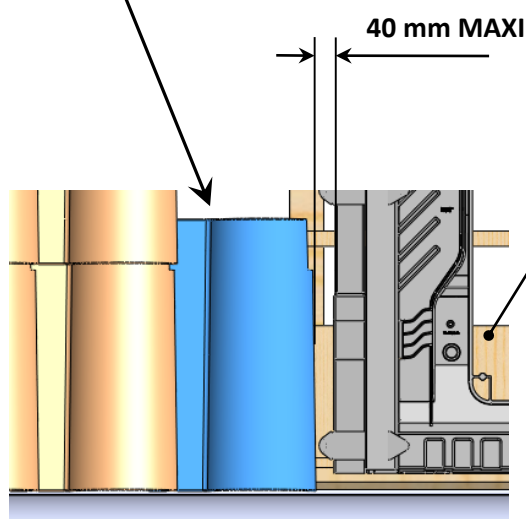


PV field positioned at the gutter/eave

9.2.4) Installation of the bottom metal sheet



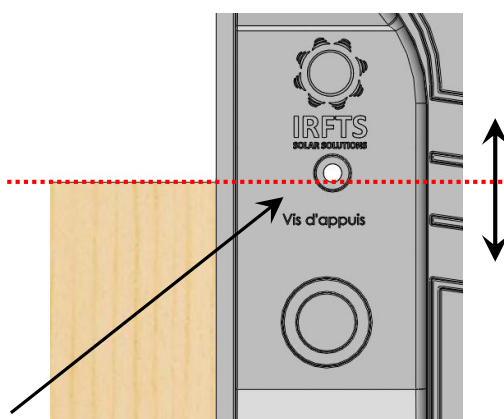
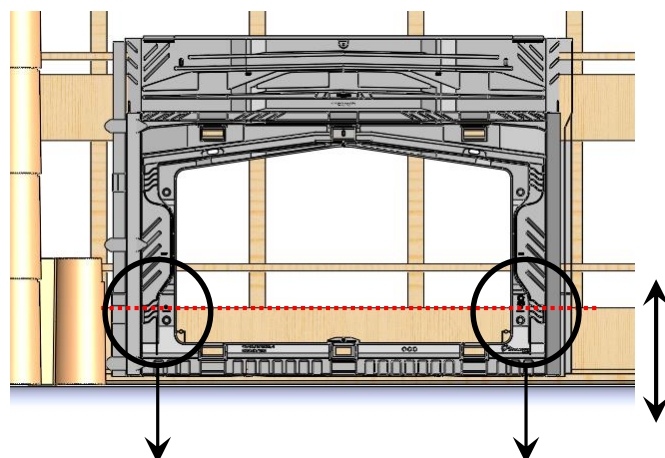
Replace the first tile at the lower left corner, Position the first frame (1) at a distance of 40 mm MAXIMUM of the edge of the tile



Position the frame (1) in the slope direction using two screws of $\varnothing 6$ placed in the openings indicated and put them leaning against the reference support batten (d), for reference batten wider than 250mm align the hole with the chalk line as indicated p.23



**DO NOT SCREW THESE SCREWS IN REFERENCE SUPPORT BATTEN.
MUST REMOVE SCREWS BEFORE THE MOUNTING OF THE PV
MODULES.**

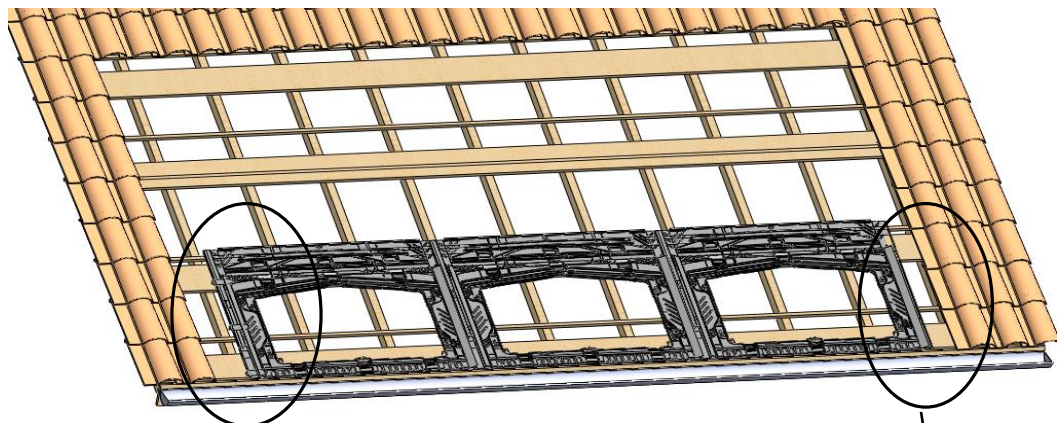


* Reference nomenclature

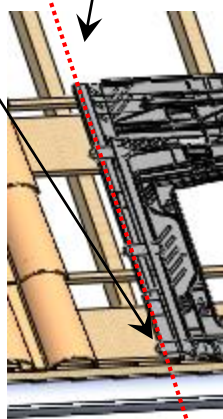
PV field positioned at the gutter/eave

9.2.4) Installation of the bottom metal sheet

The bottom metal sheet must be aligned with the frames on each side of the PV field.
Position all the frames of the first line while proceeding as indicated page 28. Do a marking at each end on the wood. Then slide the frames upward slightly

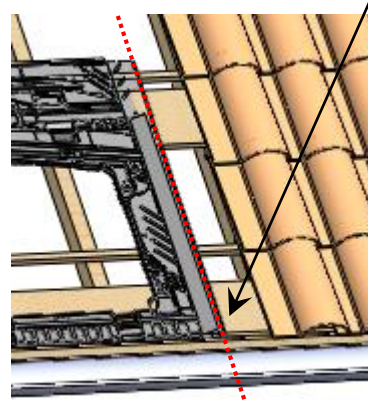


Marking



(view with fictitious frames)

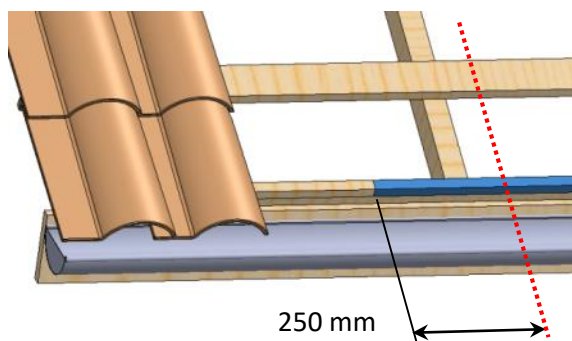
Marking



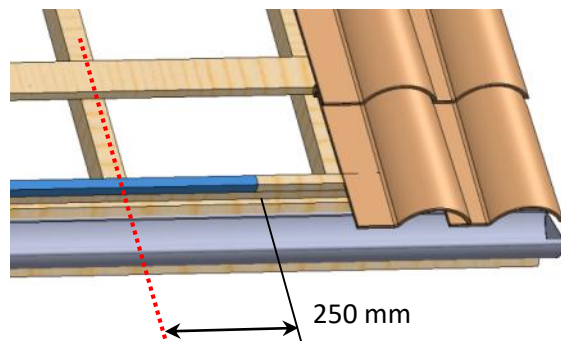
(view with fictitious frames)

(view with fictitious frames)

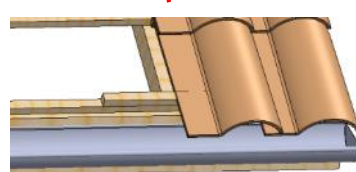
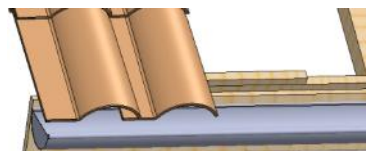
Cut the top batten of the double lath 250mm wider than the marking so that the remaining batten is on the same level as the reference support batten. If the barge board is too high, cut it again along all the length of the batten that was removed previously.



250 mm



250 mm



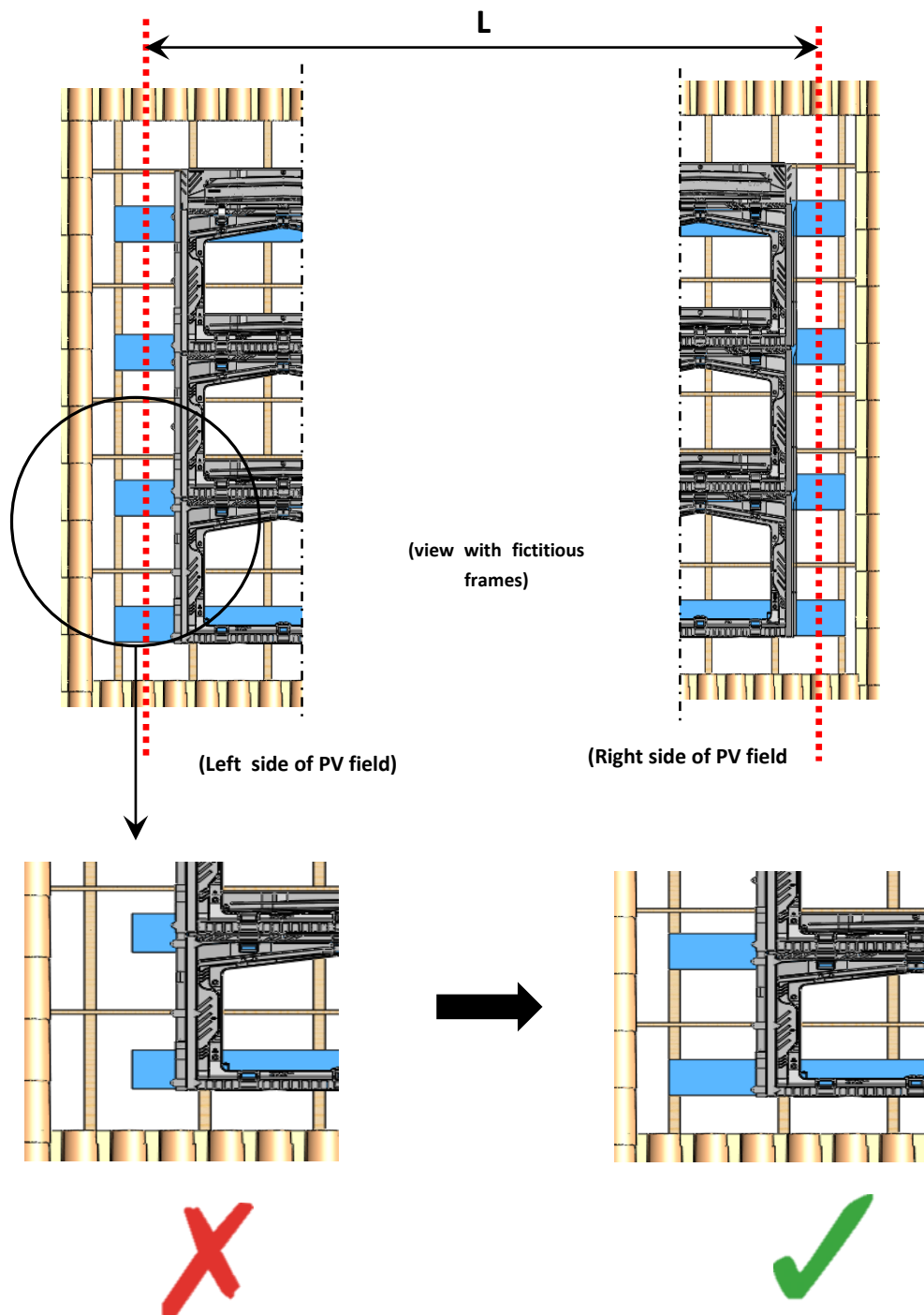
Flooring Installation

9.3) Flooring installation for all PV field installation

The length "L" of the support battens (d)* must imperatively make all the width of the PV field.
For the value "L" to see table page 14 of this document.

If needed, add to this dimension "L" a sufficient length on each side of PV field so that the ends of the batten lean on the rafter on both sides.

* Reference nomenclature



Flooring installation

9.3) Flooring installation for all PV field installation

9.3.1) Flooring for an assembly with 4/6 brackets per module

Set up the horizontal flooring for the frames support with a number of support batten (d)* equal to $(1 \times \text{no. vertical PV modules}) + 1$, at the top add a tile batten.

To screw the support batten follow the recommendations page 18 to 20 to know the type and the number of screws to be set up.

Step 1: Position and screw the first support batten 885 mm above the reference support batten (installed at the preceding Step).

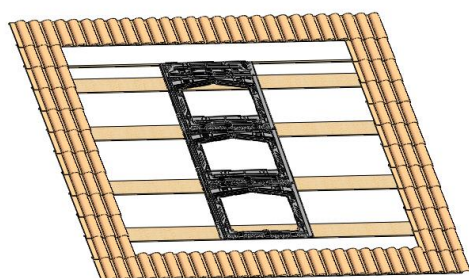
Step 2: Position and screw another support batten 1020 mm above the preceding one.

Etape 3 : Repeat Step 2 as many times as necessary up to the highest line of modules.

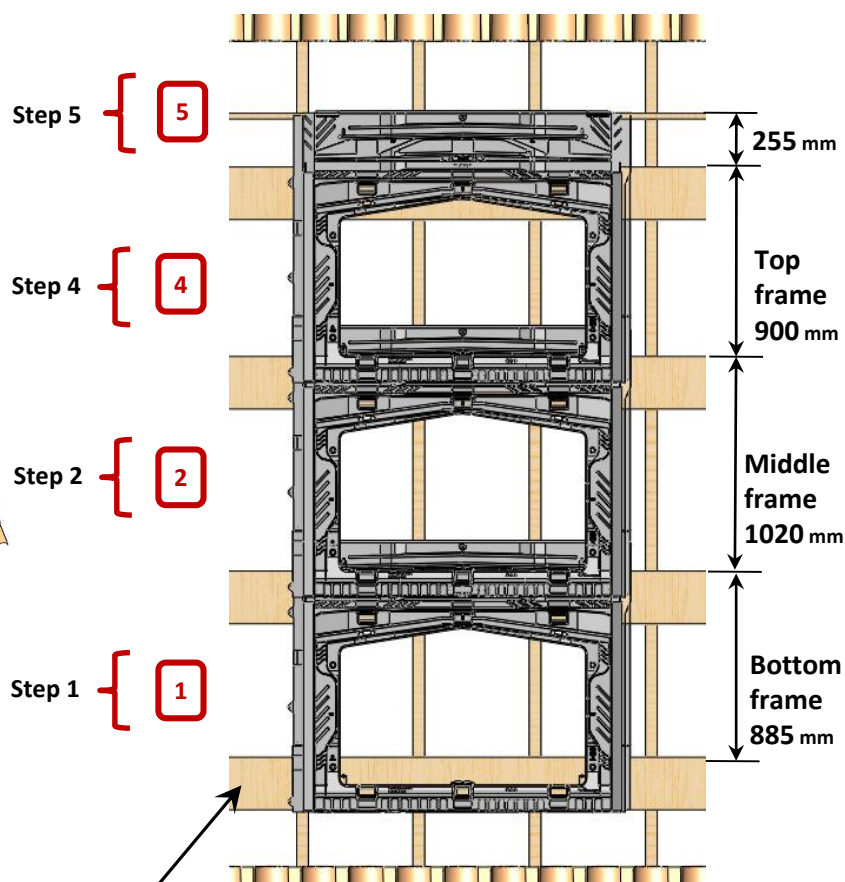
Etape 4 : Position and screw the last support batten 900 mm above the preceding one

Etape 5 : Position and screw the tile batten 225 mm above the preceding support batten

* Reference nomenclature



(view without the rafters and tiles batten)



Reference support batten

(view without the rafters and tiles batten)

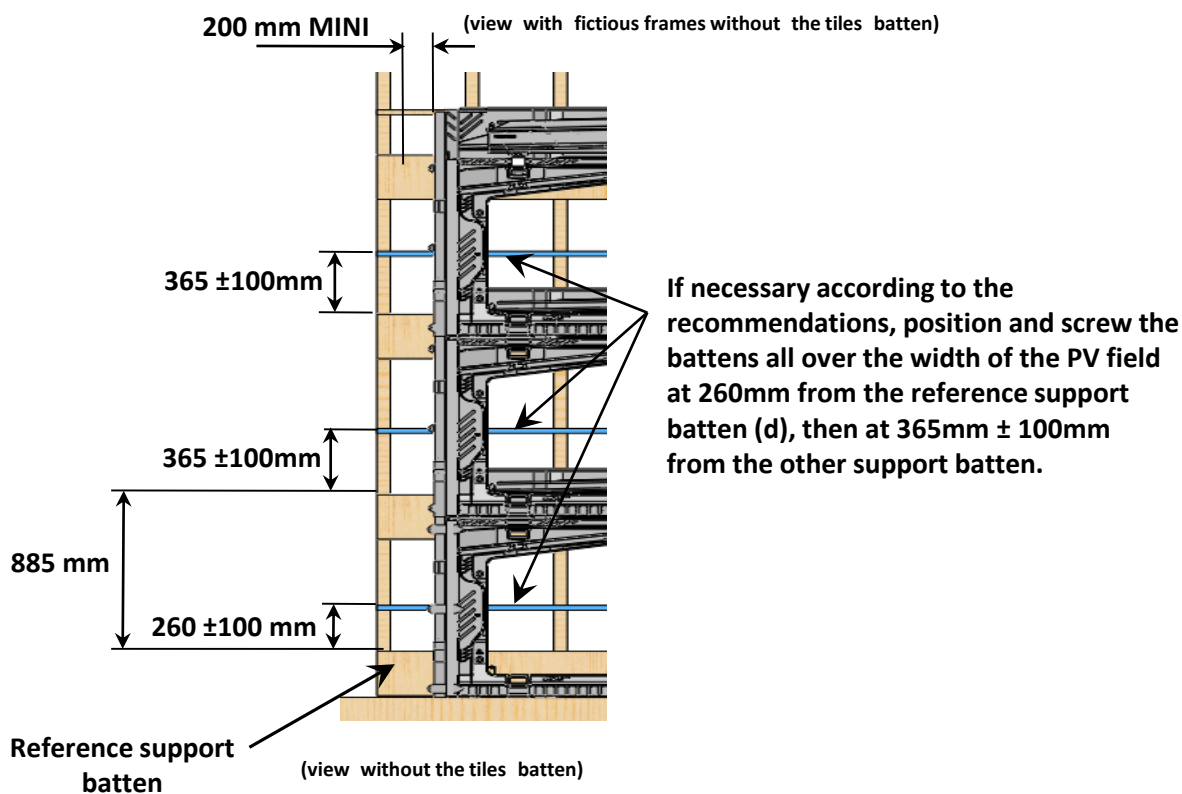
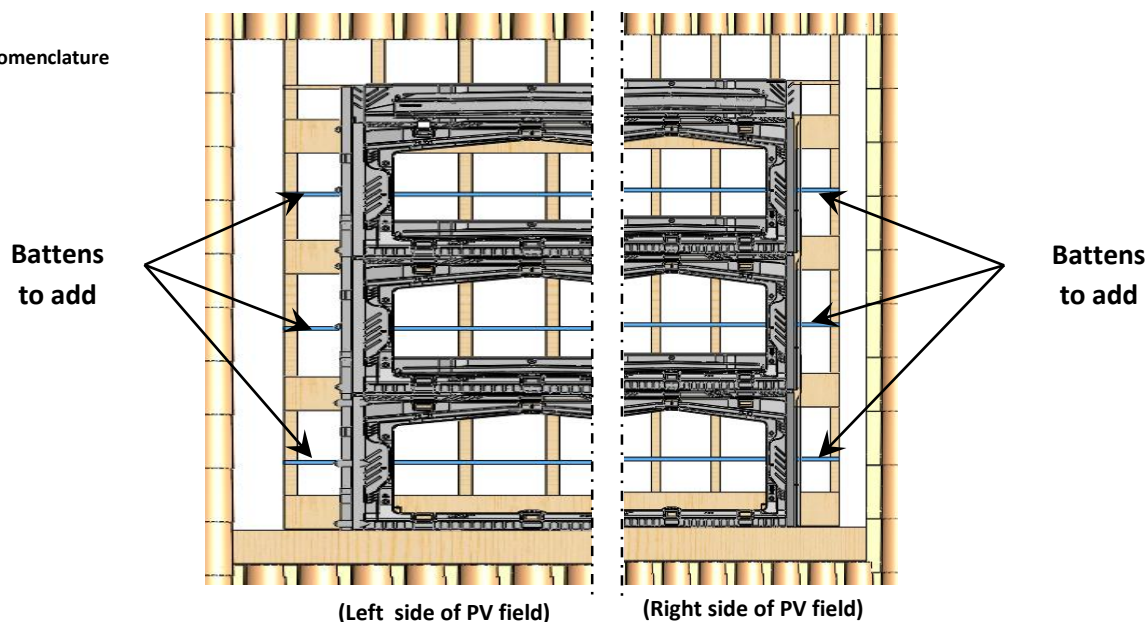
Flooring installation

9.3.2) Flooring for the assembly of the PV field

The battens must pass under the frame, to exceed this one of at least 200 mm MINI outside the PV field.

For a roof without tiles battens, it is imperatively necessary to add a horizontal batten with a thickness identical to the support batten (d)* by line of frame, centered on the height of each line, over all the width of the PV field.

* Reference nomenclature



9.4)

Installation of system EASY-ROOF

This section of the installation manual relates to all kind of installation (middle of the slope or at the gutter)

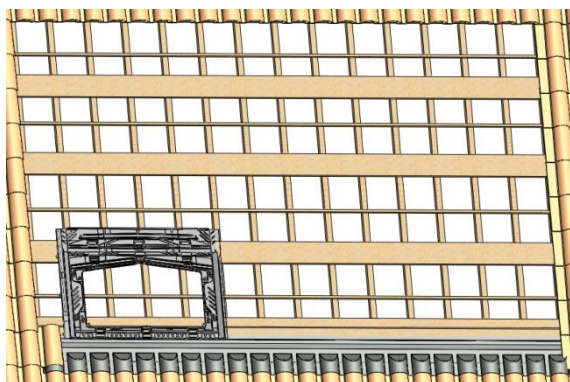
9.4.1)

We require the installation of a breather membrane before the EASY-ROOF integration system is put in place.

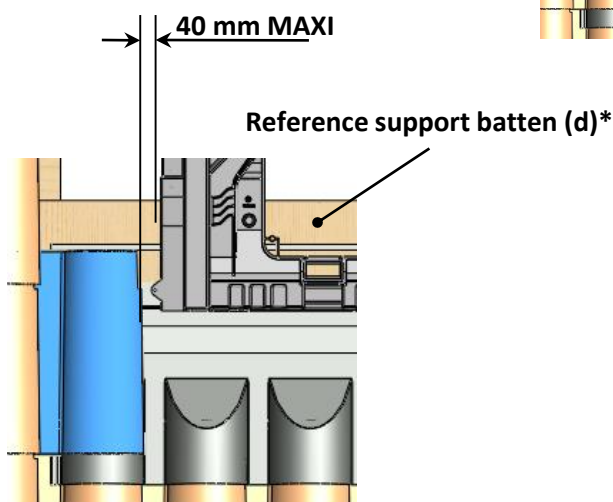
The installation of the membrane is described in a document entitled "INSTRUCTIONS AND INSTALLATION OF THE BREATHER MEMBRANE" which is available from the manufacturer of the Easy-Roof system. Refer to this document to ensure that the installation is compliant.

9.4.2)

Installation of the EASY-ROOF system



Replace the first tile with the left lower corner, Position the first frame (1) at a distance of 40 mm MAXIMUM of the edge of the tile.

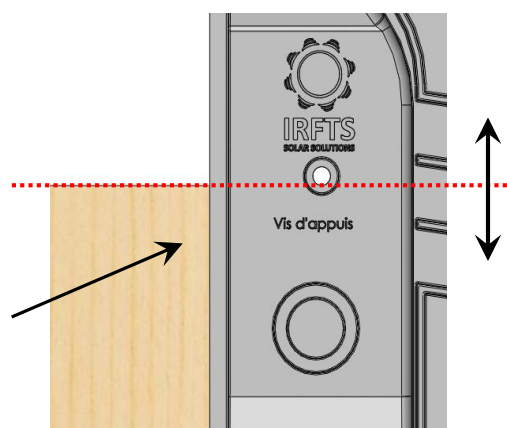
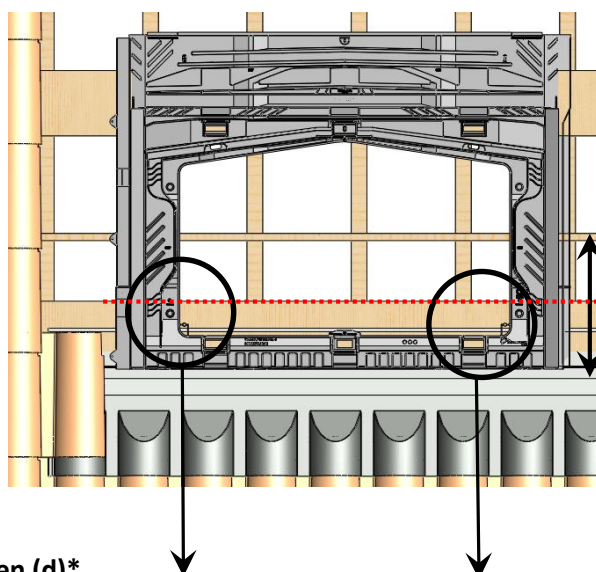


Position the frame (1) in the slope direction using two screws of $\varnothing 6$ placed in the openings indicated and put them leaning against the reference support batten (d), for reference batten wider than 250mm align the hole with the chalk line as indicated p.23



**DO NOT SCREW THESE SCREWS IN REFERENCE SUPPORT BATTEN.
MUST REMOVE SCREWS BEFORE THE MOUNTING OF THE PV
MODULES.**

* Reference nomenclature

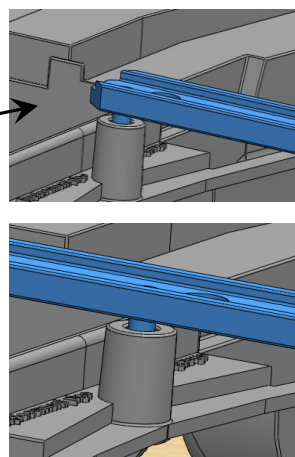
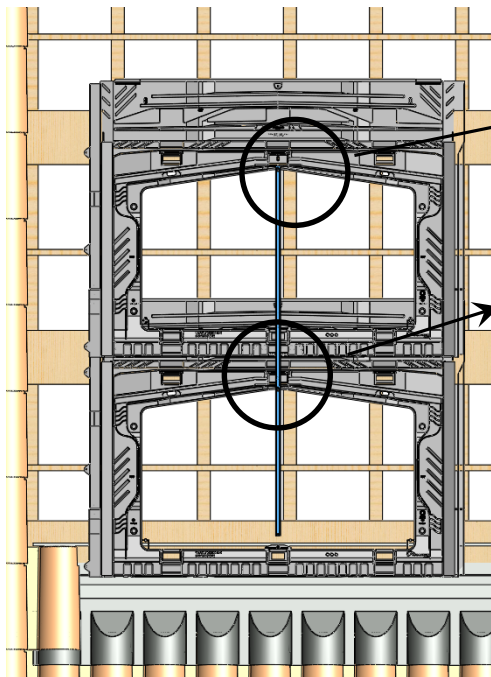
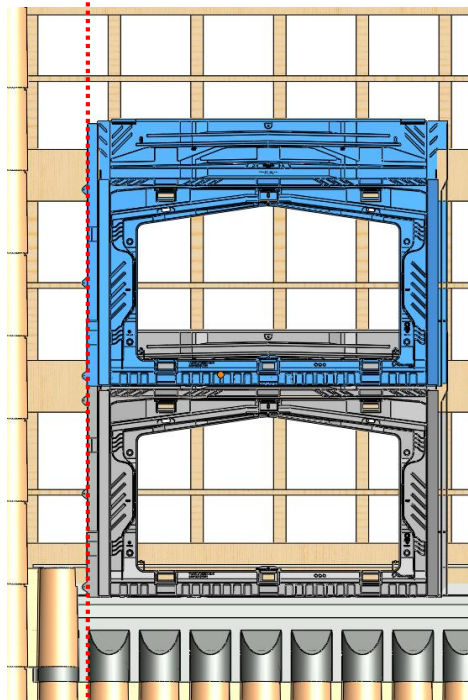


9.4.2)

Installation of the EASY-ROOF system

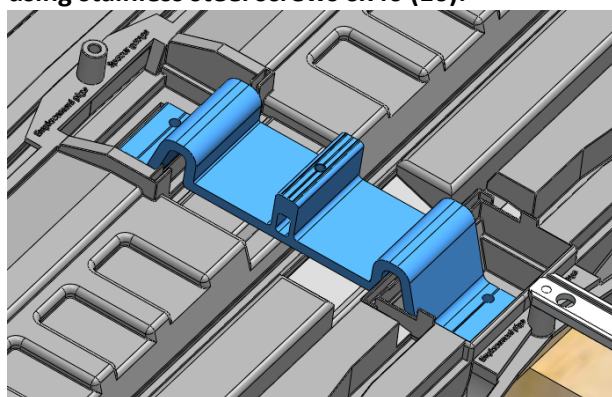
1°) Set up and interlock another frame above the precedent. Align them perfectly in the vertical direction. (do a marking with the chalk line)

2 a) Adjust the vertical spacing between the frames by fitting the mounting tool in two frames. When mounting the 4 brackets, screw the frame on the board in the hole for this purpose, screw with stainless screws 6x40 (10).

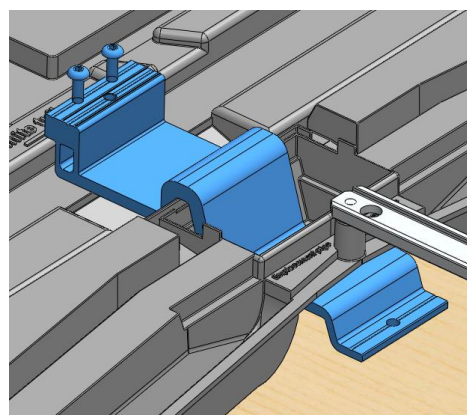
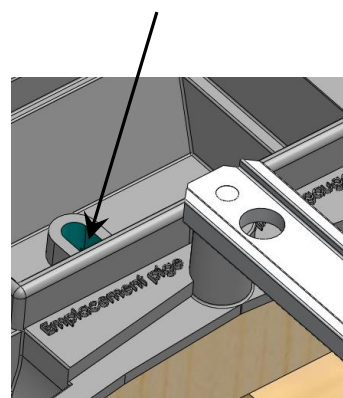


Hole for the screw that maintains the frame (4-bracket assembly)

2 b) When assembling with 6 brackets, place the top frame and place a middle bracket into place and screw on the board. If there is no frame at the top, screw the end bracket into its slot , using stainless steel screws 6x40 (10).



6 brackets middle of the field

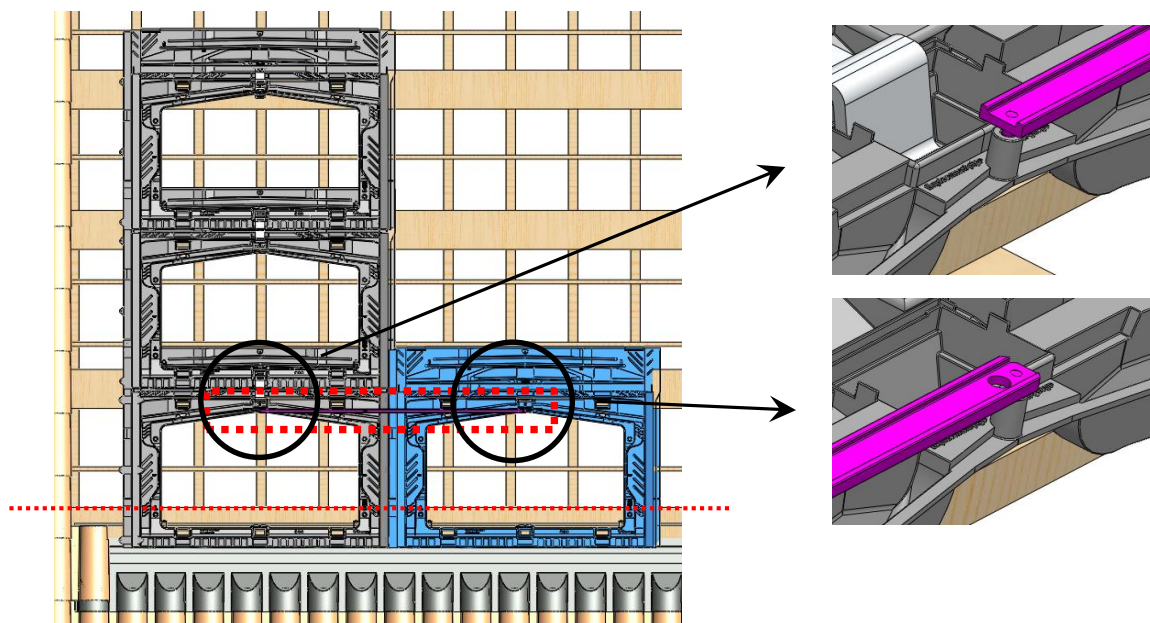


6 brackets top of the field

9.4.2)

Installation of the EASY-ROOF system

1) Set up another frame on the first line. Align it to the reference board as shown on page 33. Encase an mounting tool between at the top of the two lower frames. At least two mounting tools are required to build the system.



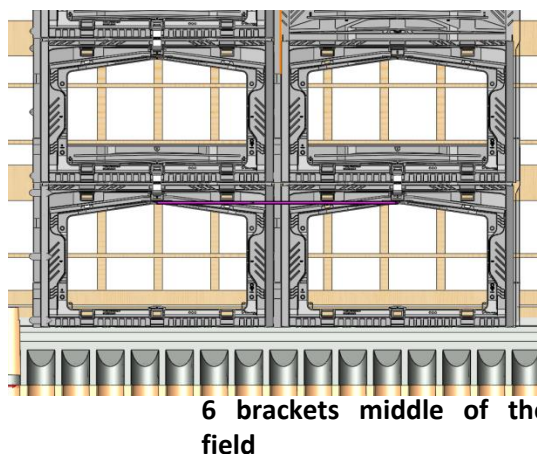
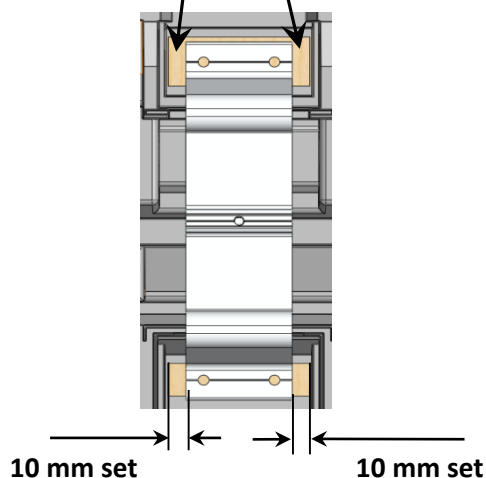
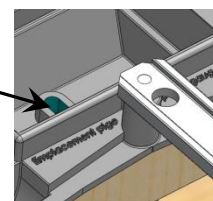
THE USE OF MOUNTING TOOLS IS MANDATORY TO ASSEMBLE THE WHOLE SYSTEM.

2) a) When assembling 4 brackets, screw the frame on the board in the hole provided for this purpose, then screw the middle brackets into the slots with stainless screws 6x40 (10) ..

b) When assembling 6 brackets, place the top frame and place a middle bracket into place and screw on the board. If there is no frame at the top, screw the end bracket into its slot, using stainless steel screws 6x40 (10)

Center the bracket in the horizontal direction into the positioning hole

Hole for the screw that maintains the frame (4-bracket assembly)



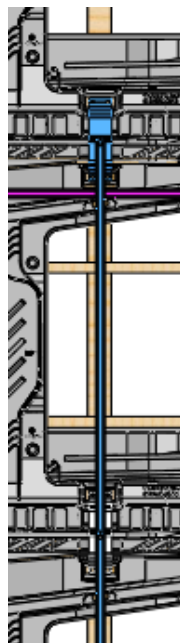
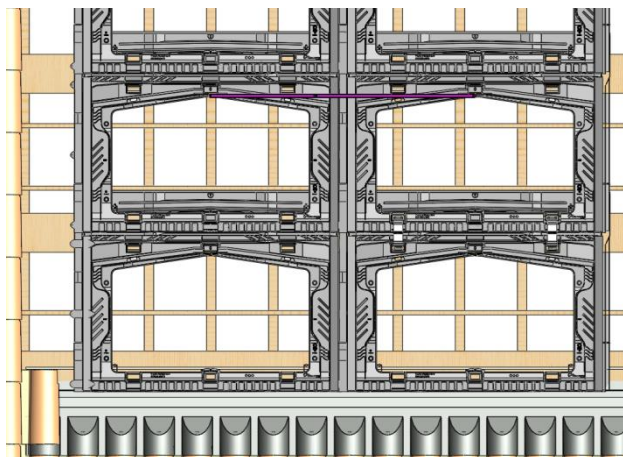
9.4.2)

Installation of the EASY-ROOF system

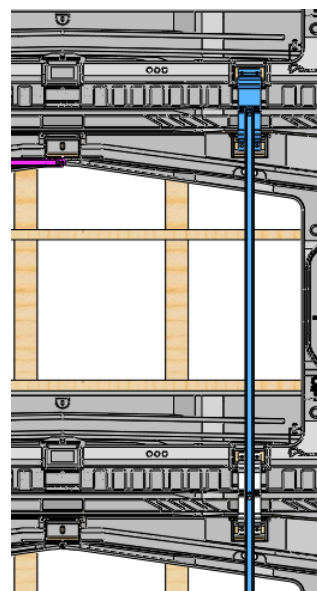
a °) 4-bracket assembly, place and screw the middle brackets with stainless screws 6x40 (10).

Place and encase a frame on the third line to the right of the previous one.

Adjust the vertical spacing between the frames using the mounting tool in the middle brackets, first right side and then left side, place and screw the brackets with 6x40 stainless screws (10).

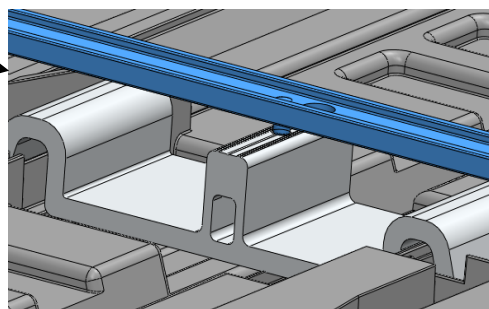
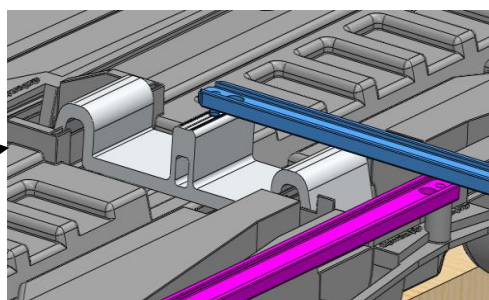
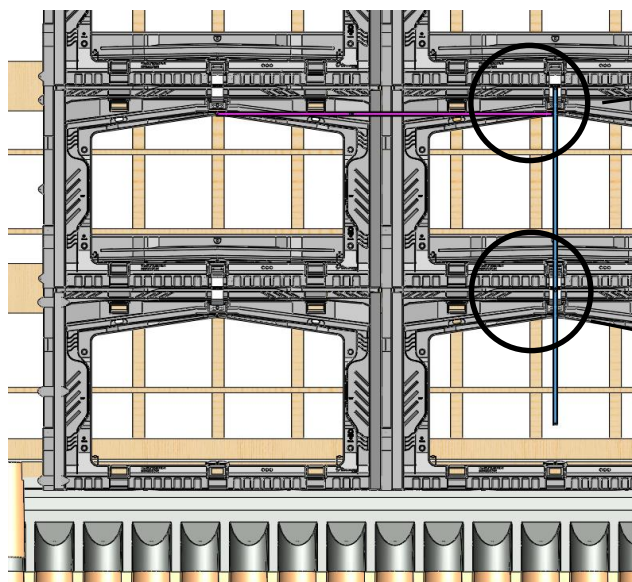


Left side



Right side

b °) 6-bracket assembly placing and encasing two mounting tools between the two frames in the upper section of it and the two middle brackets to give the step vertically and horizontally, screwed in with stainless steel screws 6x40 (10).

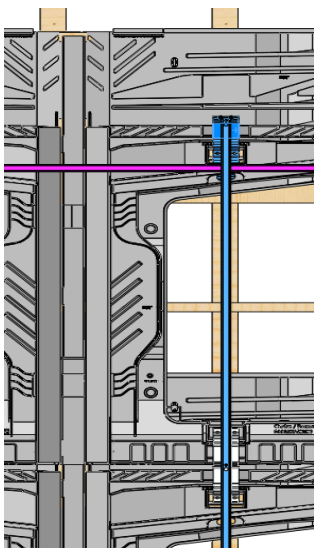


9.4.2)

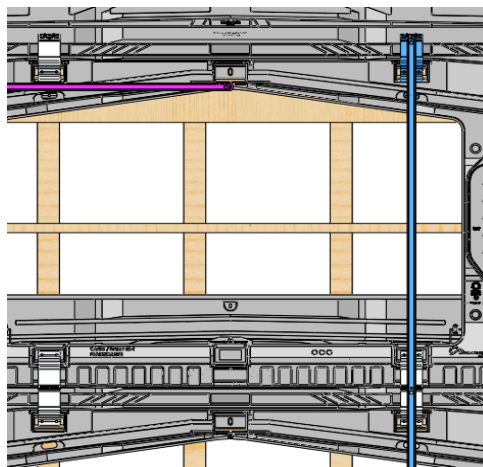
Installation of the EASY-ROOF system

5) Top of field 4 or 6 brackets always end up placing the end brackets with a mounting tool, screw in with stainless screws 6x40 (10), do the same for bottom end brackets.

a) 4-bracket assembly: place the left end bracket, then the right end bracket, screw with stainless screws 6x40 (10).

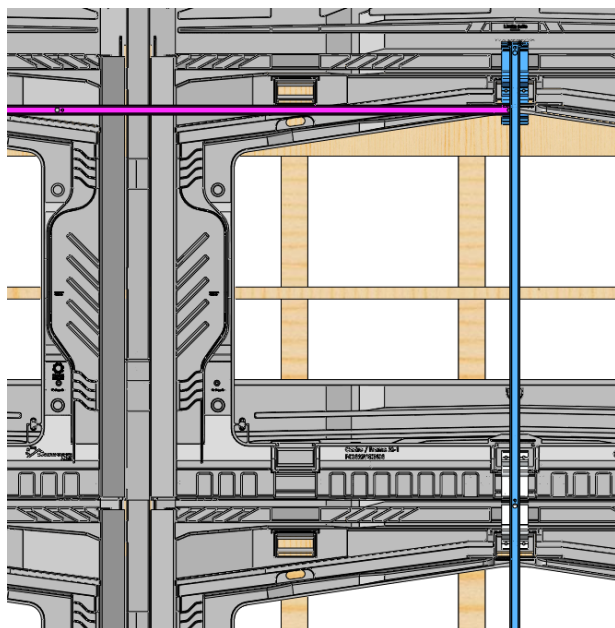


Left side



Right side

b) 6-bracket assembly: place the central end bracket, screw with stainless screws 6x40 (10).

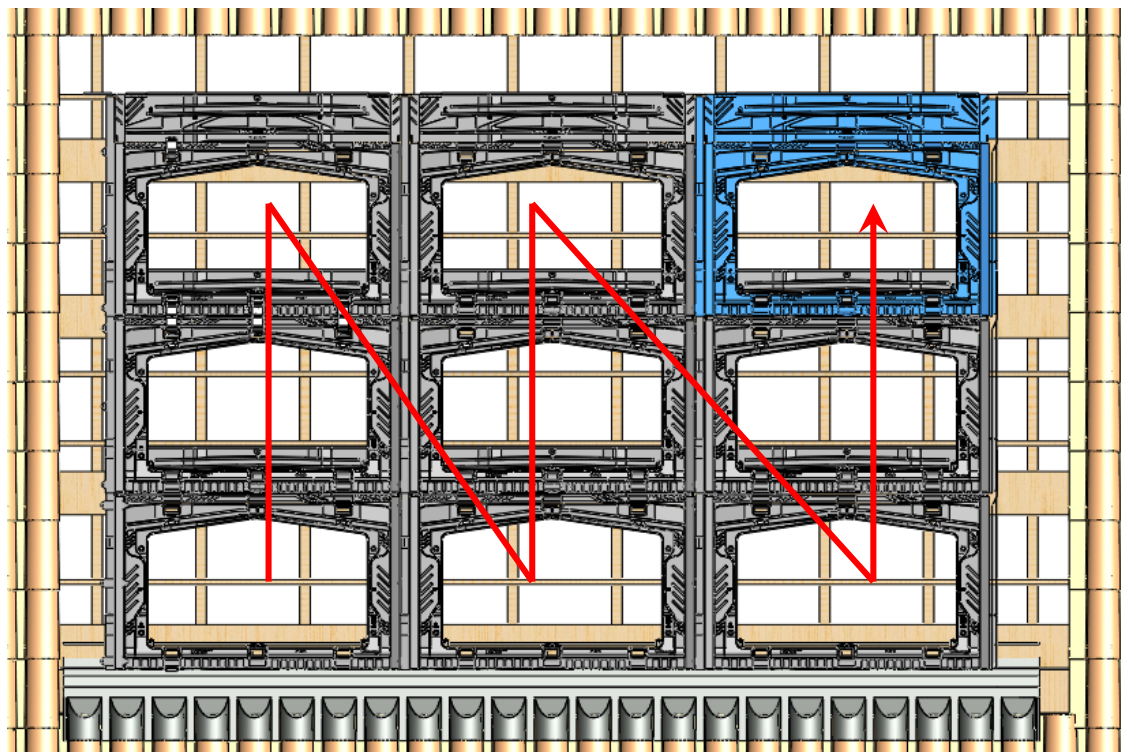


**THE MOUNTING TOOLS CAN BE
DISPLACED ON IF 4 (OR 6) BRACKETS
ARE MOUNTED.**

9.4.2)

Installation of the EASY-ROOF system

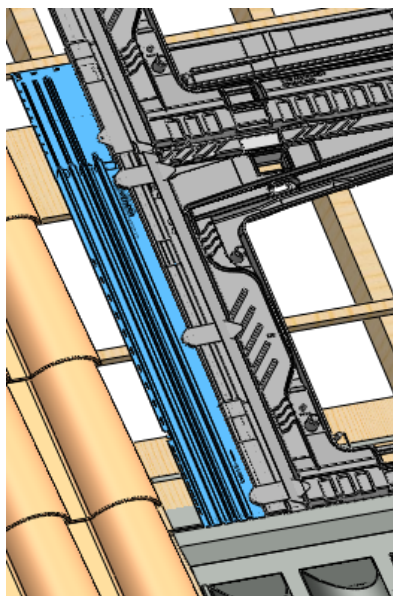
7°) Place and encase all other remaining frames to position in the PV field by repeating the operations on pages 36 to 38.



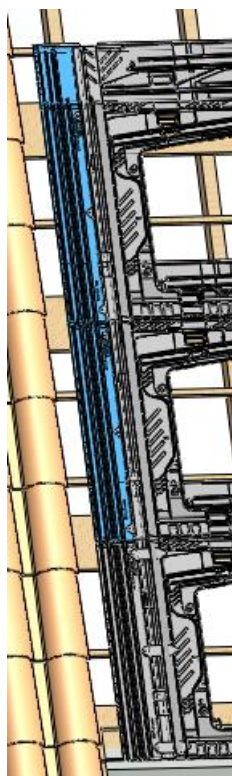
9.4.3)

Installation of the EASY-ROOF system

1) Position the first left flashing next to the first frame.

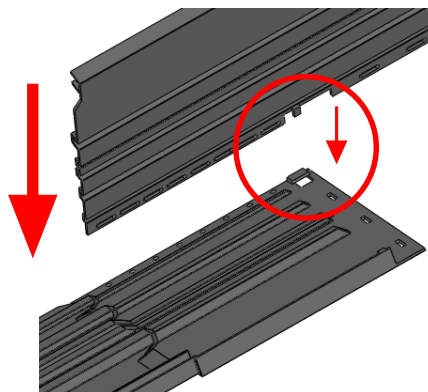


° 2) Place other flashings fitting them into each other (see beside).

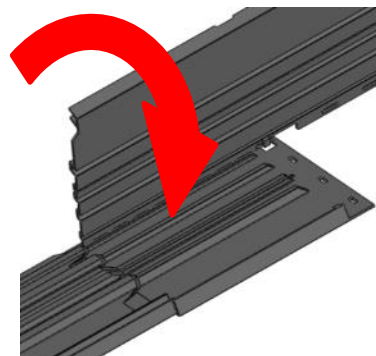


Assembly of flashings

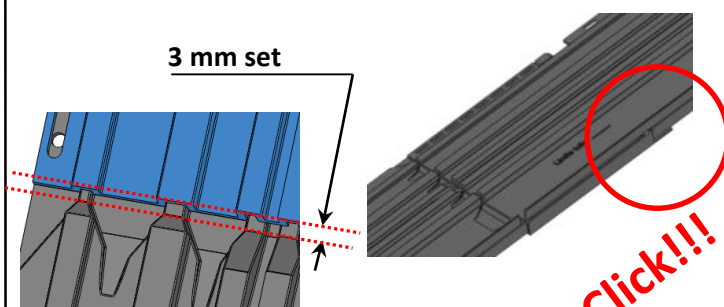
a) Encase the tab of the second flashing into the first.



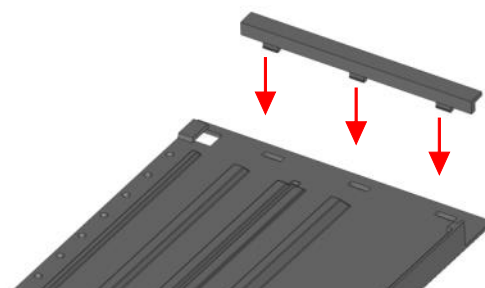
b) Rotate the second flashing.



c) Clip the second flashing with the other one. Make a space of 3 mm between the two.



d) For the high frieze option, clip the support frieze at the top of the last flashing.

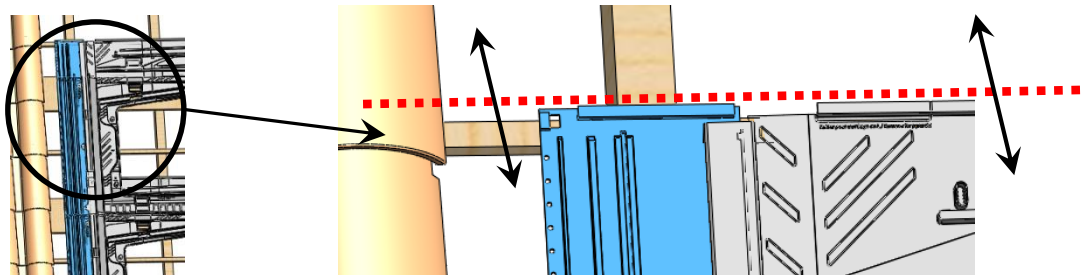


9.4.3)

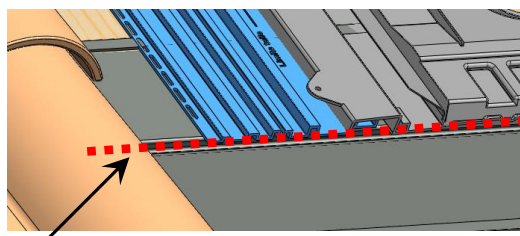
Installation of the EASY-ROOF system

3) Slightly lift the frames on the left, drag the row of flashings under the frames.

4) Align the last flashing with the top of the frame.

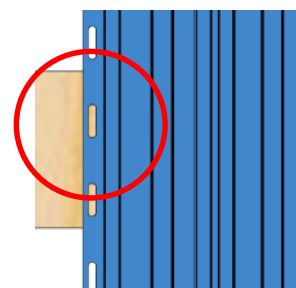
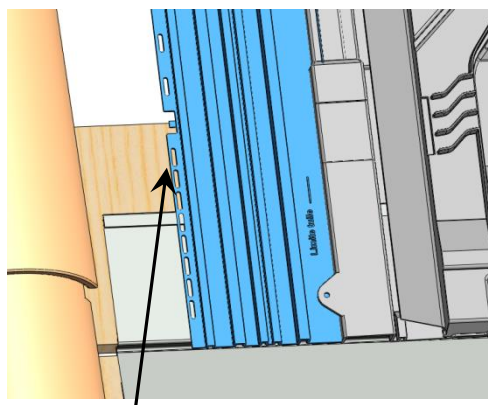
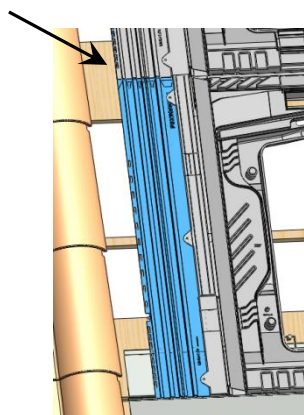


**DO NOT TOUCH
THE BOTTOM
FLASHING**



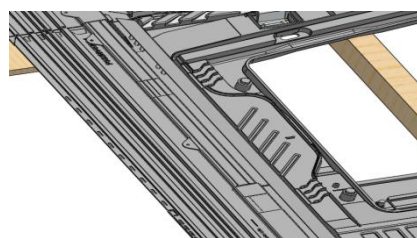
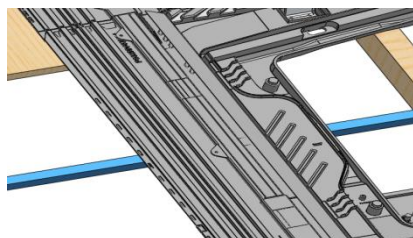
5) At the bottom, cut the part of the flashing which exceeds the frame.

6) Place a domed head screw 5 x 30 Inox (b) at each flashing overlap. Tighten moderately.



7) Place a domed head screw 5 x 30 Inox (b) centered on the oblong hole. Tighten moderately. **VERY IMPORTANT:** unscrew one turn, it is essential for the thermal expansion of the part.

8) If there is no batten under the flashings overlap, add a batten under the overlap.



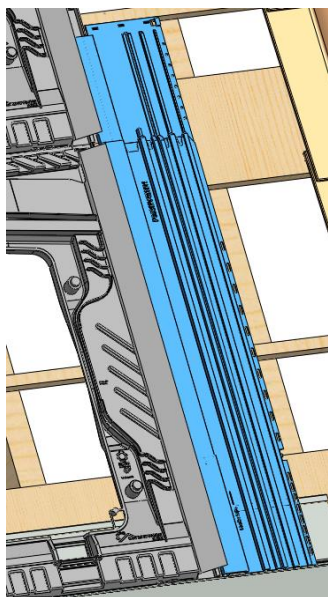
9) Fix all the left flashings using the previous 6, 7 and 8 guidelines.

9.4.4)

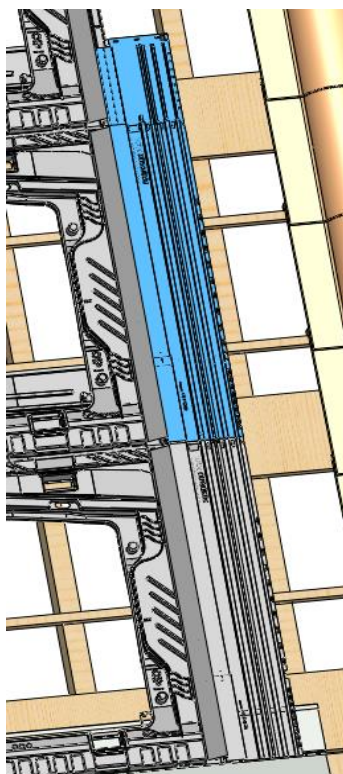
Installation of the EASY-ROOF system

Assembly of flashings

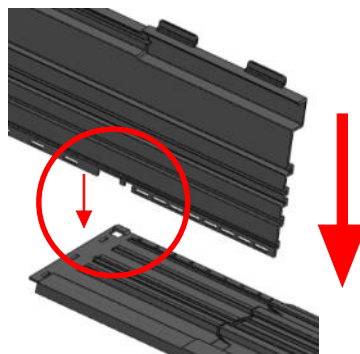
1) Position the first flashing on the right over the frame.



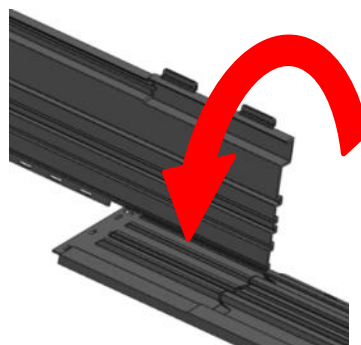
2) Place other flashings by slotting on the previous ones (see below).



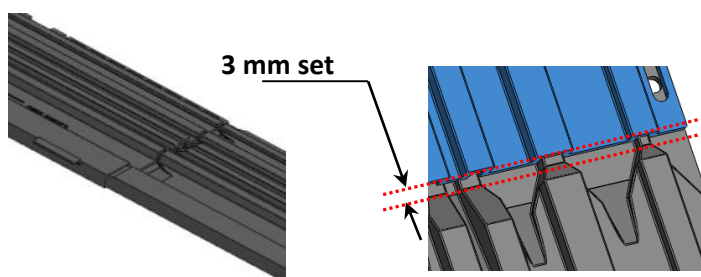
a) Encase the tab of the second flashing into the first.



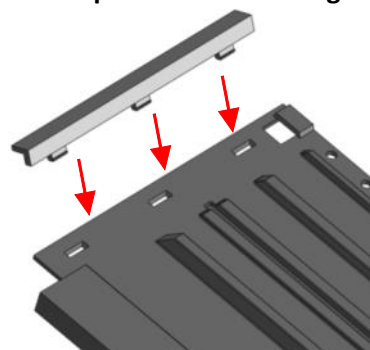
b) Rotate the second flashing.



c) Slick the second flashing with the other. Make a space of 3 mm between both flashings.



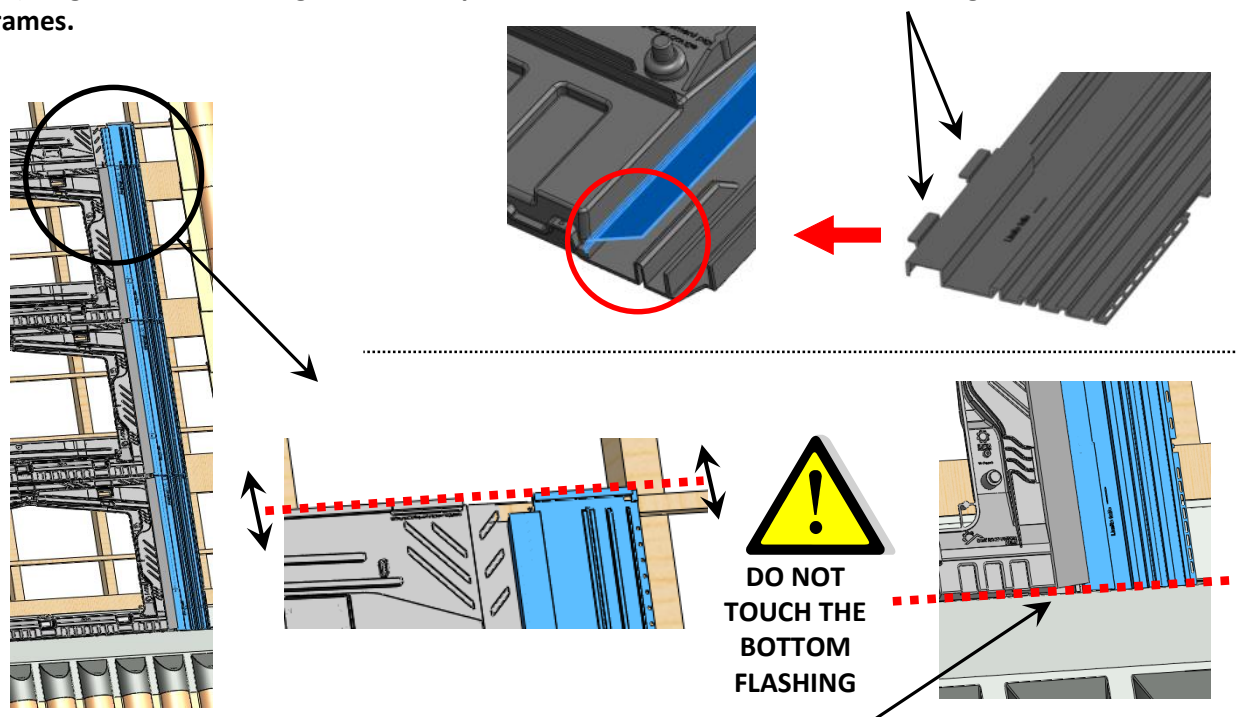
d) For the high frieze option, clip the support frieze at the top of the last flashing.



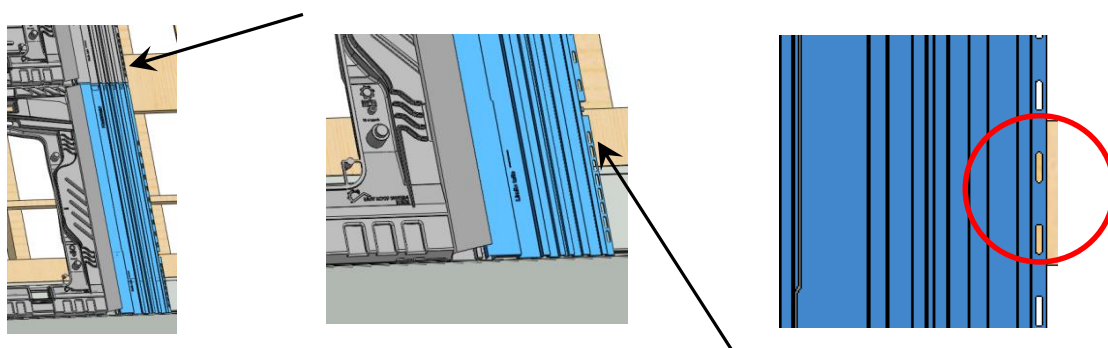
9.4.4)

Installation of the EASY-ROOF system

4 °) Align the last flashing with the top of the frame. Place the ears of flashings under the flexible flap frames.

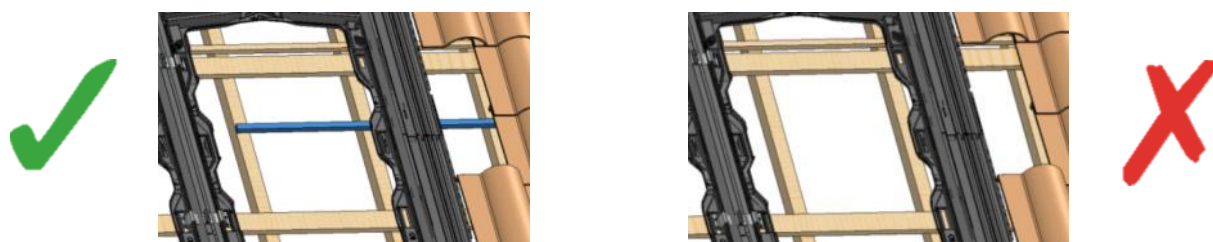


- 5) At the bottom, cut the part of the flashing which exceeds the frame of the first flashing if necessary.
6) Place a domed stainless head screw 5 x 30 (b) in each flashing overlap. Tighten moderately.



7) Place a domed stainless head screw 5 x 30 (b) centered on the slot. Tighten moderately. **VERY IMPORTANT:** unscrew one turn, it is essential for the expansion of the part.

8) If there is no batten under the flashings overlap, add a batten under the overlap

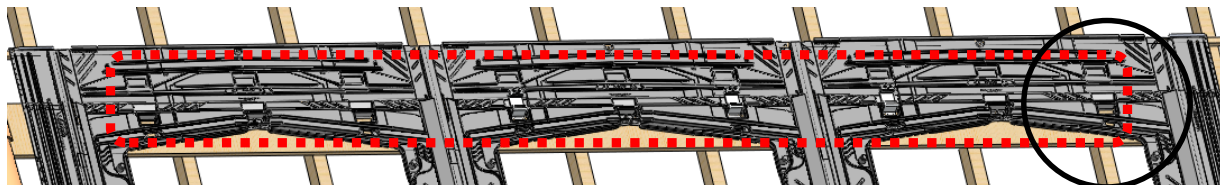


9) Fix all the left flashings using the previous 5, 6 and 7 guidelines.

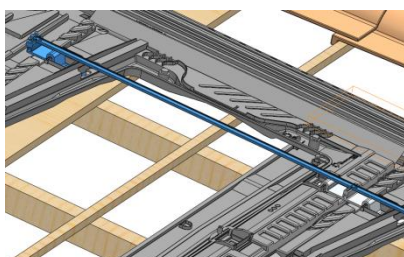
9.4.5)

Installation of the EASY-ROOF system

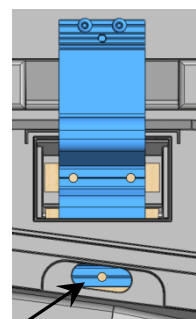
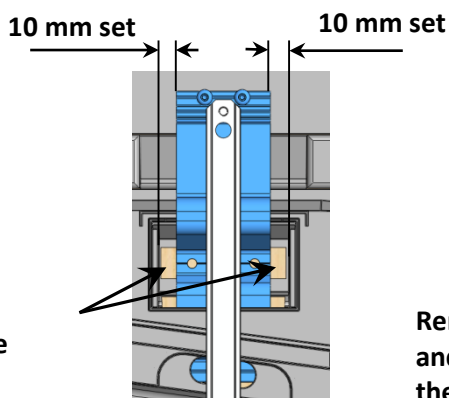
1) Place all end brackets (9) at the top of the PV field using an mounting tool. Encase each bracket into the holes on the frames. 2 or 3 brackets per frame according the technical recommendations, screwed in with 6 x 40 stainless screws (10).



THE USE OF A MOUNTING TOOL IS MANDATORY FOR THE end BRACKETS.



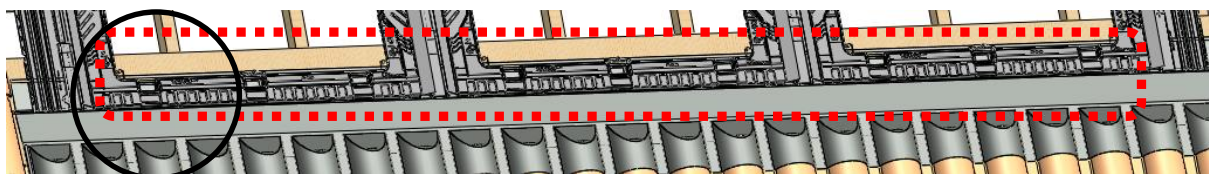
Center the bracket horizontally in the positioning hole (for expansion)



Remove the mounting tool and tighten the last screw of the end bracket

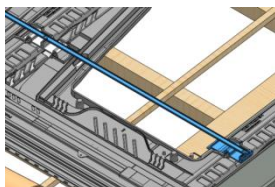
9.4.5)

1) Place all end brackets (9) at the bottom of the PV field using a mounting tool. Encase each bracket in the holes on the frames, 3 end brackets per frame, align the bracket with help of the mounting tool, screw in with 6 x 40 stainless screws (10).

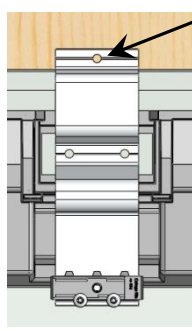
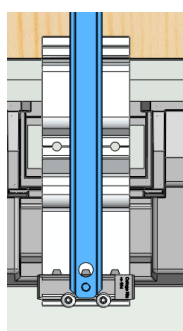


THE USE OF AN mounting tool IS MANDATORY FOR end brackets.

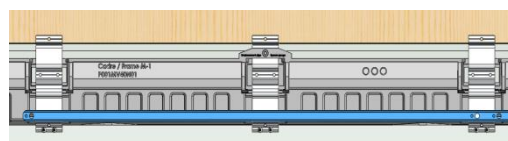
Remove the mounting tool and tighten the last screw of the end bracket



Center bracket in horizontal direction as above

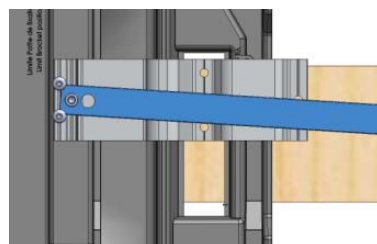
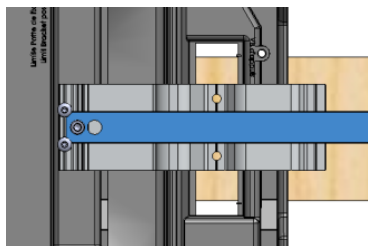


Alignment of the central end bracket with the mounting tool

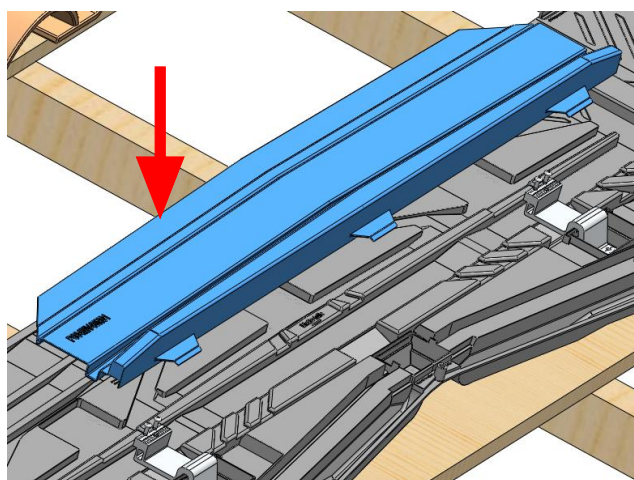


9.4.5)

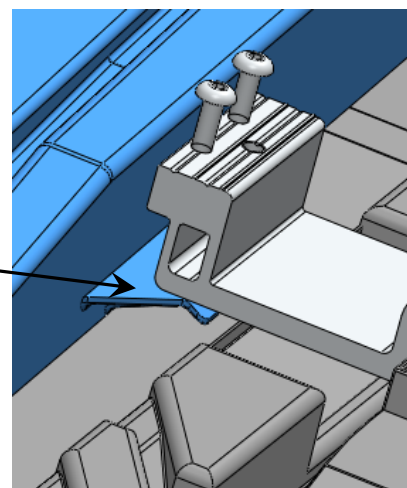
Installation of the EASY-ROOF system



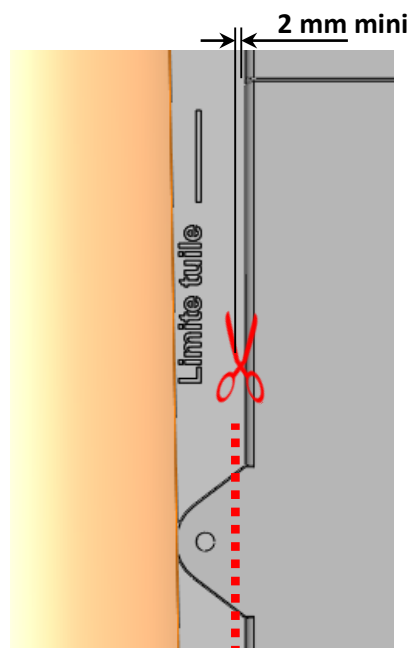
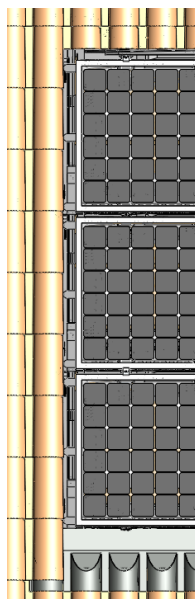
2) Install the deflectors at the top of the field under the end brackets, placing as many deflectors at the top of the field as frames.



tab



3) On the left side of the system, to optimize the tiles position, it is allowed to cut the ears 2 mm from the frame using a cutter.



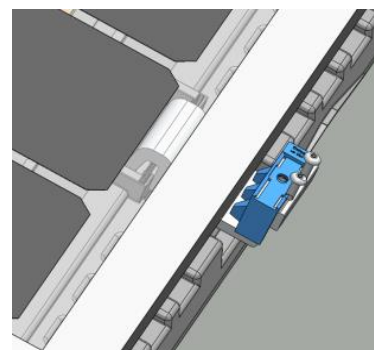
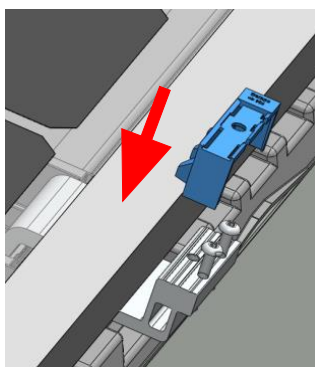
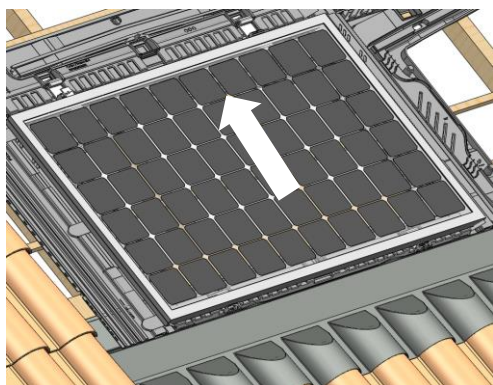
9.5)

Installation of the EASY-ROOF system

The PV connectors are fixed and secured in a dry zone on the top of the support battens (mandatory for the EASY ROOF EVOLUTION system). Moreover they must not touch nor interfere with the breather membrane situated underneath.

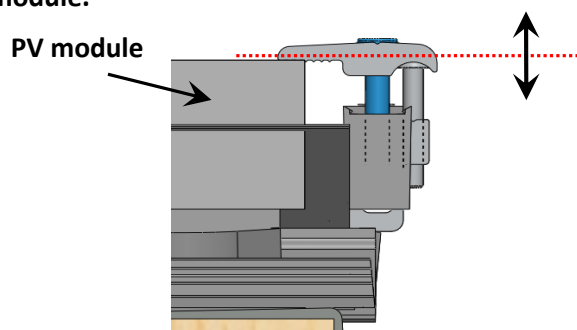


1°) Position and interlock the photovoltaic modules. To ground the modules see page 48. Move the PV modules slightly up so that the wedge that corresponds to the dimensions of the panel can be put in place, then lower the panel so that it rests on the wedge.

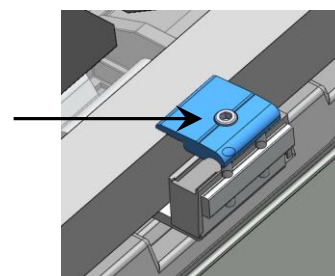


2°) Adjust the height of the single bracket support screws so that they are flush with the top of the PV module

3°) Fix the photovoltaic modules in place at the bottom of the field with single brackets (5 or 16) using socket headed screws CHC M6 x 30 (12) or CHC M6 x 40 (11) depending on the thickness of the PV module.



Tightening
torque 8.8
Nm

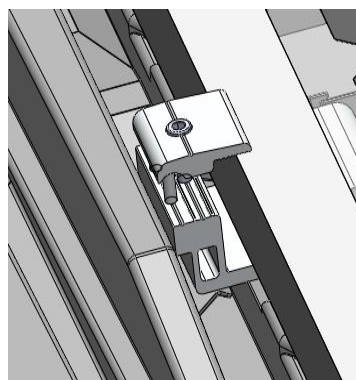
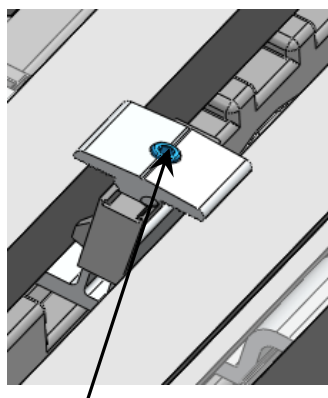
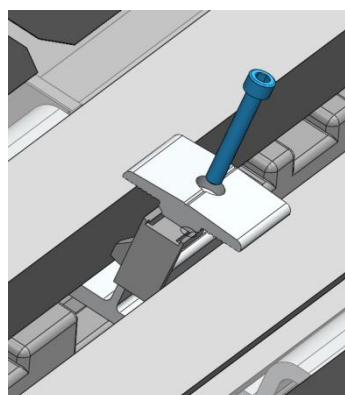
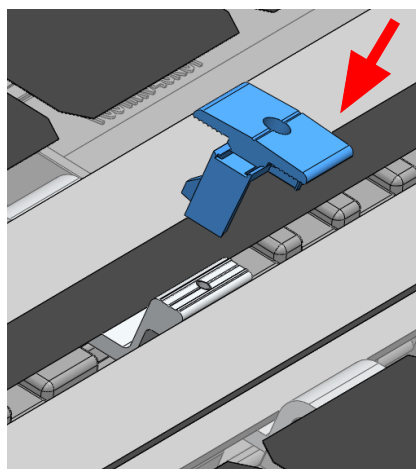
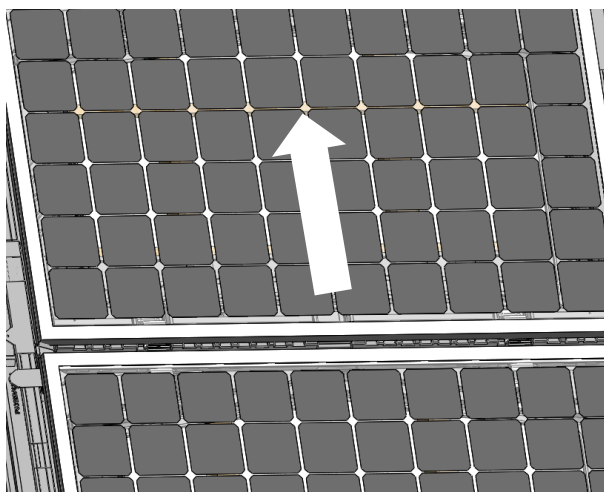


(Single clamp)

7°) Put all the PV field double brackets in place

9.5)

Installation of the EASY-ROOF system

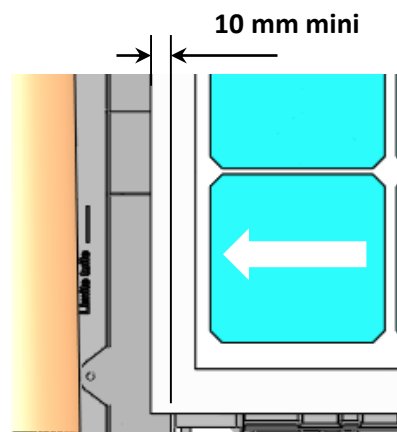


Tightening torque 8.8 Nm

- 1) Place the middle bracket (6 or 7) with the anti-rotation wedge above the middle bracket and between two modules, the clamp leaning on the PV modules.
- 2) Slide to encase it on the bracket.
- 3) Slick the modules against the anti-rotation wedge.
- 4) Screw with screws CHc M6 x 30 (12) or CHc M6 x 40 (11) depending on the thickness of the PV module.
- 3) Attach the PV modules at the top of the field with end clamps (5 or 16) with screw socket head cap M6 x 30 (12) or M6 x 40 (11) depending on thickness of the PV module. Same assembly on the lower part without the maintaining wedge.

Note: for panels below 1650 mm length, shift the panel to the left to have a minimum of 10 mm overlap with the frame

as shown here.



9.5.1)

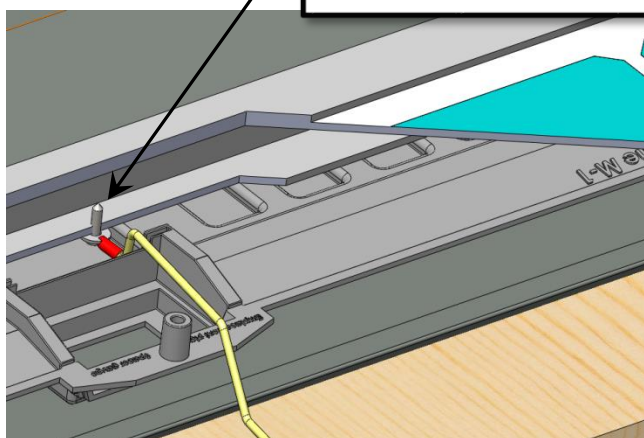
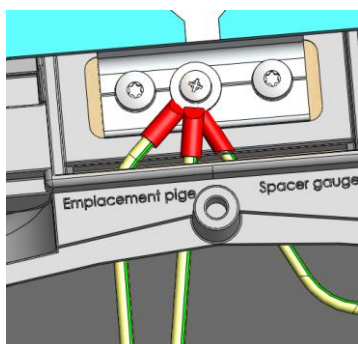
Grounding

If the grounding is not done by connecting the cable directly to the PV module, perform the following operations.

1) Identify the middle brackets grounded during assembly. (See p. 36)

Option 1)

Connect the ground by connecting the middle brackets with the cable lugs and connect the ground to the PV module.

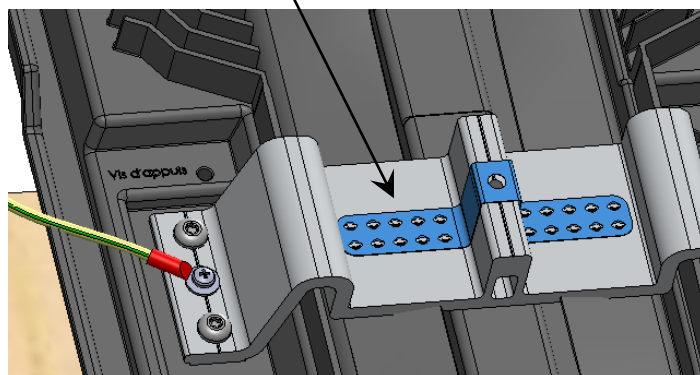
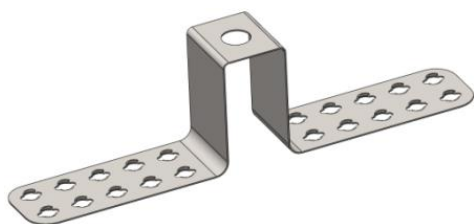


Connect the ground wire to the frame of the module, see manufacturer instruction.

Option 2°)

Position the EASY GROUNDING on the mounting bracket

EASY GROUNDING

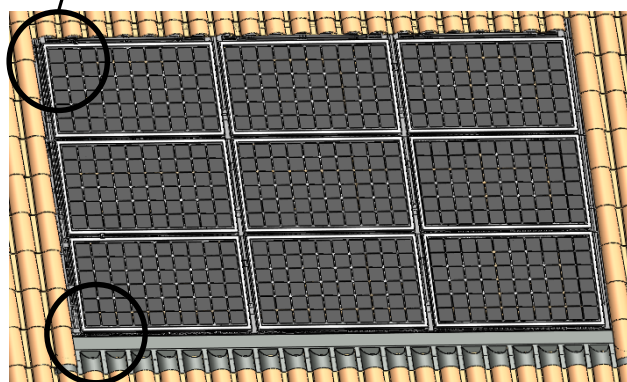
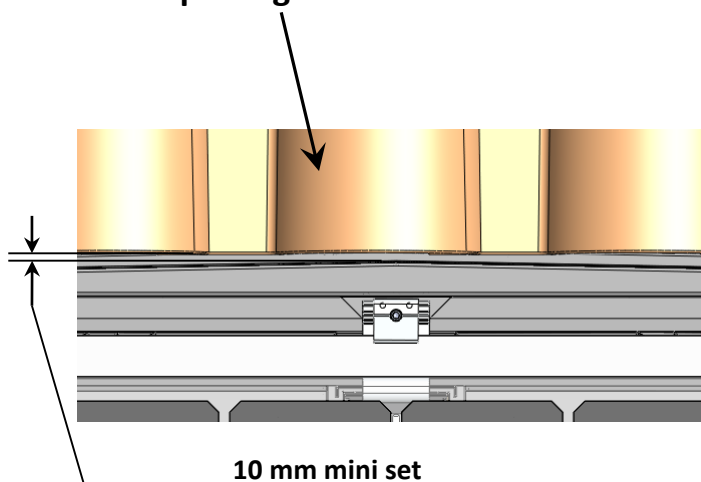
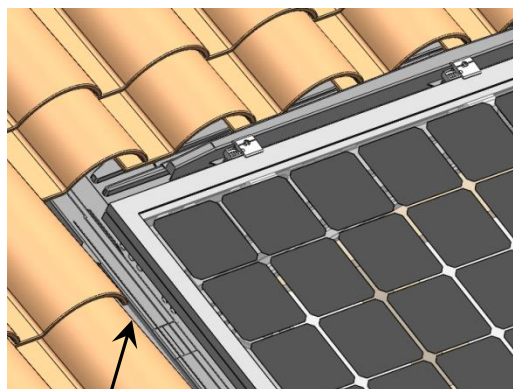


2) Then ensure that the connection is made between the PV module and the middle bracket (6) and that this connection is less than 2 Ohms.

9.6)

All that is left is to re-tile, covering up the maximum the top flashings. The bottom of the tiles should have a set of 10 mm mini with the wall of the landscape deflector.

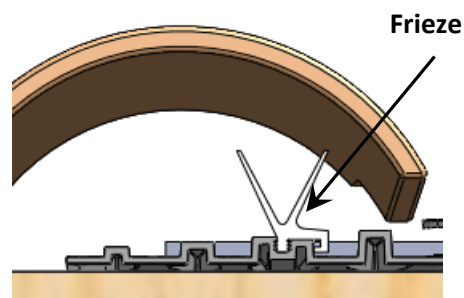
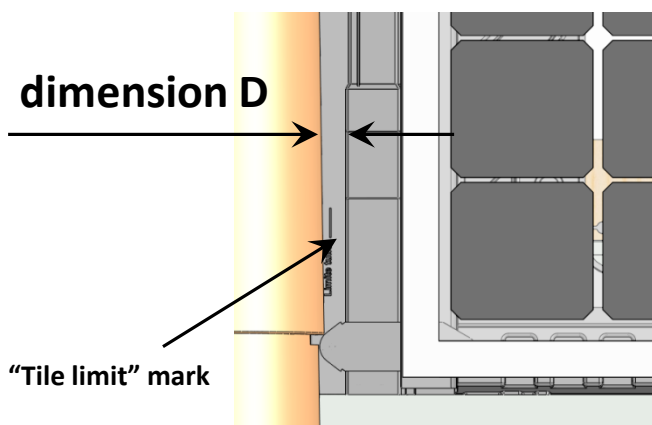
IMPORTANT: For tiles with high profile, it is imperative to use a frieze (for EASY ROOF system) or a strip of adhesive foam before replacing the tiles.



With less than 2m between the top of the PV field and the ridge of the roof, the deflector landscape is not mandatory.

For the tile overlap on the lateral flashings (2) and (3), the tiles should be tangent with the mark indicating "Tile limit".

It is imperative that dimension D is 40 mm MAXI as shown in the diagram.



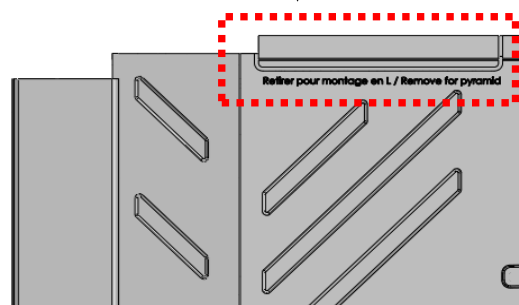
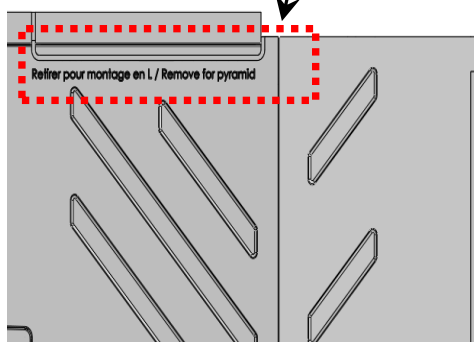
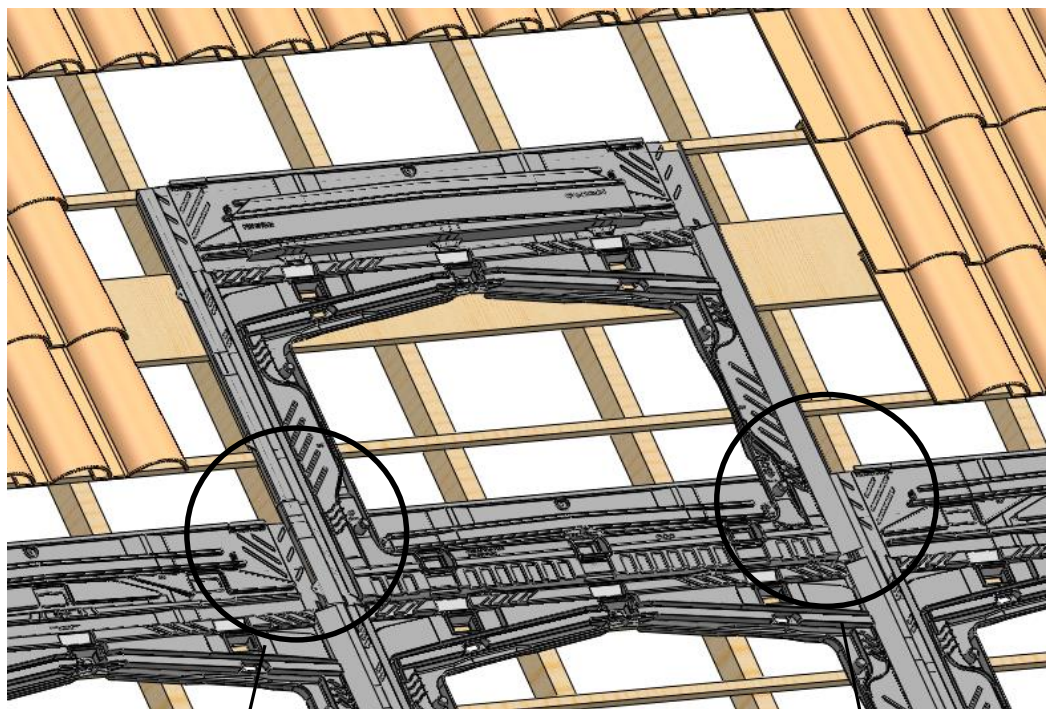
Example of frieze positioning on left of PV field

Annex 1

Pyramid assembly

A) Flashing installation “L” shape left or right

- 1) Remove the detachable portion at the top of the frame.

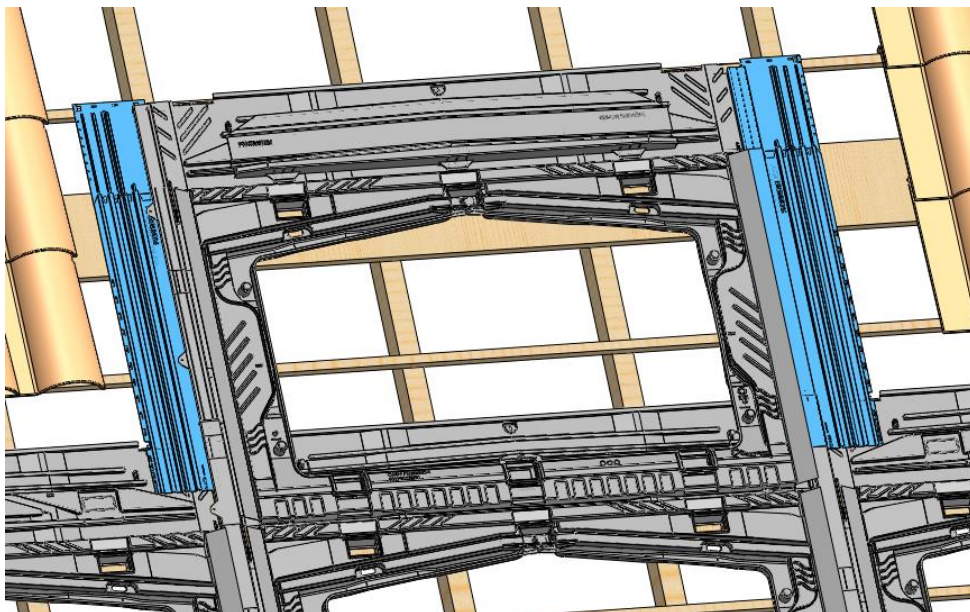


Annex 1

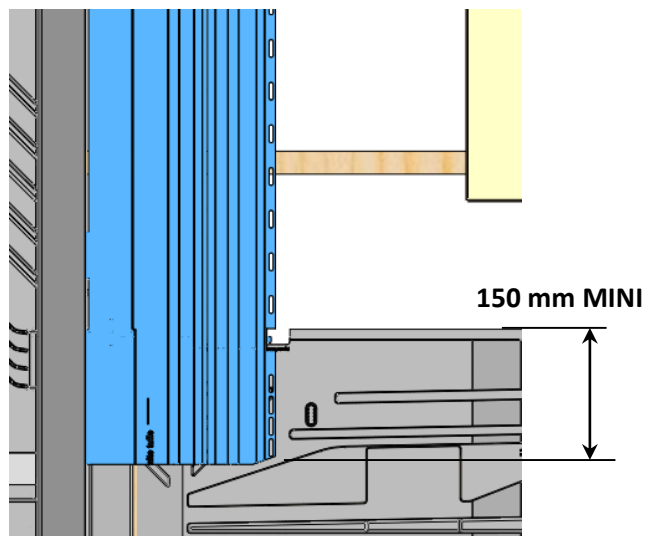
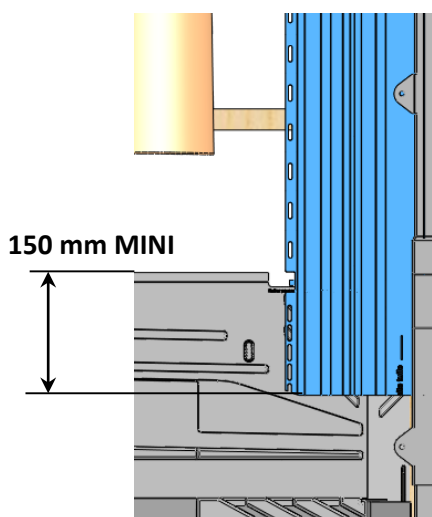
Pyramid assembly

A) Flashing installation “L” shape left or right

2) Assemble and install the flashings as described on page 39-42 of the general instructions.



3) Cut the flashing from the bottom so that it covers the lower frame from 150 mm MINI.

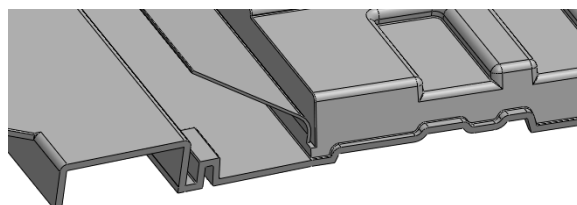
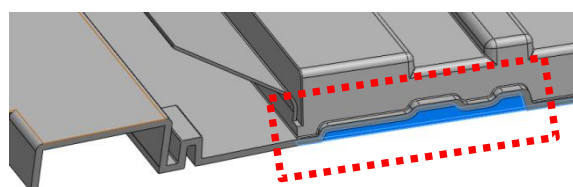
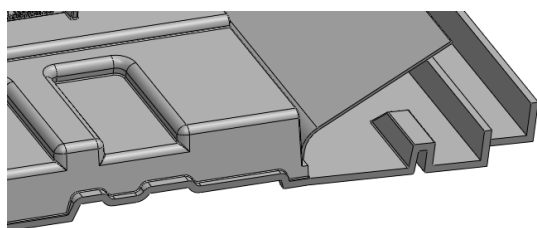
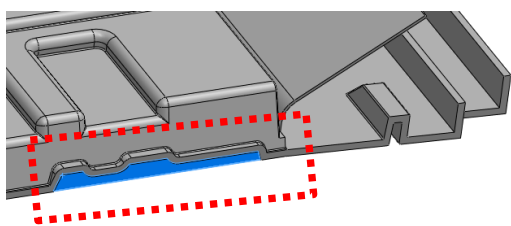
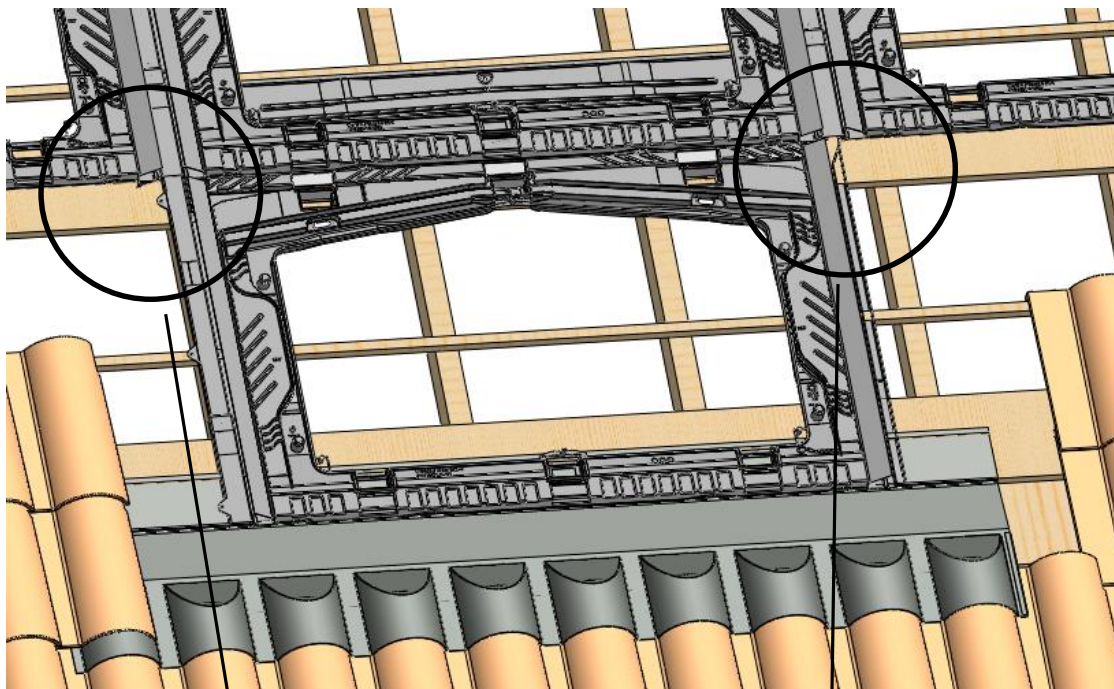


Annex 1

Pyramid assembly

B) Flashings installation "T" shape left or right

- 1) Pull the detachable bottom part of the frame to the right or left as required.

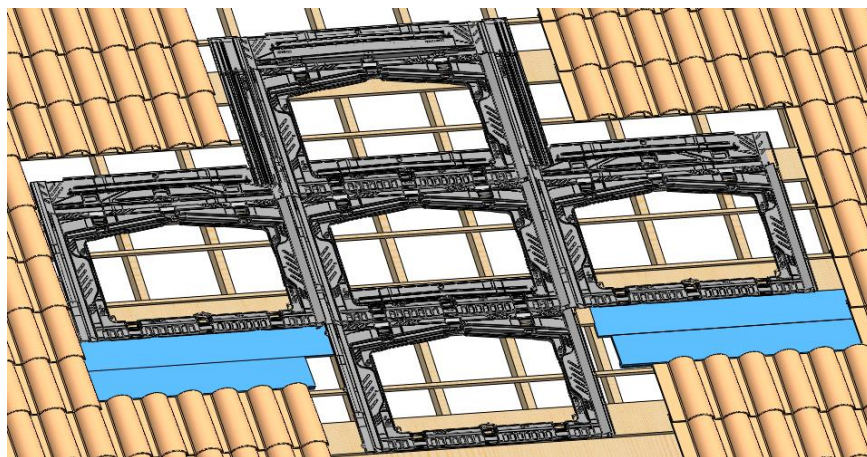


Annex 1

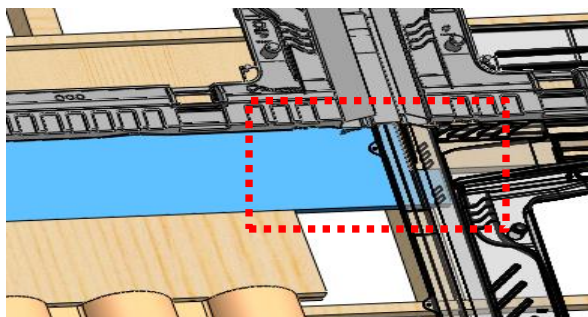
Pyramid assembly

B) Flashings installation "T" shape left or right

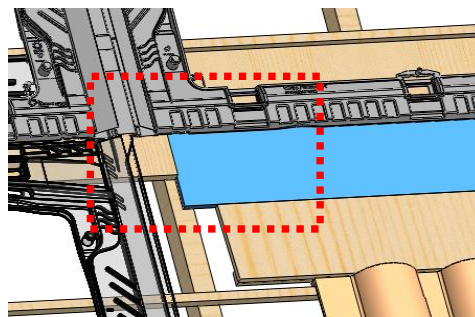
2) Do the flashing flooring. For the batten sizing, refer to the general instructions on page 21 to 23.



3) Extend the horizontal battens to ensure the flashing support under the frame.

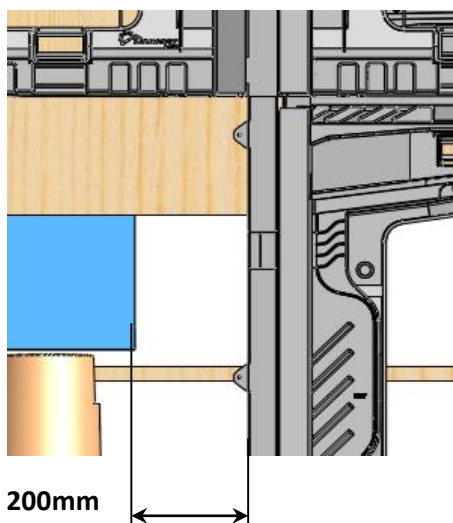


(sectional view of the frames)

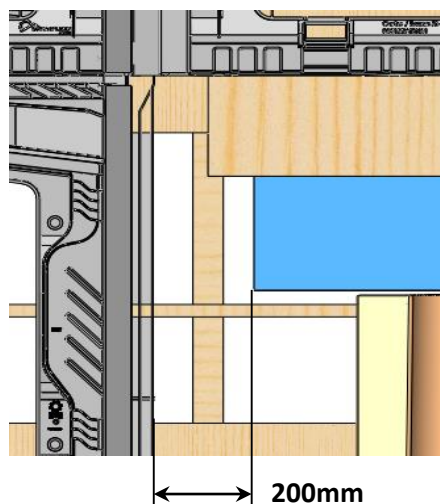


(sectional view of the frames)

4) Position the batten inclined at 200 mm from the frame (space needed for the lateral flashing)



200mm



200mm

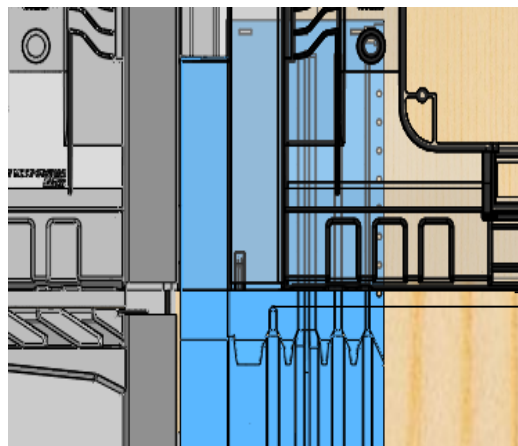
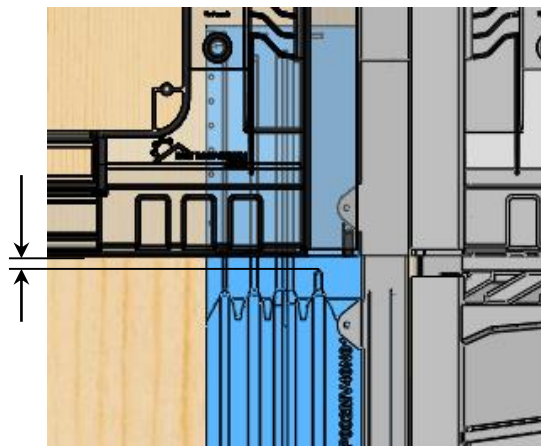
Annex 1

Pyramid assembly

B) Flashings installation "T" shape left or right

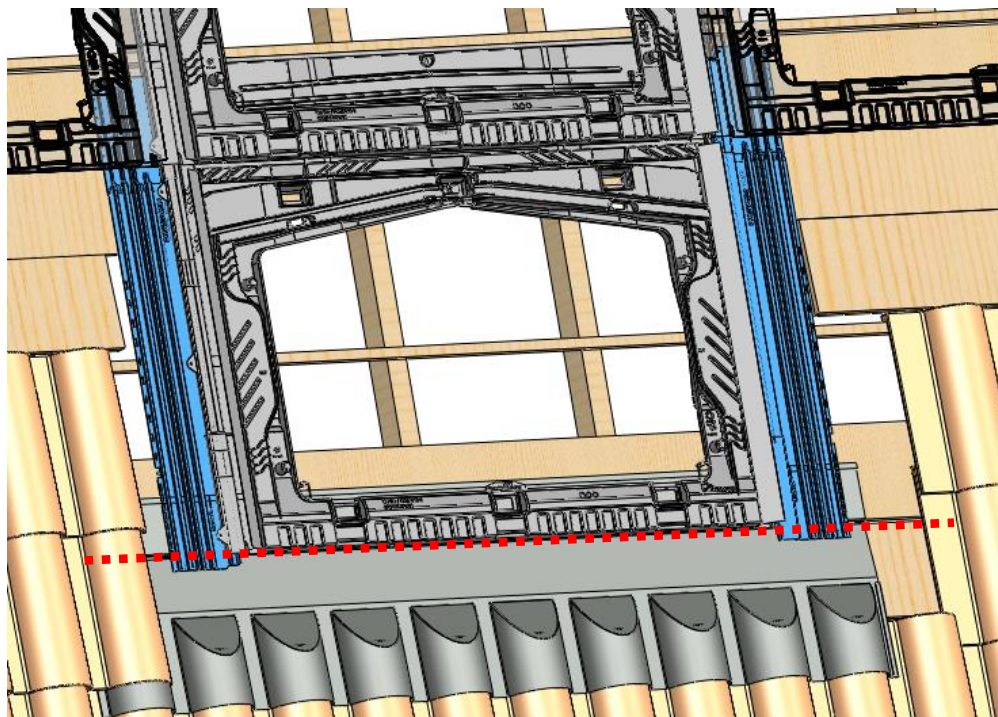
5) Position the flashing on top of the column 15 mm from the bottom of the frame (see below).

15mm



15mm

6) Assemble and install the flashings as described on page 40 to 43 of the general instructions.
7) Cut the flashing down the column in alignment with the bottom of the frame.



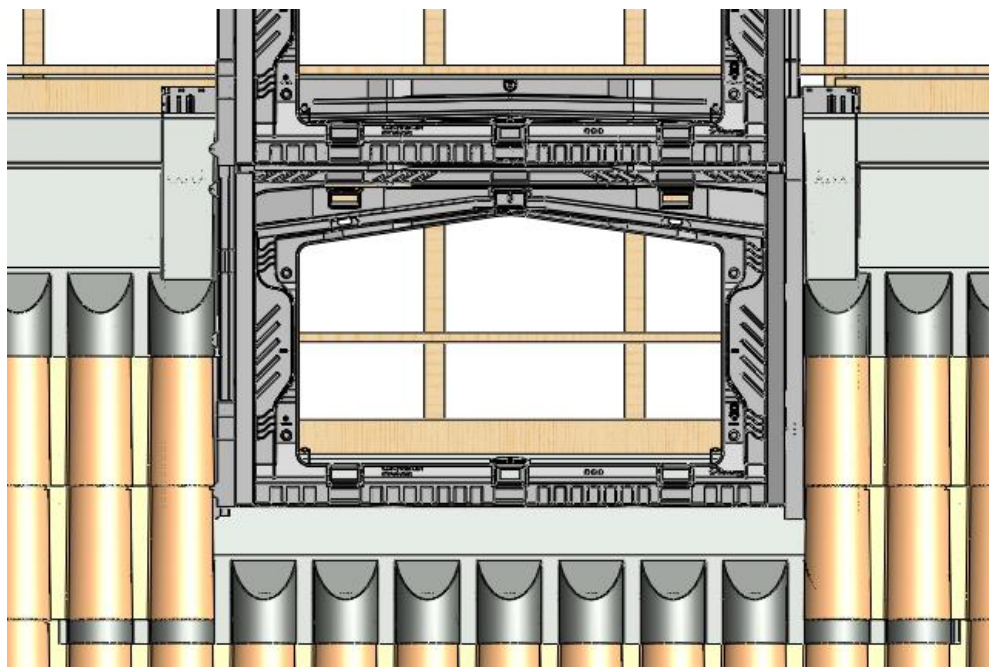
Annex 1

Pyramid assembly

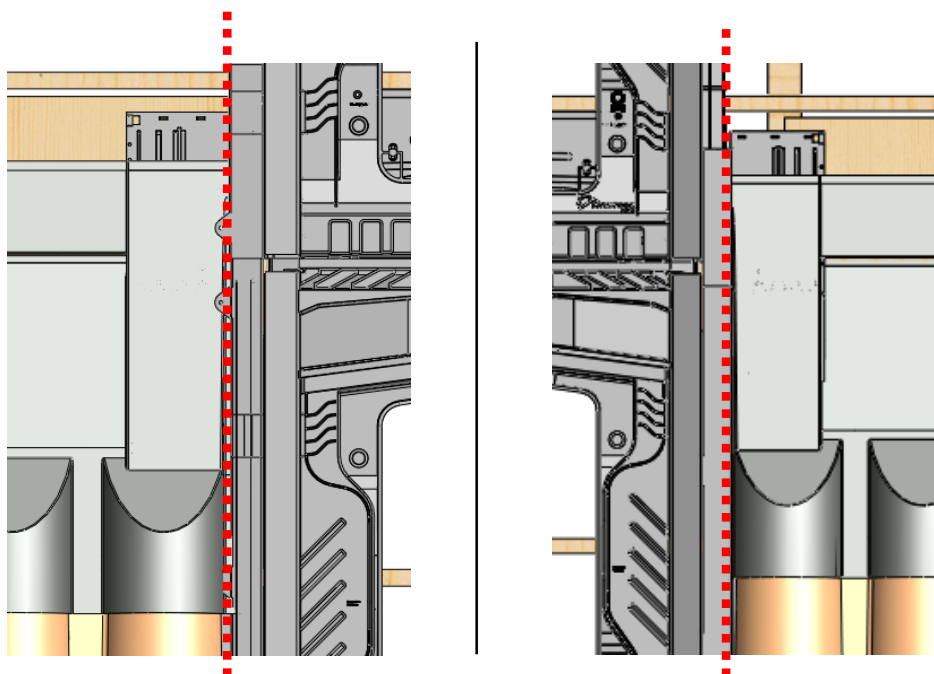
B) Flashings installation "T" shape left or right

8) Replace the tiles on the flashings.

9) Place the roof flashings with respect to the MINI overlaps imposed in the general instructions on page 21.



11) Also cover the top of the flashing in alignment with the edge of the last tile.

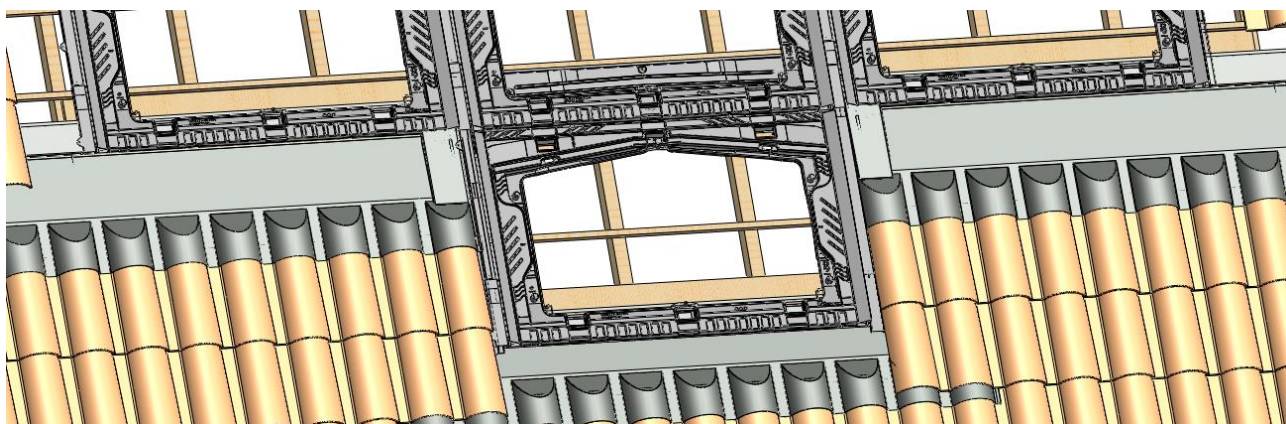


Annex 1

Pyramid assembly

B) Flashings installation "T" shape left or right

11) Place the top frame to continue the installation according to guidelines of the general instructions for placing and securing the remaining elements of the system.



Annex 2

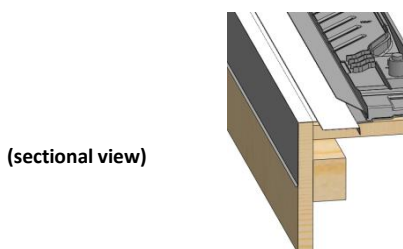
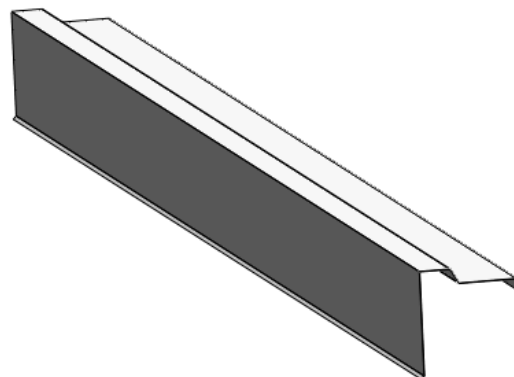
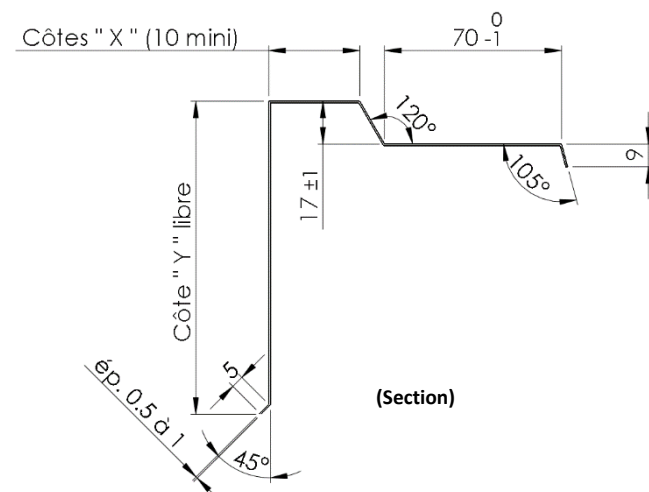
Assembly on the lateral dimension

A) Definition of the plate edge

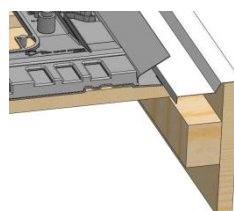
Left and Right lateral edge metal sheet have the same shape.

The "X" dimension may vary between left and right depending on the space between the EASY ROOF frame and the fascia. "X" must not be less than 10 mm.

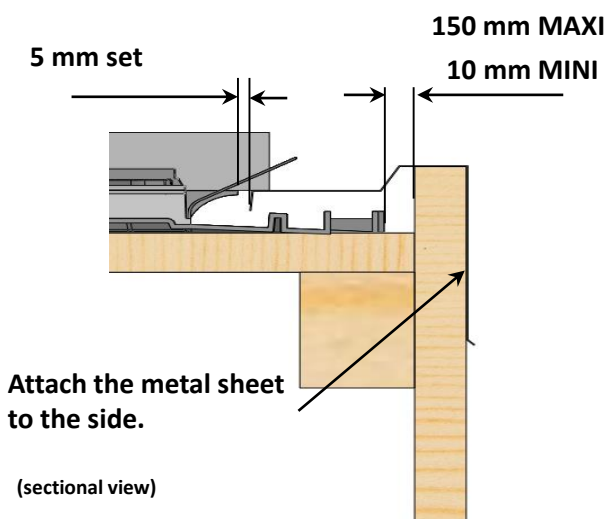
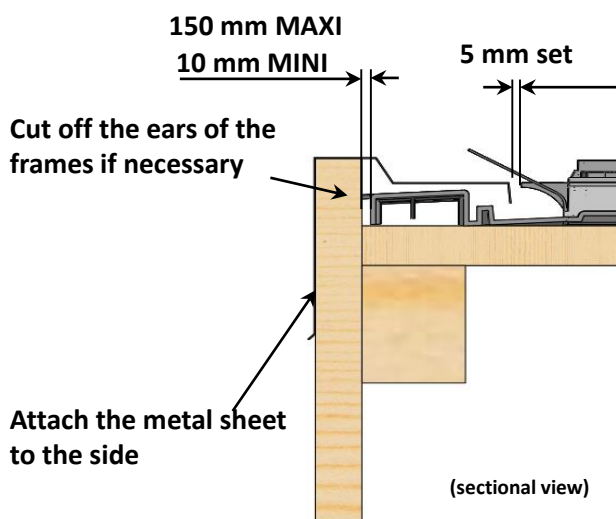
The "Y" dimension must be adapted to cover what is necessary.



(sectional view)



(sectional view)



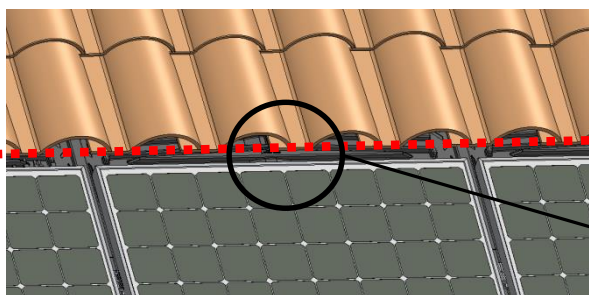
After 150 mm MAXI, do an additional fixing of the lateral edge metal sheet.

Annex 3

Tile's alignment over the Top Flashing

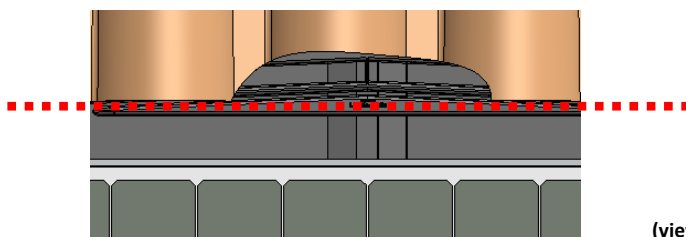
A) 3 possible case

Spot the "limite tuile" mark on the EASY ROOF frame



1) The bottom of the tile is tangent to the "limite tuile" mark.

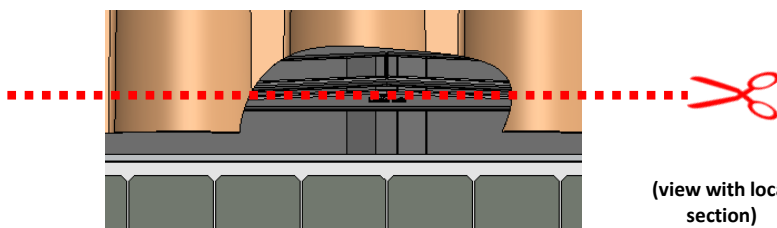
Optimal overlap and compliance with manufacturer's instructions.



(view with local section)

2) The tile is too long.

Trim it to align the tile's bottom with "limite tuile" mark.

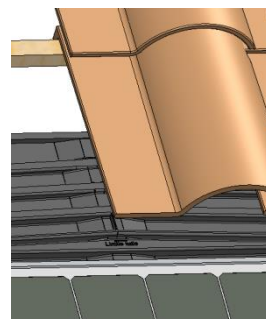
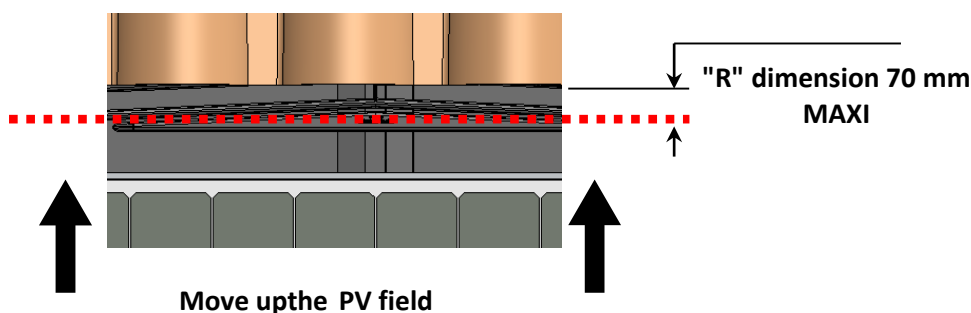


(view with local section)

3) The tile is too short.

The tile must overlap the top flashing with a minimum of 150mm.

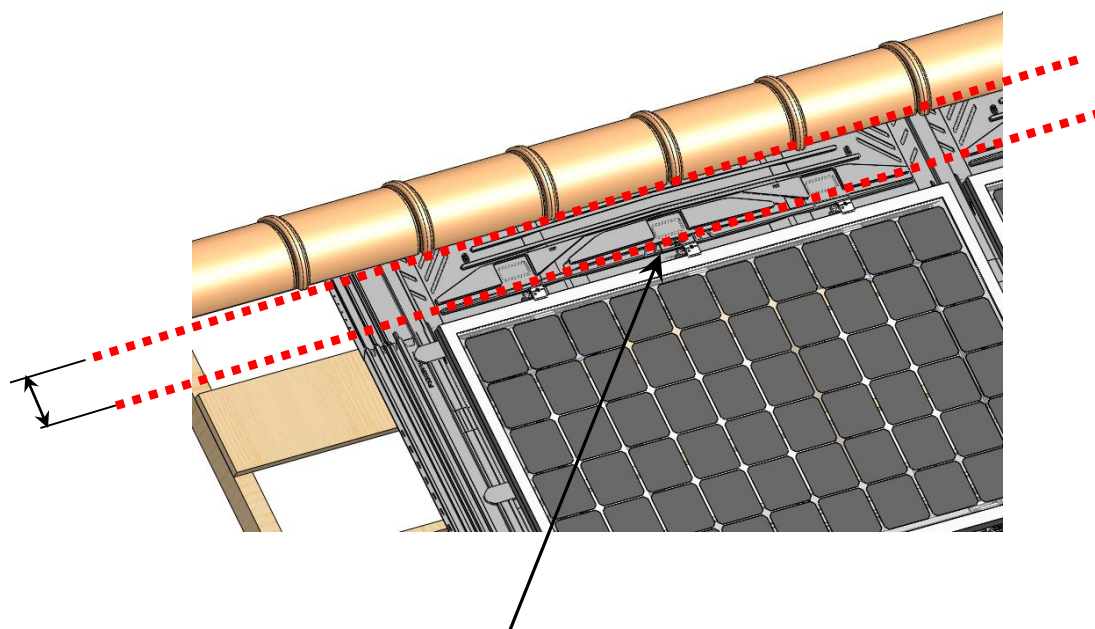
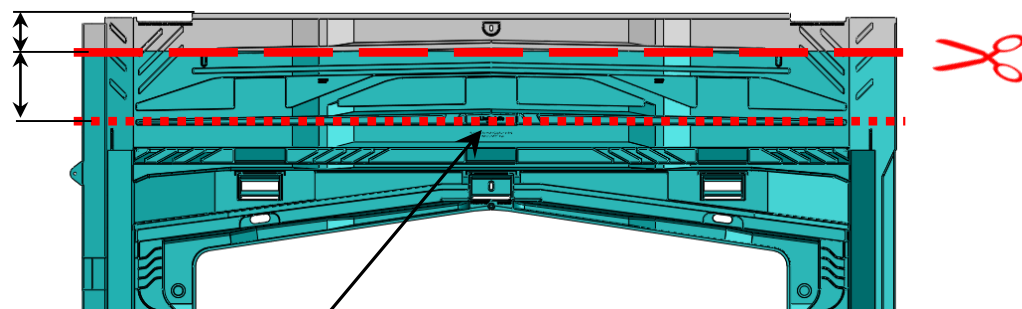
If the « R » dimension » (distance between the marking « Limite tuile » and the tile's bottom) is higher than 70mm, move up the PV field. In that case the dimension « A » will be increased, see page 22.



Annex 3

Tile's alignment over the Top Flashing

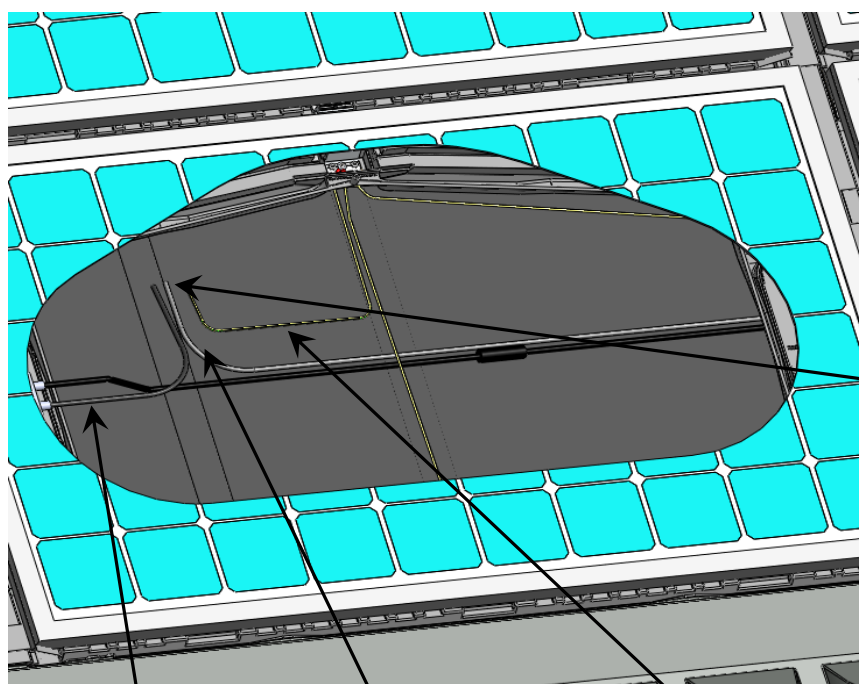
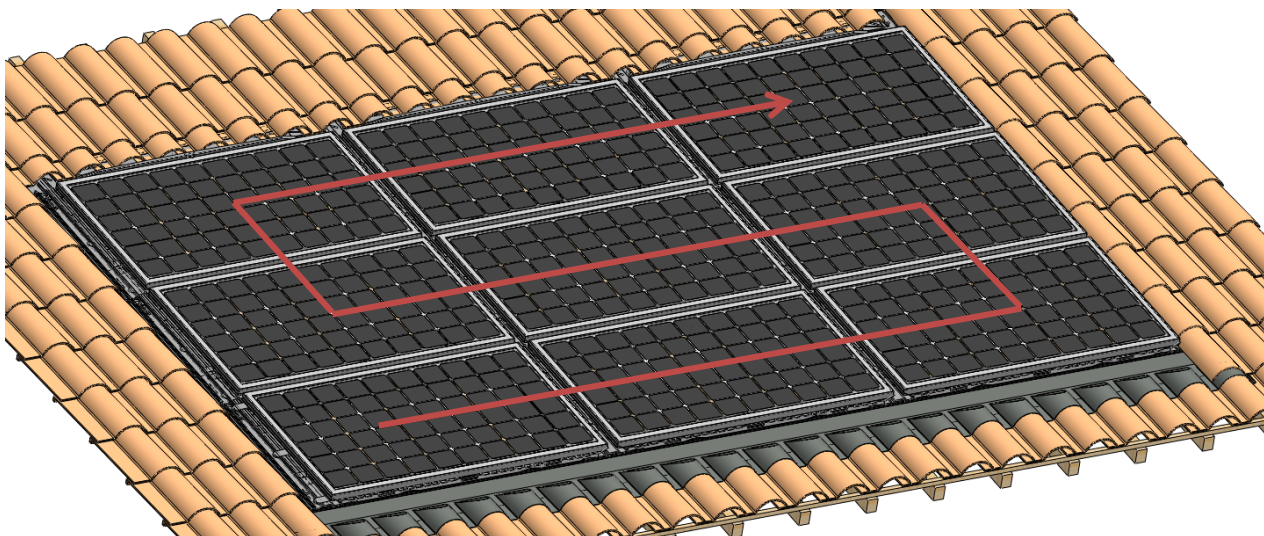
B) Ridge installation



Annex 4

Connection of the PV cables and grounding

Ground wire into the module frame and the self-taping screw into the bracket



Cables coming from the attic between 2 layers of underlayment. The cables directions must be towards the bottom.

+

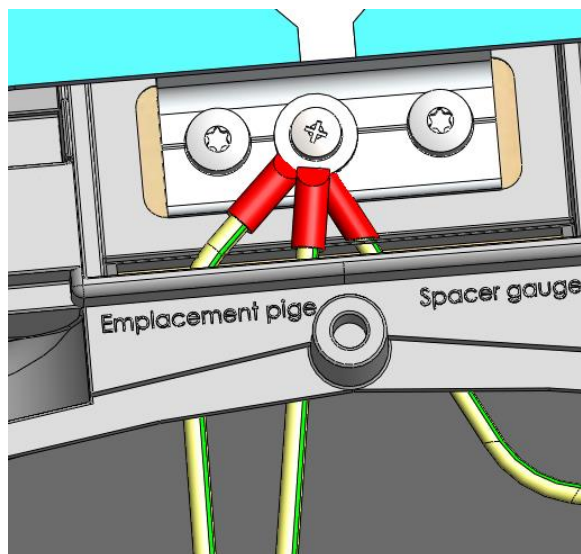
-

Ground

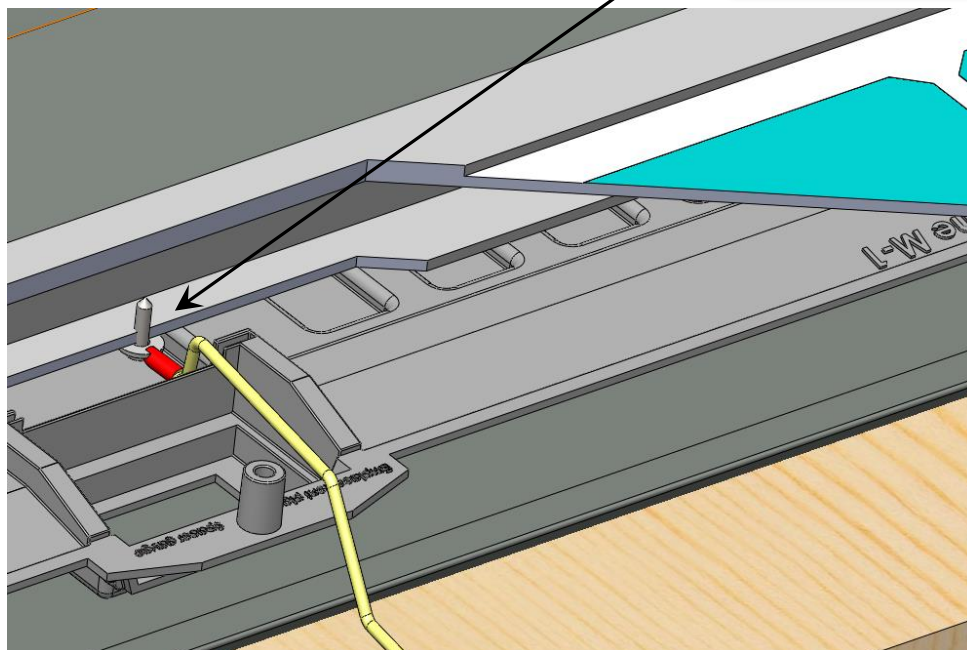
Annex 4

Connection of the PV cables and grounding

- Ground every second brackets (1 bracket to ground 2 PV module).
Connect the + from the inverter to - of the first module.



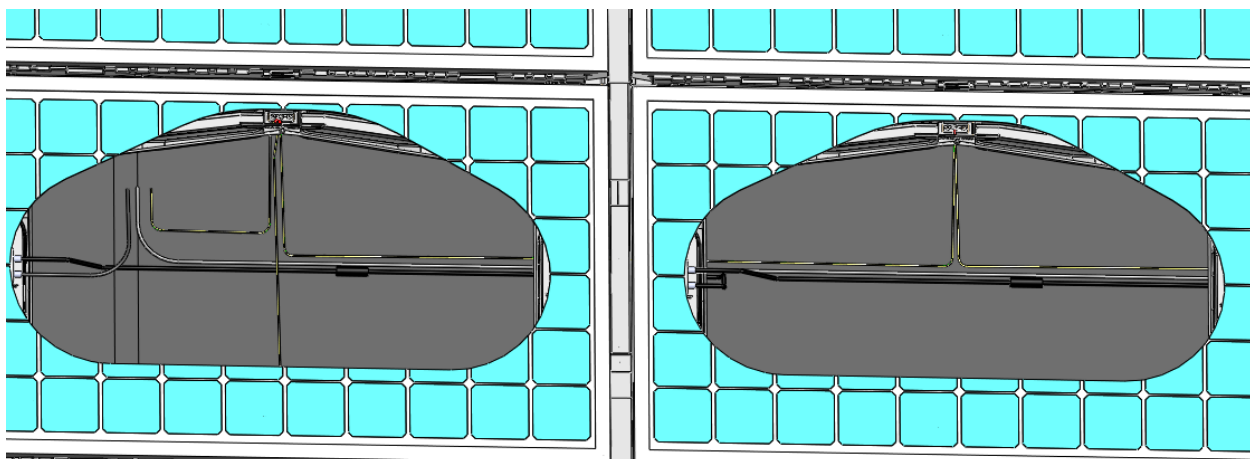
Connect the ground wire to the frame of the module, see manufacturer instruction



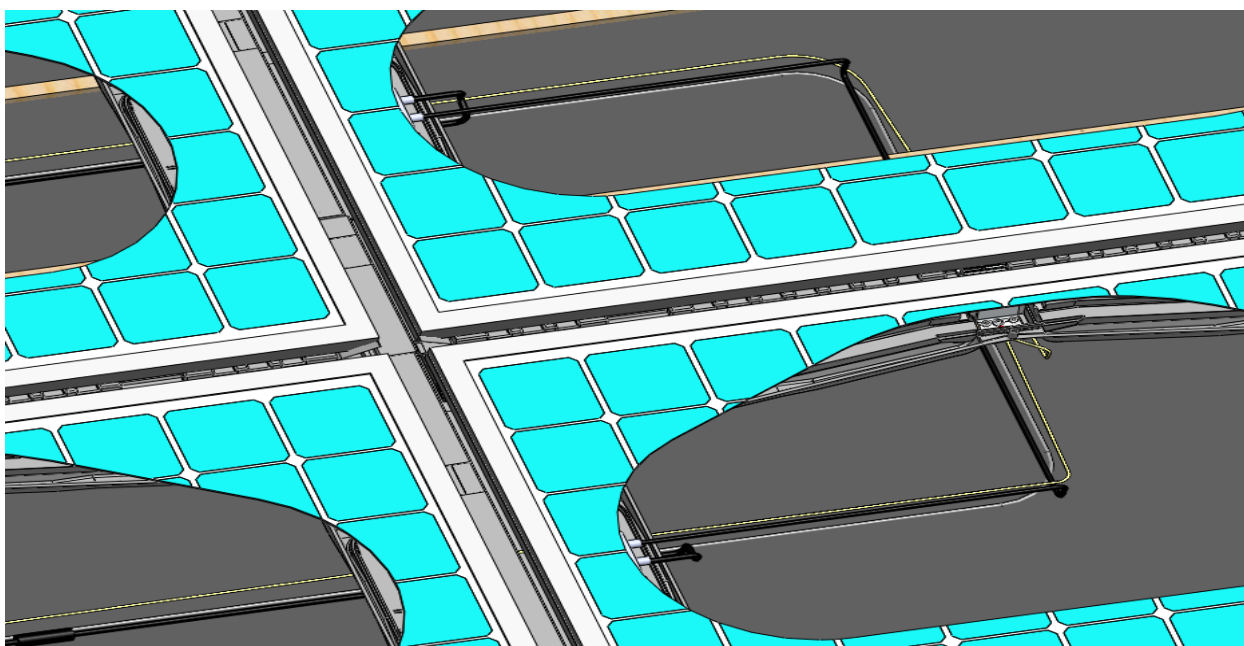
Annex 4

Connection of the PV cables and grounding

- Connect the modules together (+ cable on - cable).
- Route the - and the ground wire along these cables so as not to loop them.



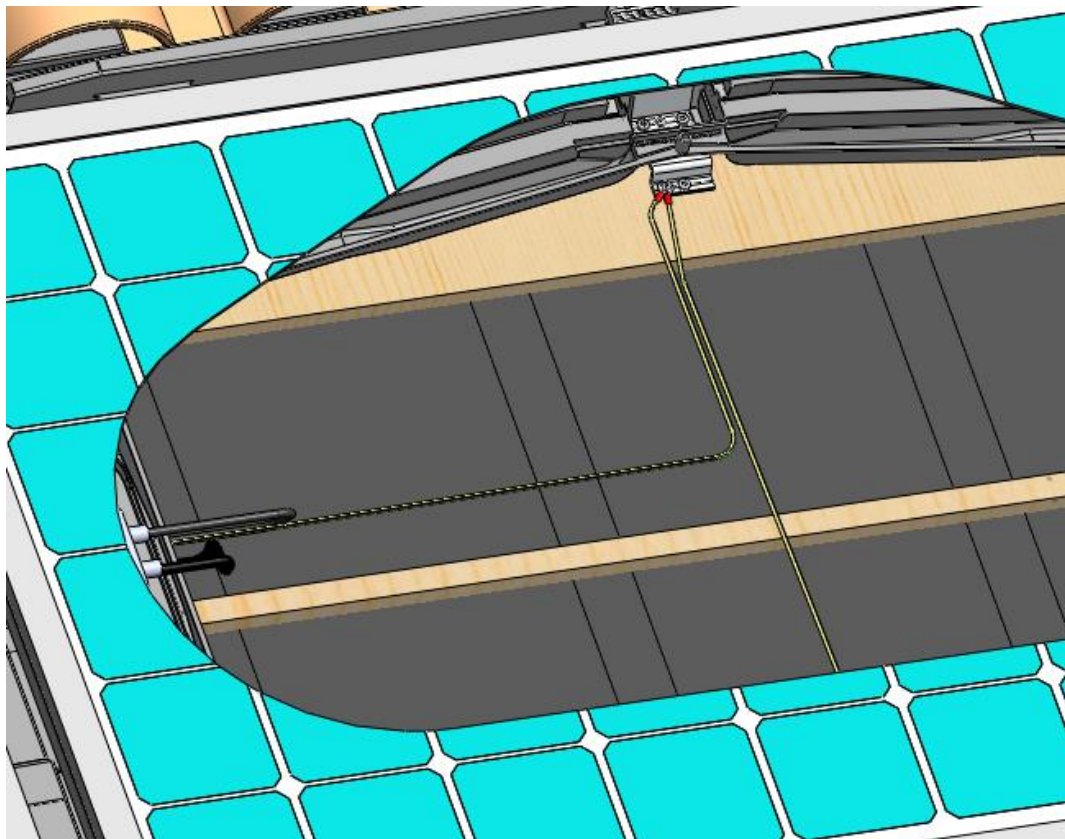
- Go on the upper line.



Annex 4

Connection of the PV cables and grounding

- Wire the final module of the line with the inverter (-) line.
- Connect the ground wire to the last frame of the last module.



Annex 5

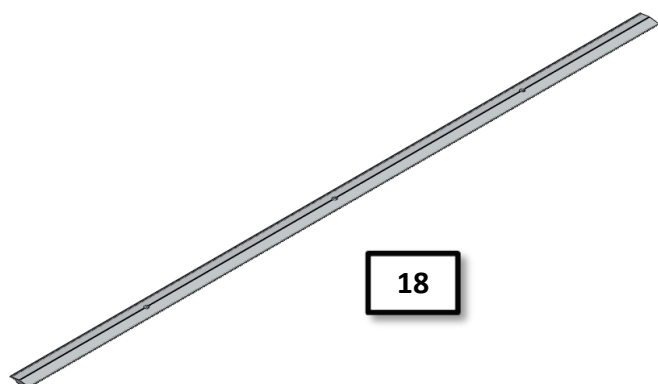
Assembly on long slope

Parts for long slope (up to 15 m)		
Number	Definition	Article Code
Optional parts		
18	Middle Clamp Deflector	A022V40
19	Black Middle Clamp Deflector	A021V40N
20	Large Middle Clamp Deflector	A022V40
21	Large Black Middle Clamp Deflector	A021V40N

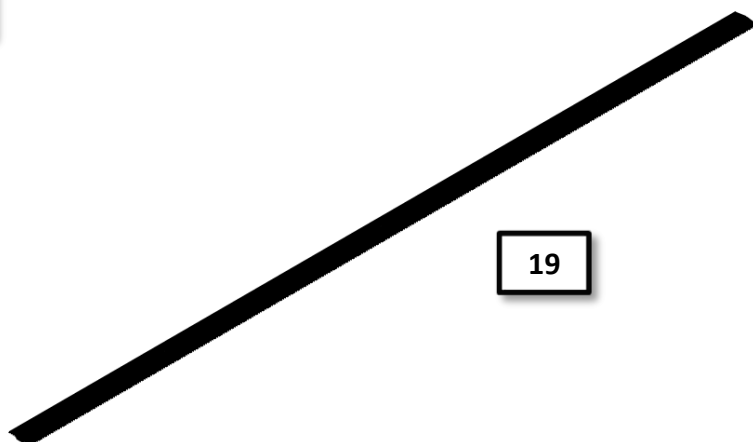
Information et visuels non contractuels. Sous réserve de modifications techniques sans préavis.

Annex 5

Representation of parts

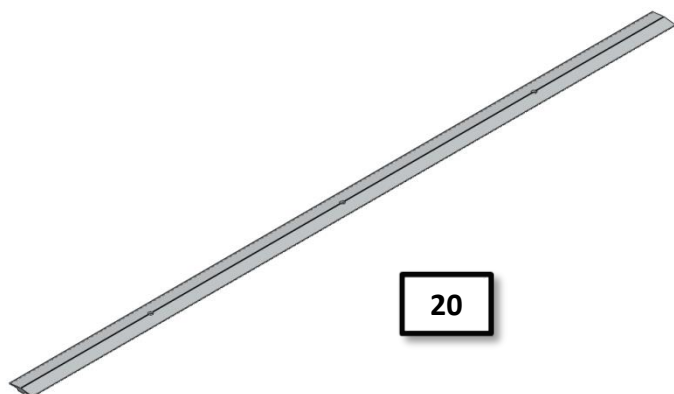


18

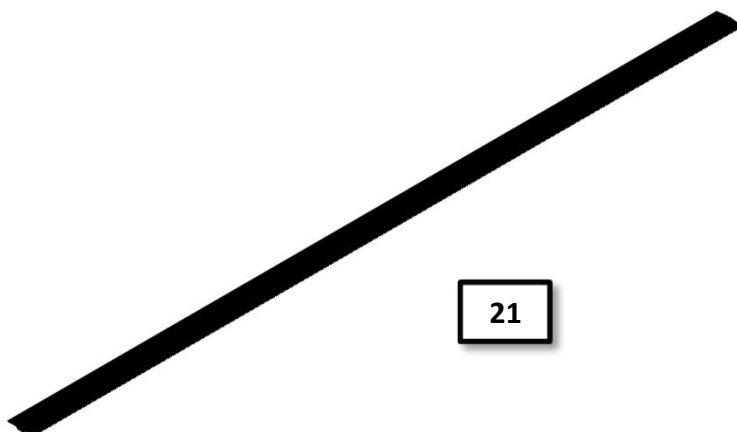


19

Deflector: a part that is mounted perpendicular to the slope at the joining of the two modules.



20



21

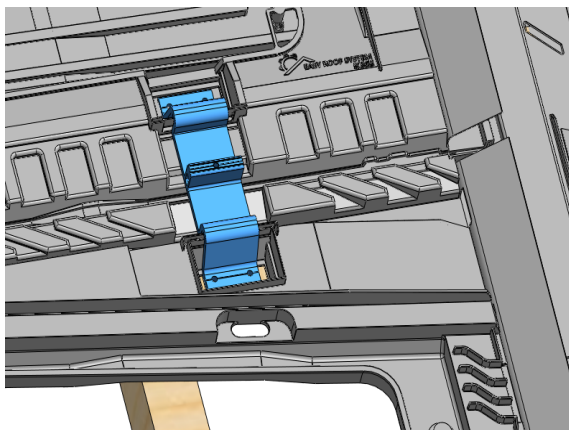
Annex 5

Assembly on large slope

This annexe applies to the PV field of over 12m in height (slope irection)

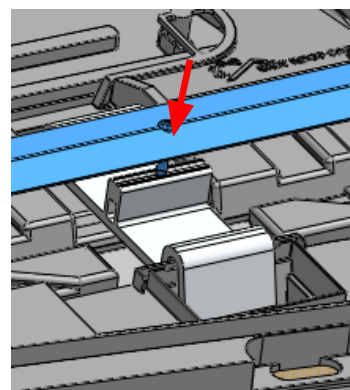
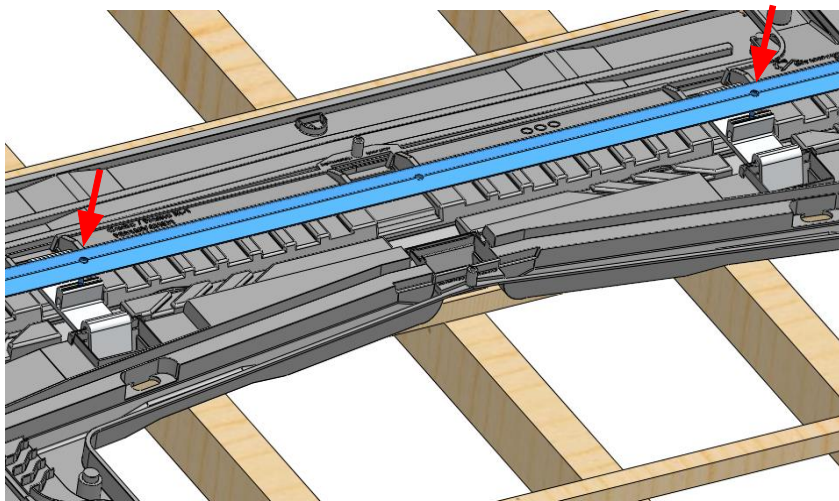
1. Assembly of middle brackets

- a) 6 brackets assembly: set in place and tighten the upper central middle bracket.
4 brackets assembly: set in place and tighten the upper right middle bracket.



b) Use the deflector as a gage to position the other brackets. For this, insert the screws $\varnothing 6$ into holes ($\varnothing 6$) of each support bracket.

c) Screw the middle bracket(s), remove the deflector. Then proceed for all middle brackets of each frame.

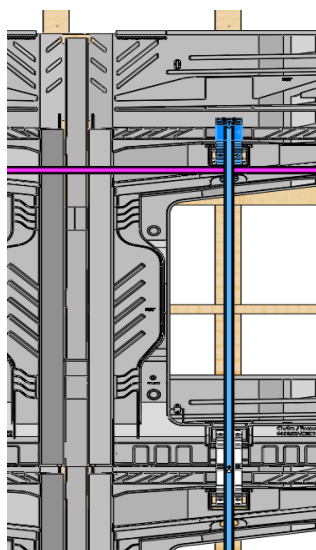


Annex 5

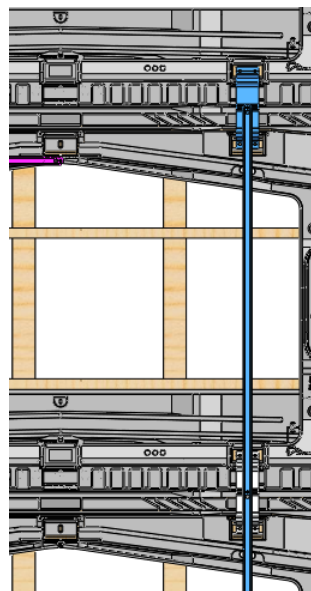
Assembly on large slope

2. Assembly of end brackets

The assembly of the End brackets at the top of the field and bottom of the field is carried out as described on page 36 with the mounting tool provided for this purpose.



Left side



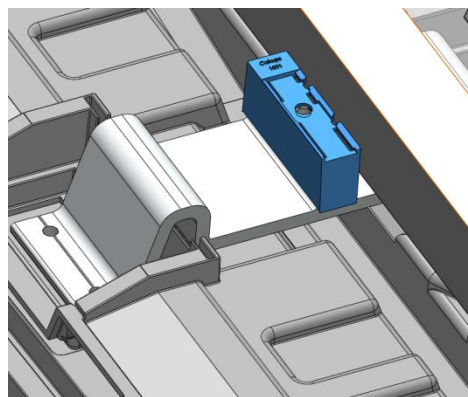
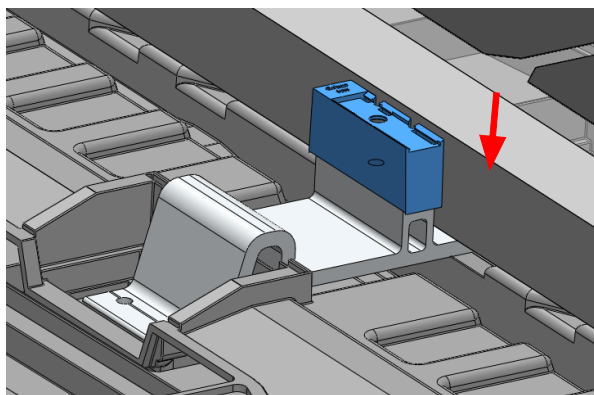
Right side

Annex 5

Assembly on large slope

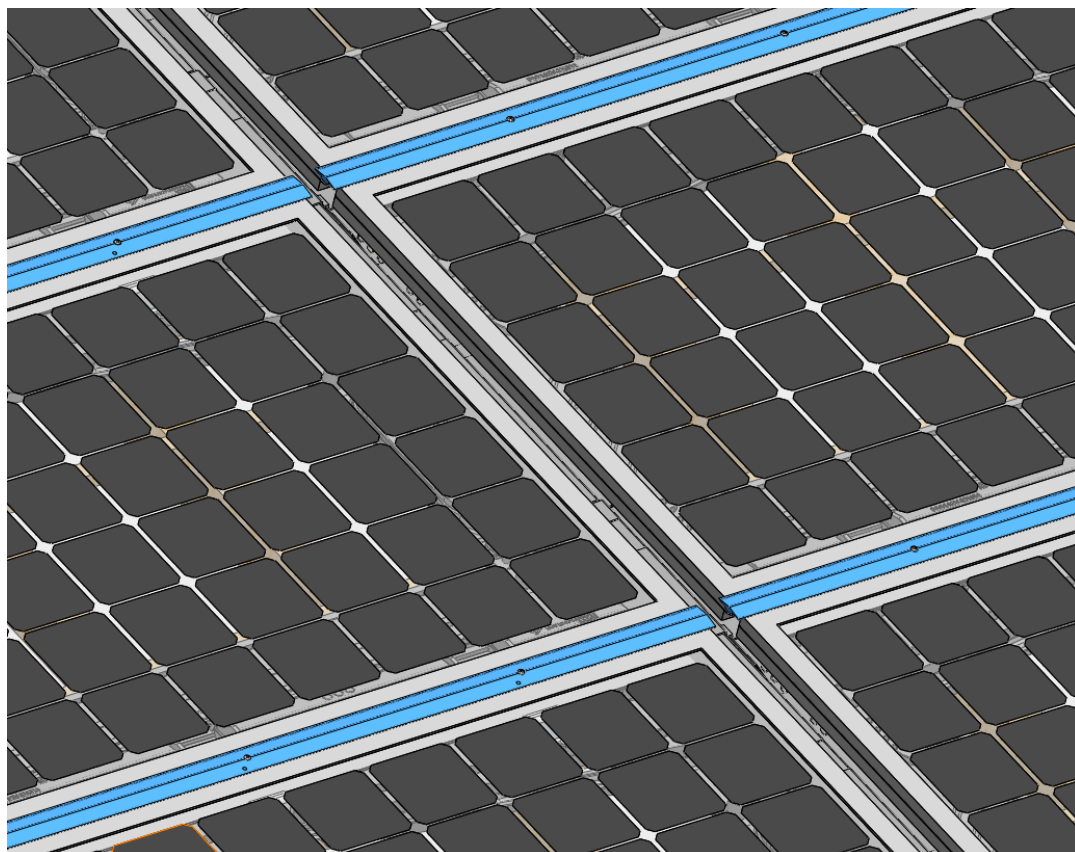
3. Middle Clamp Deflector assembly

a) Position the wedges on the middle brackets.



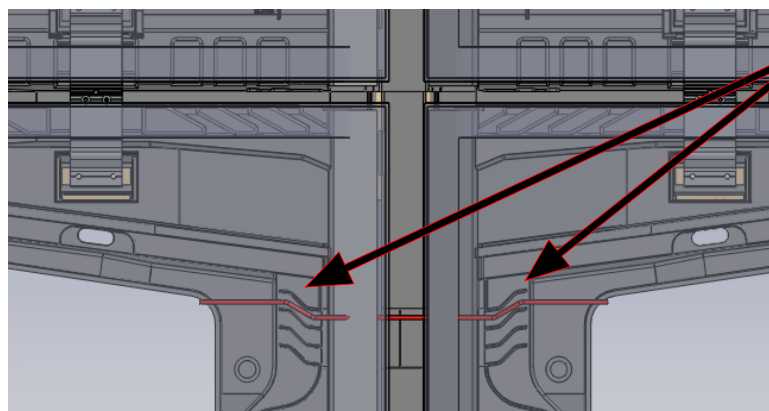
b) Screw and tighten all Middle Clamp Deflector with the Chc M6x30 (12) or Chc M6x40 (11) depending on the thickness of the PV module.

For PV module with a width lower than 990mm use Large Middle Clamp Deflector .



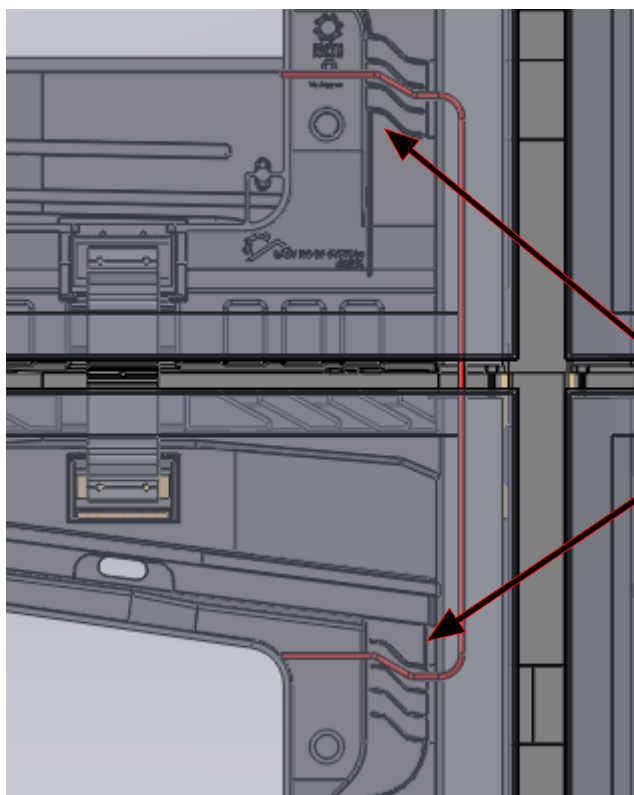
Annexe n° 6 Alternative for assembling a cable that is “too short”

1. Passage from one column to another



Passage of the panel cable through the spaces usually reserved for roofs that are completely battened.

2. Passage from one line to another



Passage of the panel cable through spaces usually reserved for completely battened roofs; in addition, position the cable vertically by inserting it between the panel frame and the easy-roof frame tab, after the passage of the exterior cables.

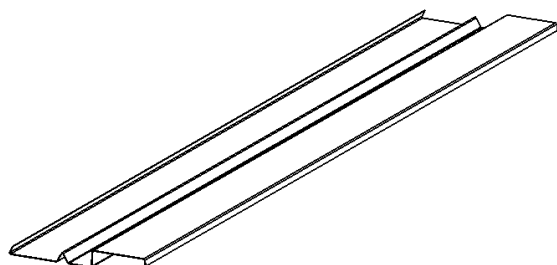
Warning, the panel connectors must never be found in the cable passages of battened roofs nor in the visible exterior part of the panel so as not to form an extra layer or obstacle which could hamper clamping or water run-off.

Annexe n° 7

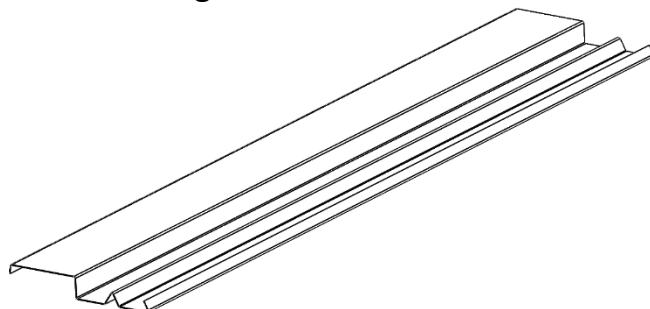
Metal flashings to be tailor made

Side flashings

Flashing aluminium Right



Flashing aluminium Left



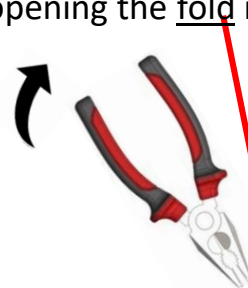
EASY ROOF EVOLUTION side flashings can be replaced by metal channels.

These can be placed on the left or on the right of the field.

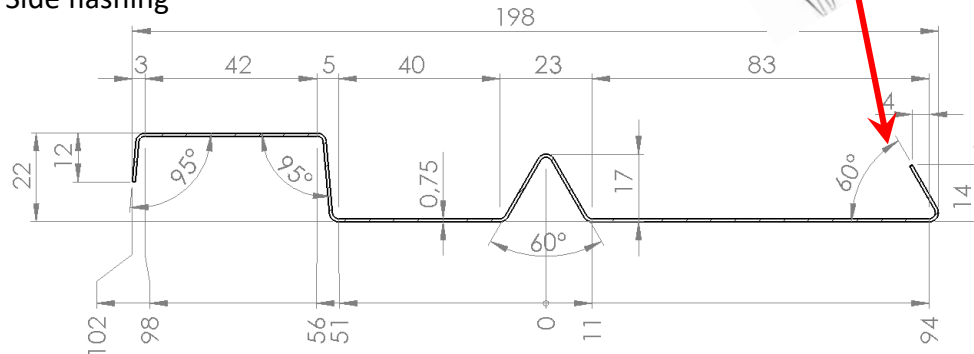
The recommended length is 1100mm.

A 230mm overlap is necessary between the channels in the direction of the roof slope.

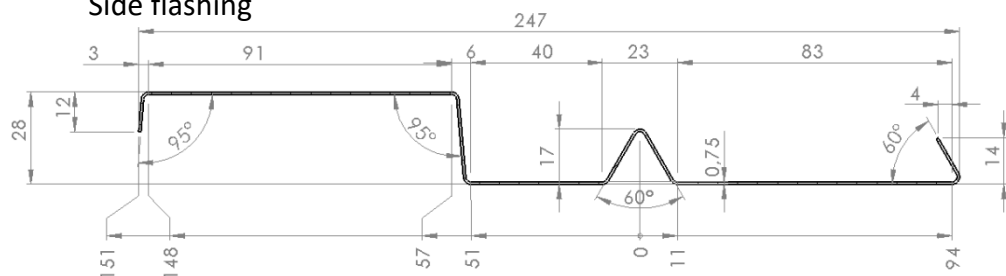
The overlap between two metal sheets is made by opening the fold in the lower sheet with pliers



Side flashing



Side flashing



Annexe n° 7

Metal flashings to be tailor made

Side flashings

NB : Indications applicable to side flashings
PRTOP00554AA and **PRTOP00555AA**

Position the flashing
on the EASY ROOF EVOLUTION frame.
Leave an even space on either side.

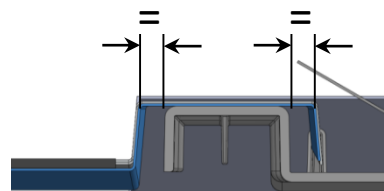


Fig.1) Drill a hole of the right size for a countersunk stainless steel wood screw (not supplied) at a maximum of 50mm from the top of the plate.
Tighten the screw until it is flush with the surface of the plate.

Fig. 2) When it is not possible to fix the flashing to a support batten, a batten of the same thickness must be added.
This batten will rest on a rafter on either side and will be fixed in place by two wood screws.

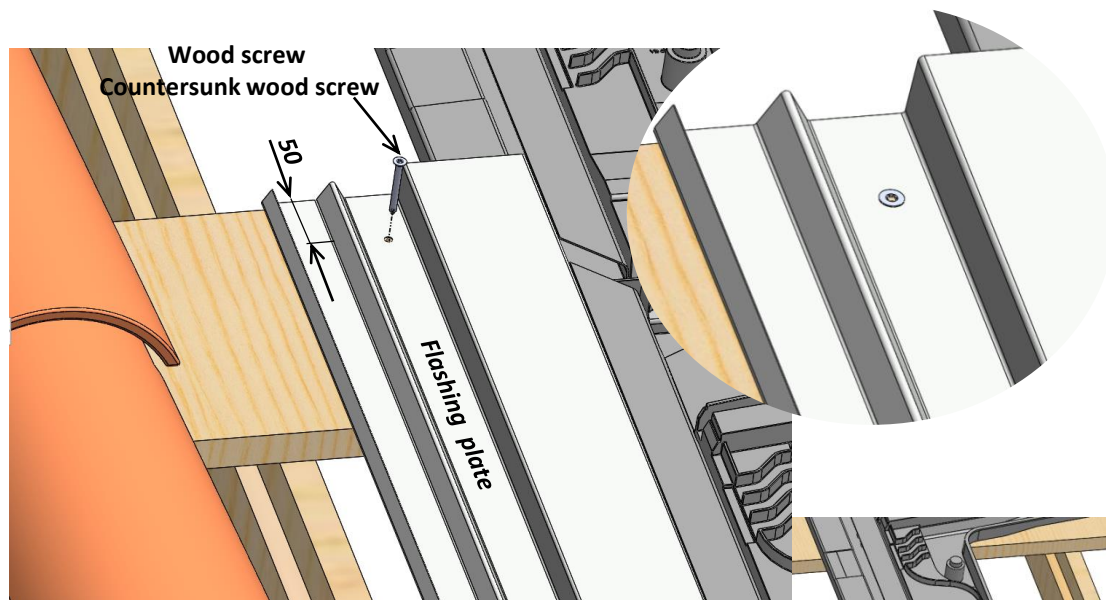


Fig. 1

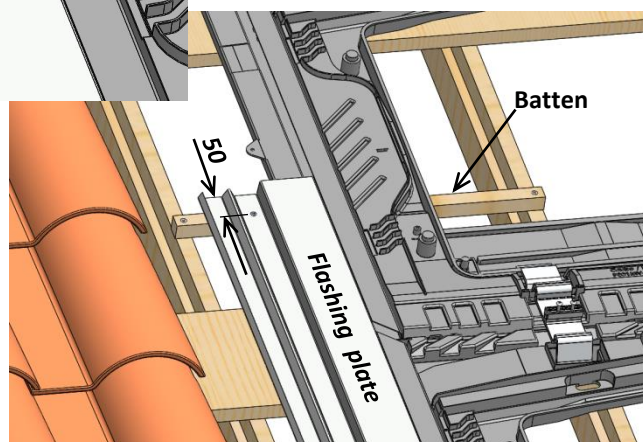


Fig. 2

Annexe n° 7

Metal flashings to be tailor made

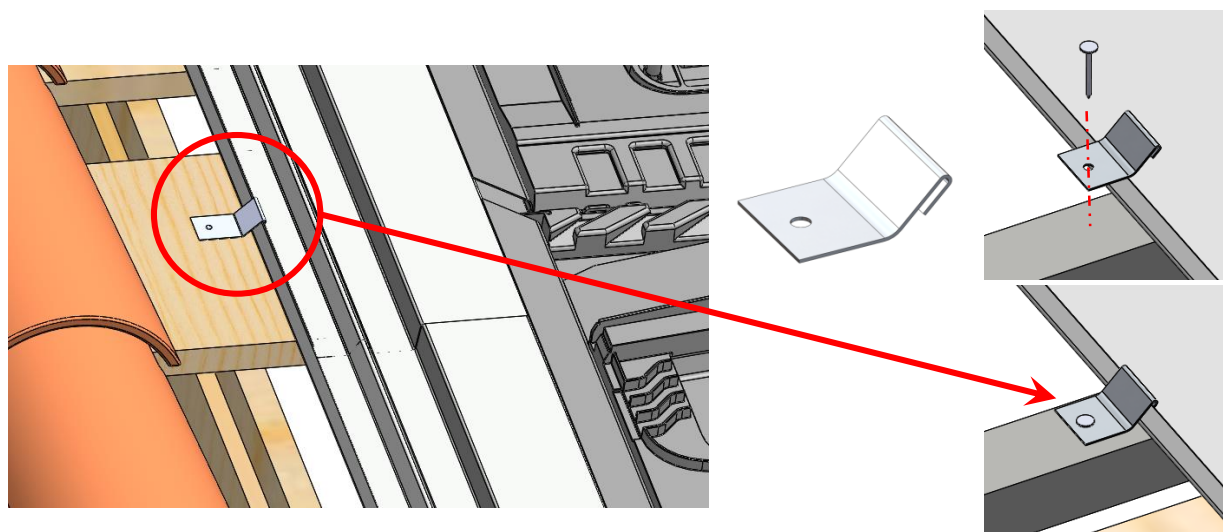
Side flashings

NB : Indications applicable to side flashings

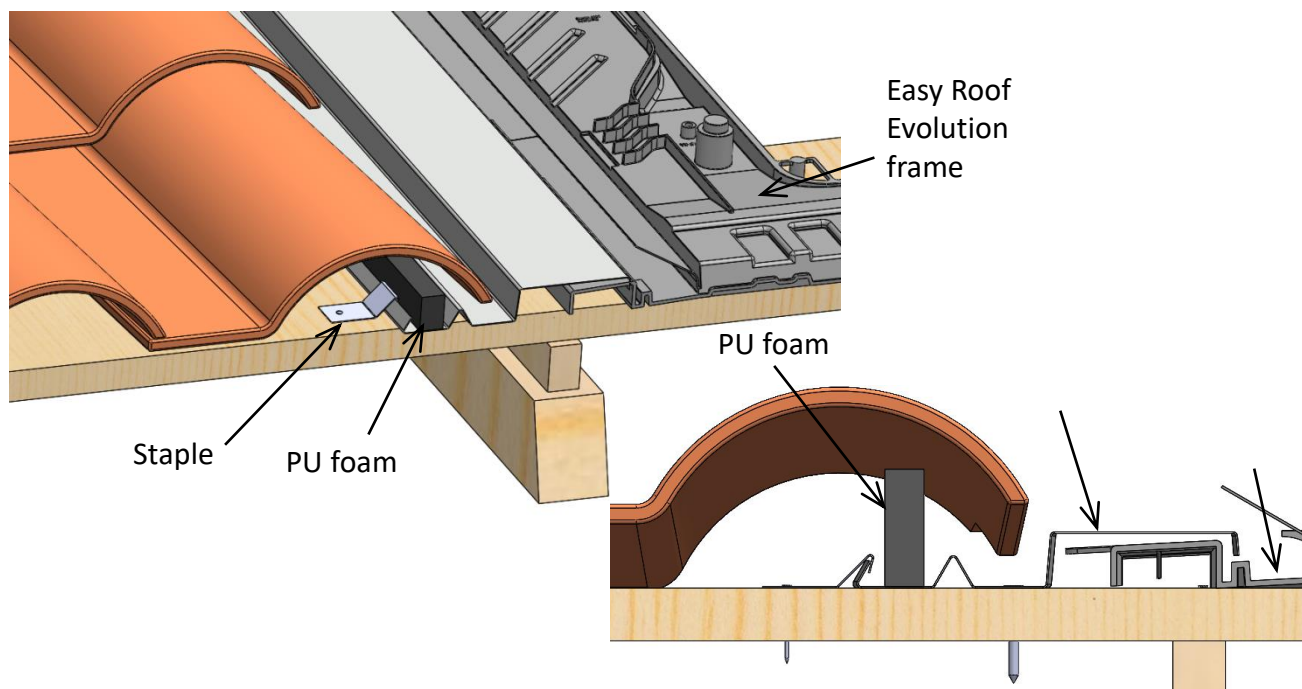
PRTOP00554AA and **PRTOP00555AA**

Fix the flashing plates in place with metal staples.

Nail or screw, at least 2 staples per flashing (1 at the overlap + in the middle of the flashing) onto the support batten or failing that a batten of the same thickness.



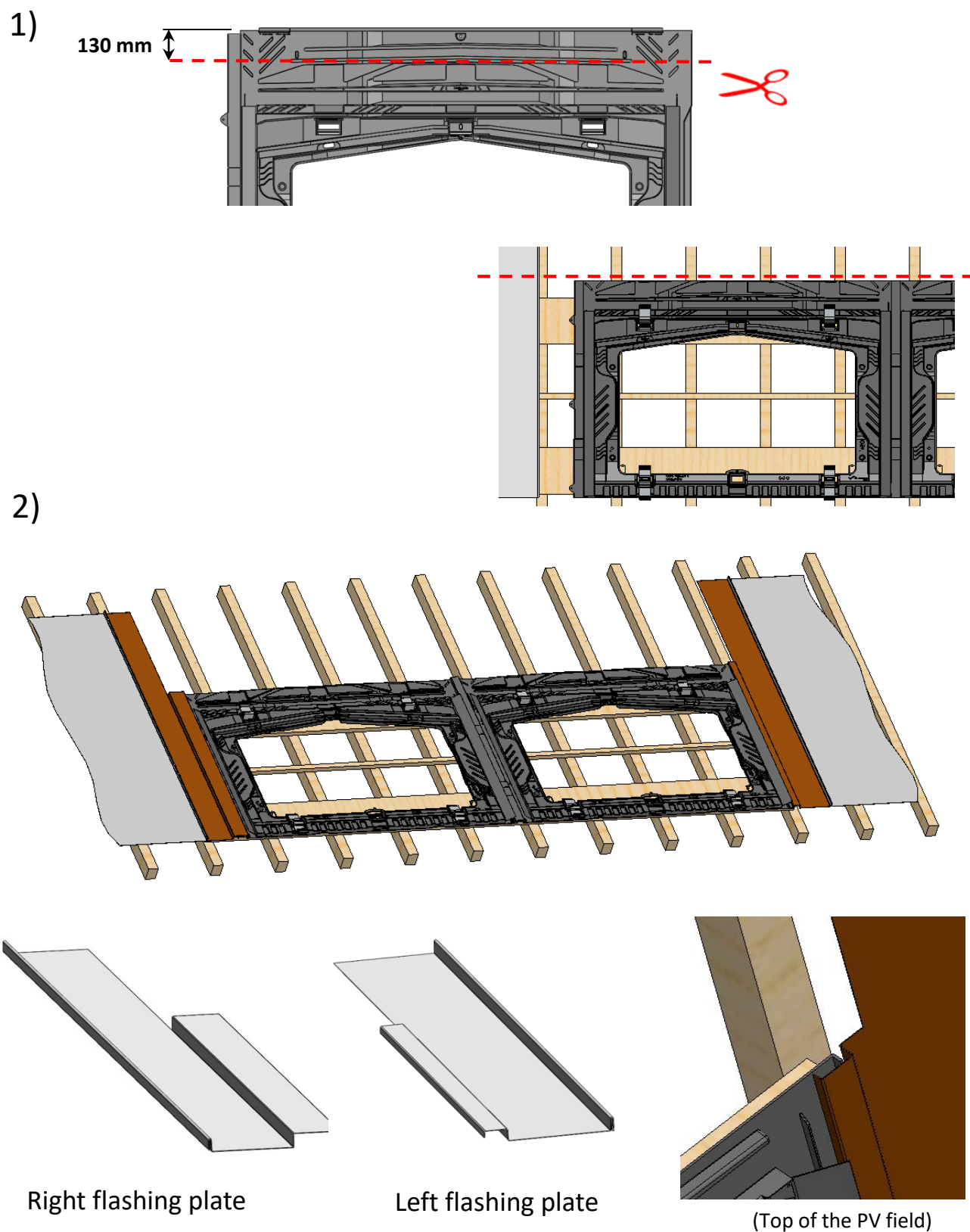
Add foam seals (of type Illmod 600 Tremco-Illbruck) between the sheet metal flashing and the bottom of the tiles.



Annex n° 8

Zinc flashing with standing seams

Side flashing

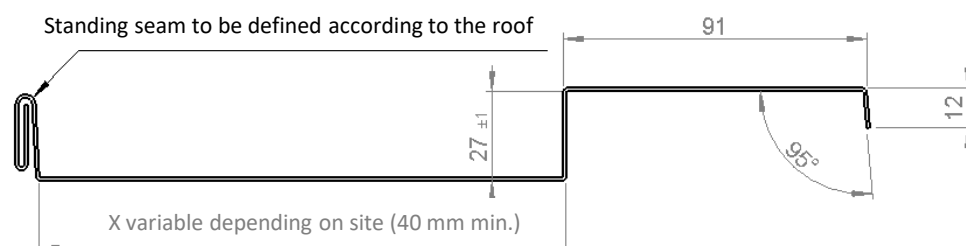


Annex n° 8

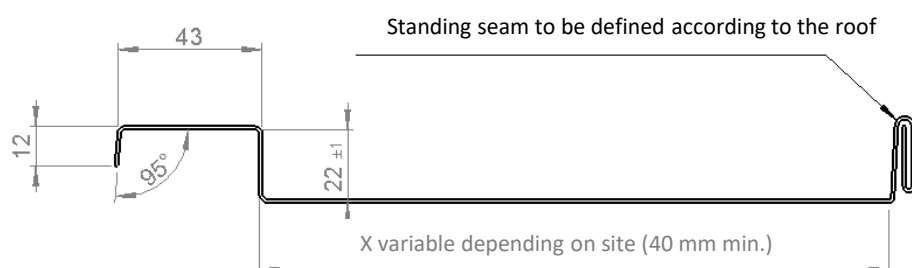
Zinc flashing with standing seams

Side flashing

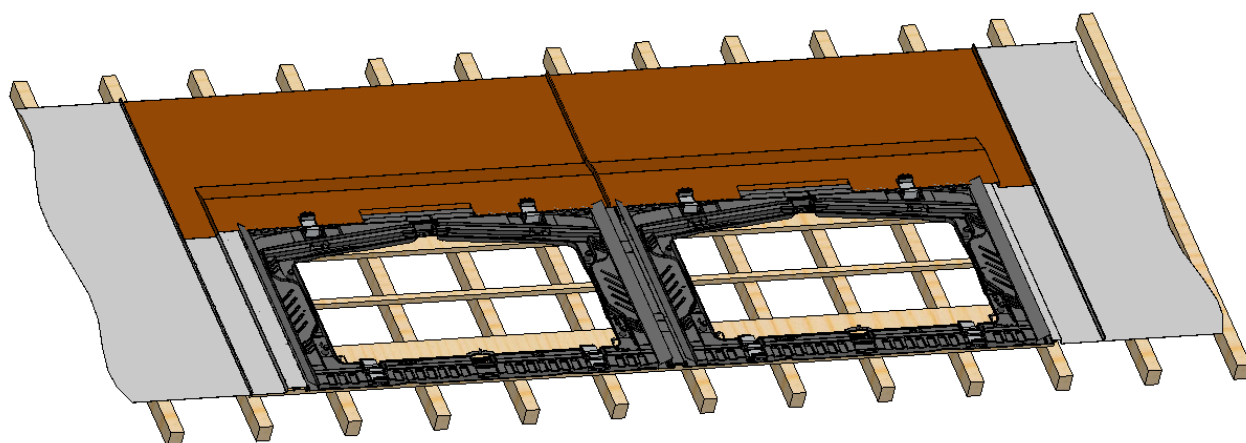
Right flashing plate



Left flashing plate



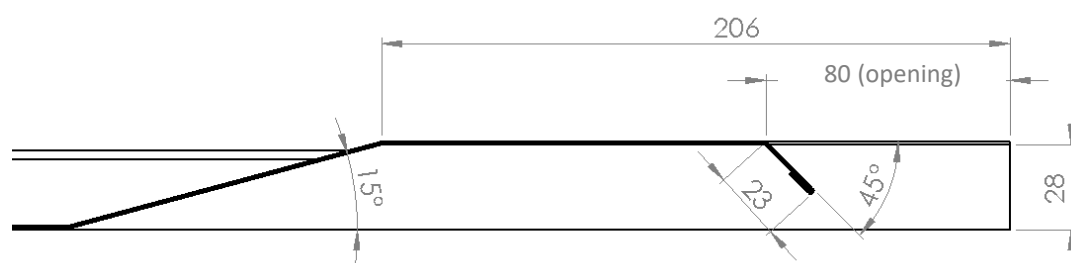
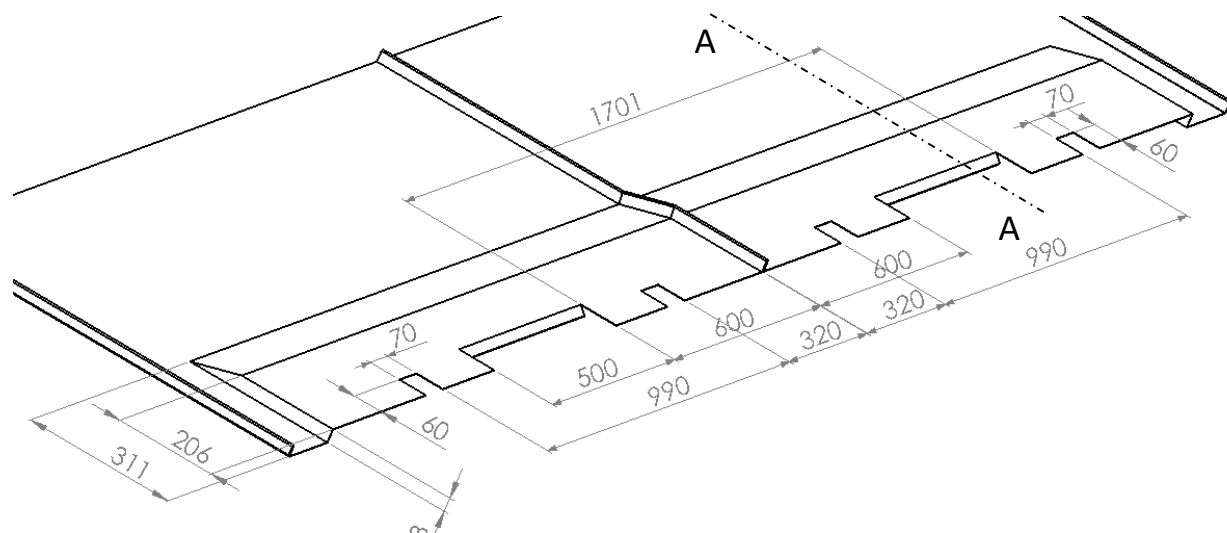
C-2 Top of PV field



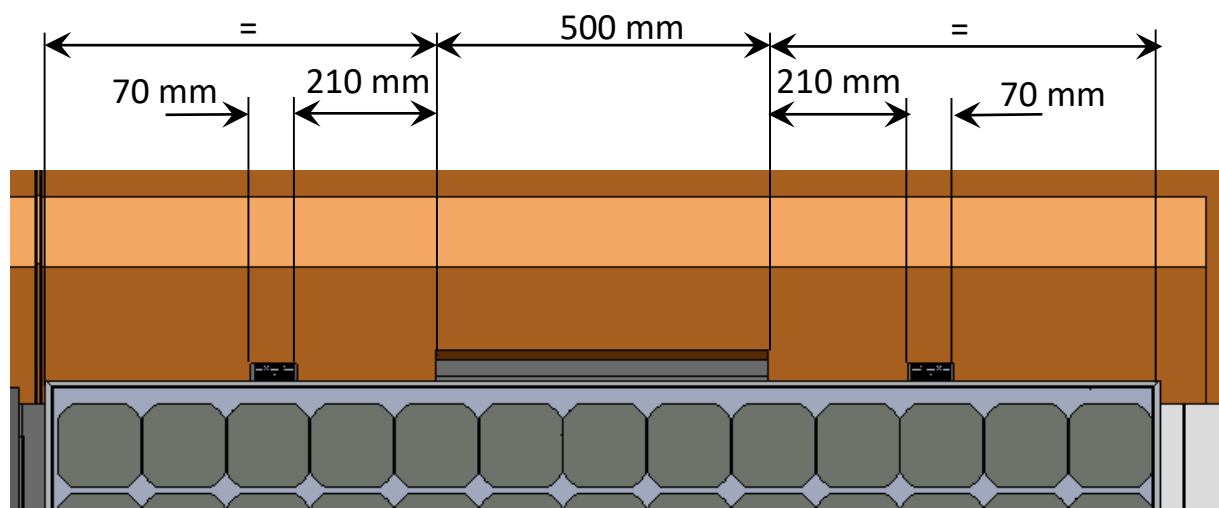
Annex n° 8

Zinc flashing with standing seams

Top of PV field



(A-A section drawing)

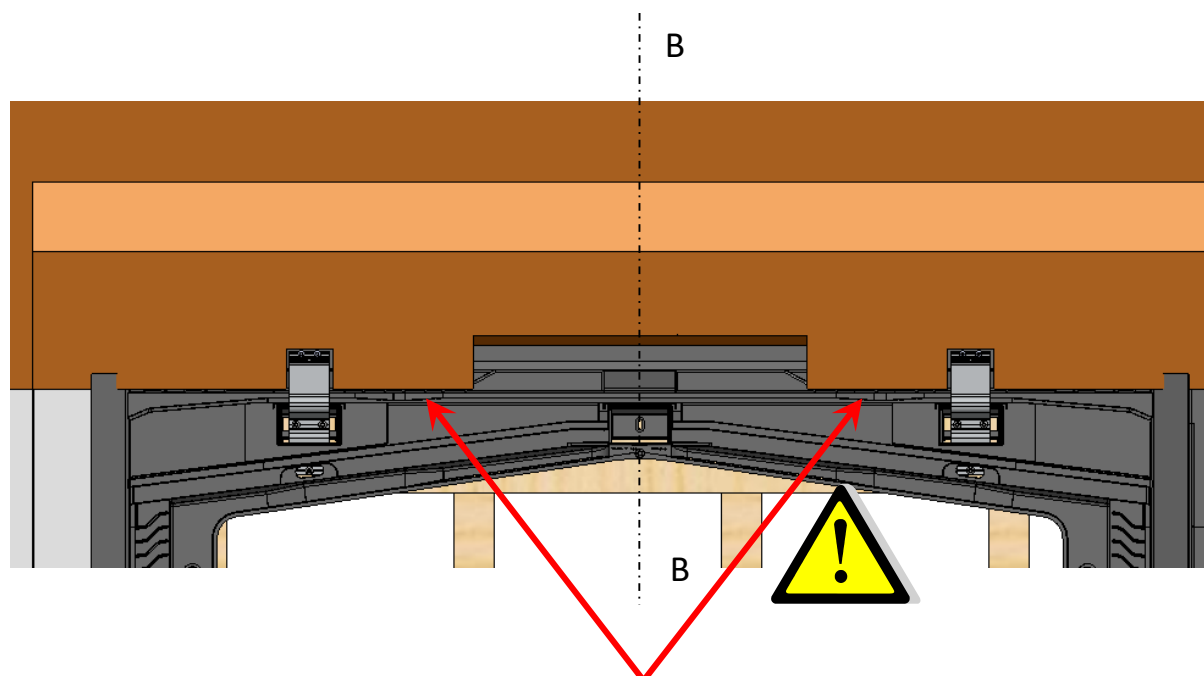


Top flashing plate

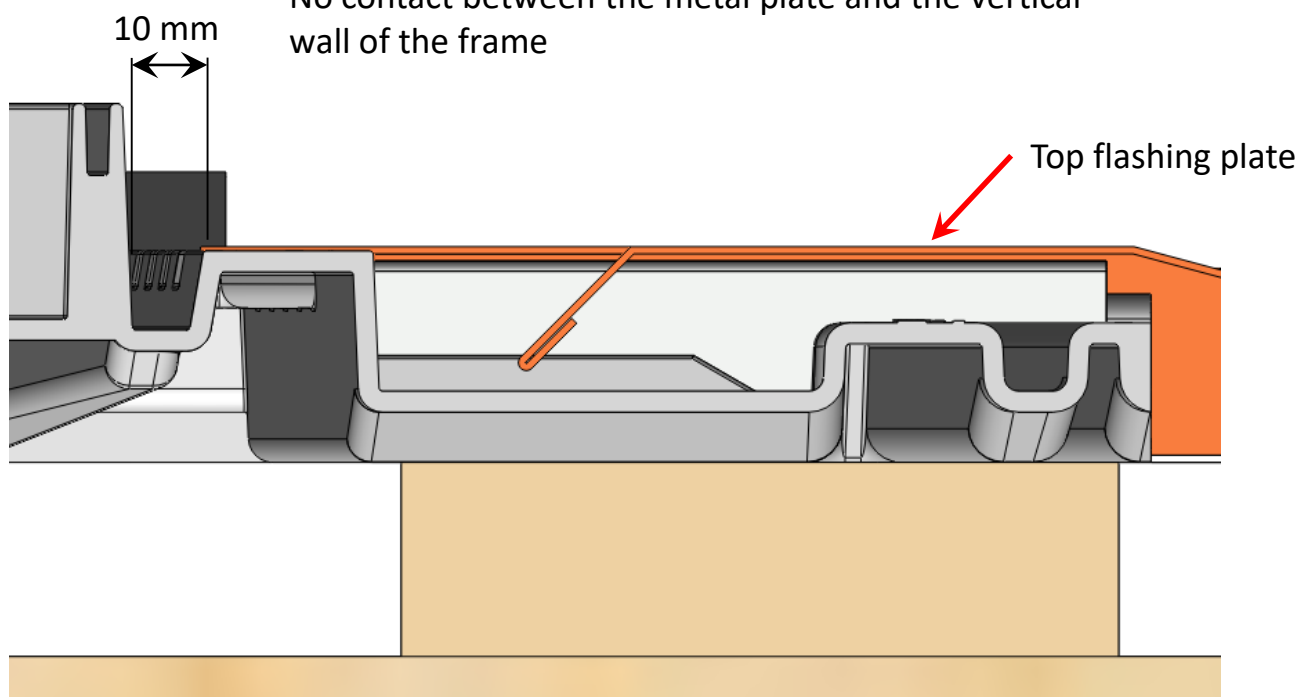
Annex n° 8

Zinc flashing with standing seams

Top of PV field



No contact between the metal plate and the vertical wall of the frame



(B-B section drawing)

Top flashing plate