

Installation manual ValkBox3



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Pay attention

- This manual is not project specific.
- This manual is not legally binding.
- No rights may be derived from this installation manual.
- See **datasheet ValkCableCare** for cable management.
- The system is placed in the middle zone of the roof.



Disclaimer

This installation manual composed with the greatest possible care and contains specific information for correct and safe installation of the solar mounting system, including installation drawings and ballast tables, calculated according to the Eurocode regulations. The standard values used for input of these calculations, always need to be checked in advance by the installer for correctness. In case values are different, a project case specific calculation needs to be made. Please contact Van der Valk Solar Systems in this situation.

At all times all currently applicable structural, safety and building regulations must be observed prior to installation of the solar mounting system. The building in question will be subject to a load as a result of the solar mounting system installed/mounted. Solar mounting systems installed on roofs will be exposed to wind and snow loads. Therefore, you are at all times responsible to obtain and use a design calculation to establish whether or not the building will be able to withstand the (extra) load at all times. Where necessary, modifications need to be made by you. Van der Valk will not accept any form of liability upon you not having obtained and used such a required design calculation.

Mounting systems for PV-panels placed on flat roofs should either be mechanically attached to the roof or need to be supported by ballast, to make sure that the solar mounting system is unable to be lifted, tipped over or slide. The required ballast weight per system shown in the tables in this manual ensures that the mounting system can be installed and used safely. In case the inclination of the roofs is 5 degrees or more, the PV-mounting system must always be mechanically fixed to the construction of the roof.

The calculations do not take into account obstacles in the near surrounding such as, for example, high buildings, cliffs and mountains. Restrictions also apply for the position of the solar mounting system on a roof. The solar panels must be installed at a certain distance from the edge of the roof: the middle zone.

The standard warranty is 10 years, which can be extended under certain conditions. The guarantee provided is subject to the guarantee conditions stated in the general terms and conditions stipulated by Van der Valk Solar Systems B.V. Our terms and conditions shall apply to all our products at all times and can be found on our website:

www.valksolarsystems.com

Van der Valk Solar Systems B.V. does not accept any liability for any direct and/or indirect consequences of any act (or omission) ensuing from the information in or failure to observe the instructions provided in this installation manual. The use of the installation manual will at all times be subject to Dutch law.

Van der Valk Solar Systems holds the right to amend this document without further notice.

The ValkBox3 mounting system is a product of:

Van der Valk Solar Systems BV

Netherlands Chamber of Commerce: 27355116

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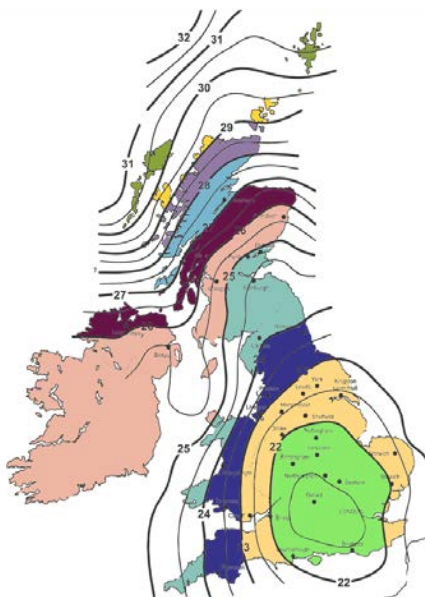
Required ballast

General

The ValkBox3 mounting system must be weighted down by tiles, which will be placed at positions G1 and G2. Start by choosing the wind area in which the system will be installed from the overview below. Next, look at the table for the panel length in question. In this table, you will choose the relevant type of roof covering. Bitumen and EPDM have a higher skin friction and it will be possible to use less ballast for this type of roof covering. Next, choose the table for the wind area in question and the row for the building height applicable. This will show you the number of tiles necessary for positions G1 and G2.



The number of tiles calculated in the tables below are based on standard tiles measuring 30 x 30 x 4.5 cm and weighing 9 kg. If you are using tiles with different dimensions and, because of this, a different weight, you will need to add tiles until you have reached the weight required.



Selection table:

Minimum number of tiles per position G1 and G2 based on:

- Tile dimensions: 30 x 30 x 4,5 cm
- Tile weight: 9 kg
- Terrain category: town (sites more than 1 km inside town boundary - area where at least 15% of the surface is covered with buildings with an average height above 15m)
- Distance to shoreline: >10km
- Maximum height above sea level: <100m

Panel height approx. 180 cm (width 100 - 110 cm)			
Bitumen + EPDM		Concrete	
Position		Position	
Total G1	Total G2	Total G1	Total G2

Wind speed	Building height	Total G1	Total G2	Total G1	Total G2
21,5 m/s	0-5 meter	5 kg	61 kg	9 kg	70 kg
	5-10 meter	13 kg	83 kg	17 kg	83 kg
22 m/s	0-5 meter	7 kg	65 kg	11 kg	65 kg
	5-10 meter	14 kg	88 kg	19 kg	88 kg
23 m/s	0-5 meter	9 kg	72 kg	13 kg	72 kg
	5-10 meter	17 kg	97 kg	22 kg	97 kg
24 m/s	0-5 meter	12 kg	79 kg	16 kg	95 kg
	5-10 meter	20 kg	107 kg	26 kg	107 kg

Safety instructions

The ValkBox3 mounting system is installed on roofs and will be exposed to wind and snow. The building in question will be subject to a greater load as a result of the PV system. A design calculation must be used to establish whether or not the building in question will be able to withstand the extra load. Where necessary, modifications will then need to be made.

When installing the ValkBox3 mounting system, the instructions provided in this user manual must be observed at all times. Read this manual carefully and keep it in a safe place. Also follow the instructions stated in the manuals for the other system components that form part of the overall PV system. All current structural, safety and building regulations must be observed. Van der Valk Solar Systems B.V. will never be liable for any direct and/or indirect intangible or consequential loss ensuing from or connected to the failure to observe the instructions provided in this manual.

Starting points

The following starting points apply for the ValkBox3 mounting system:

The standards applied (if applicable for specific solar mounting system)

NEN-EN 1990:	Eurocode – Basis of structural design
NEN-EN 1991-1-4:	Eurocode 1: Actions on structures - Part 1-4: General actions – Wind actions
NVN7250:	Solar energy systems – Integration in roofs and facades – Constructional aspects
BS EN 1991-1-4:	British Standard

Type of solar panel

The ValkBox3 mounting system is a universal mounting system for solar panels. The following starting points apply:

Design panels:	Standard solar panels with an aluminium frame, with mounting holes for M6 bolts.
Length panels:	approx. 180 cm
Width panels:	100 - 110 cm
Weight panels:	approx. 20 kg (length approx. 180 cm)

Type of roofs

The ValkBox3 mounting system can be used to mount panels on flat roofs. The following starting points apply:

Type of roof covering: bitumen, EPDM and concrete

Before installing the ValkBox3 mounting system, make sure that you carefully sweep the roof area. The ballast calculation for the ValkBox3 mounting system (see later in this manual) only applies for flat roofs and roofs with a slight pitch of up to 5°. Above this roof pitch, the system should be attached to the roof securely.



Ballast

The ValkBox3 mounting system needs to be supported by ballast, to make sure that the system is unable to move, lift or tip over. See later in this manual details of which ballast should be used for each type of solar panel, each country, each type of roof covering and for each building height (subject to a maximum of 10 m). The number of tiles specified (30 x 30 x 4.5 cm) per position will be vital to ensure that the mounting system can be used safely.



To achieve this, follow the required ballast instructions later in this manual.

Position

Restrictions also apply for the position of the system on a roof. The solar panels must be installed at a certain distance from the edge of the roof.



According to the current standard, NEN-EN 1991-1-4, this free edge zone is 1/5 of the height of the roof. So, if a roof is 6 meters high, a free edge zone of 120 cm will be necessary.

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Required ballast | Spain

General

The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- determine the wind area on the windmap
- choose the wind area and building height in the table
- you can now read the number of tiles / kg

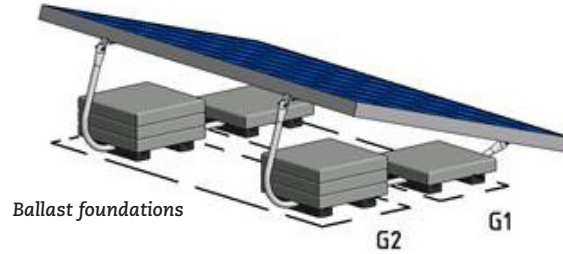
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).

Note 2: The ballast in G1 & G2 must be equally divided over the rubber ballast carriers.

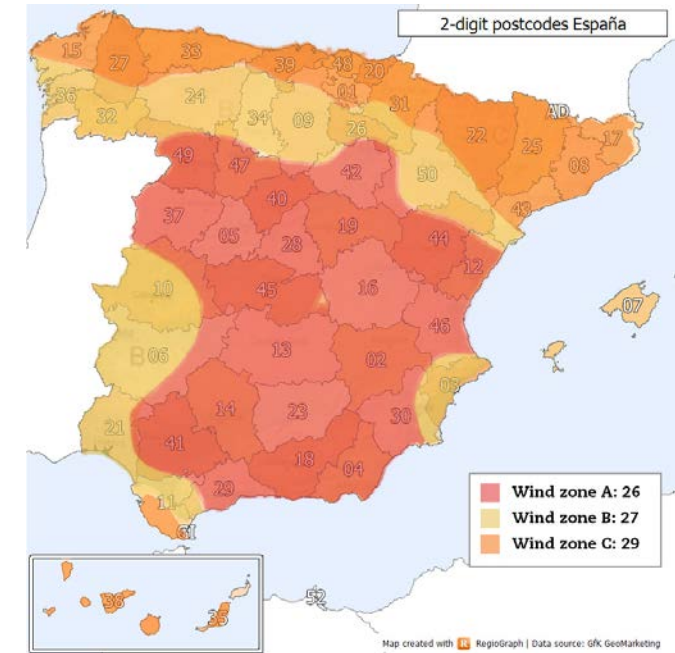
Note 3: The max. of 20 tiles (4 in G1 and 16 in G2) can be placed for extra ballast (180 kg).

Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Height above sea level	< 1000 m
Roofing materials	Concrete



Windmap Spain



Panel: maximum dimensions 1800x1100 mm (21 kg)

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
26 m/s	36,0	62,0	36,0	62,0	36,0	62,0	36,0	62,0	36,0	62,0	kg
	4,0	7,0	4,0	7,0	4,0	7,0	4,0	7,0	4,0	7,0	tiles
27 m/s	36,0	68,0	36,0	68,0	36,0	68,0	36,0	68,0	36,0	68,0	kg
	4,0	8,0	4,0	8,0	4,0	8,0	4,0	8,0	4,0	8,0	tiles
29 m/s	36,0	81,0	36,0	81,0	36,0	81,0	36,0	81,0	36,0	81,0	kg
	4,0	9,0	4,0	9,0	4,0	9,0	4,0	9,0	4,0	9,0	tiles

Panel: maximum dimensions 2100x1100 mm (24 kg)

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
26 m/s	36,0	74,0	36,0	74,0	36,0	74,0	36,0	74,0	36,0	74,0	kg
	4,0	8,5	4,0	8,5	4,0	8,5	4,0	8,5	4,0	8,5	tiles
27 m/s	36,0	82,0	36,0	82,0	36,0	82,0	36,0	82,0	36,0	82,0	kg
	4,0	9,5	4,0	9,5	4,0	9,5	4,0	9,5	4,0	9,5	tiles
29 m/s	36,0	97,0	36,0	97,0	36,0	97,0	36,0	97,0	36,0	97,0	kg
	4,0	11,0	4,0	11,0	4,0	11,0	4,0	11,0	4,0	11,0	tiles

X = the required ballast is higher than will fit under the system. The system must be mechanically attached to the roof. Please contact Van der Valk Solar Systems.

* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | Portugal

General

The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- determine the wind area on the windmap
- choose the wind area and building height in the table
- you can now read the number of tiles / kg

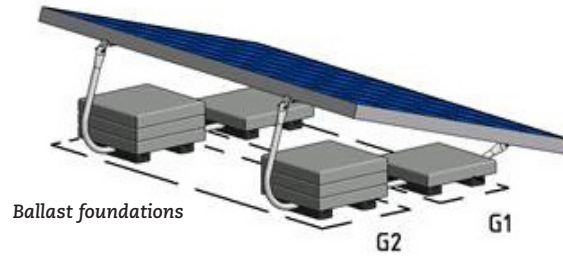
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).

Note 2: The ballast in G1 & G2 must be equally divided over the rubber ballast carriers.

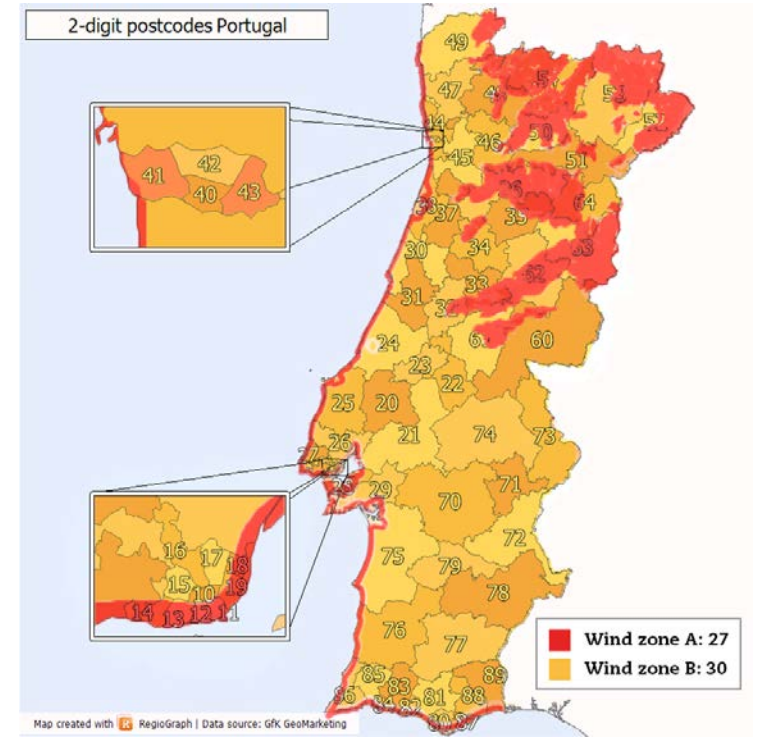
Note 3: The max. of 20 tiles (4 in G1 and 16 in G2) can be placed for extra ballast (180 kg).

Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Height above sea level	< 1000 m
Roofing materials	Concrete



Windmap Portugal



Panel: maximum dimensions 1800x1100 mm (21 kg)

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
27 m/s	36,0	68,0	36,0	68,0	36,0	68,0	36,0	68,0	36,0	68,0	kg
	4,0	8,0	4,0	8,0	4,0	8,0	4,0	8,0	4,0	8,0	tiles
30 m/s	36,0	89,0	36,0	89,0	36,0	89,0	36,0	89,0	36,0	89,0	kg
	4,0	10,0	4,0	10,0	4,0	10,0	4,0	10,0	4,0	10,0	tiles

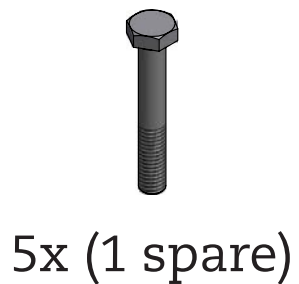
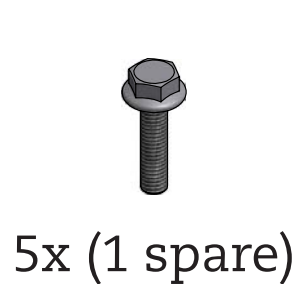
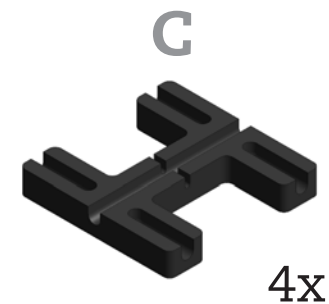
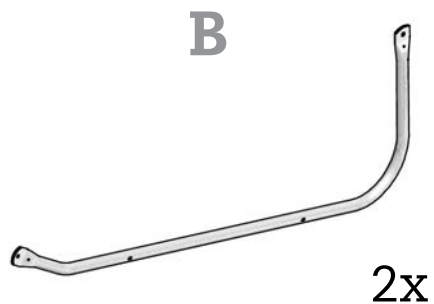
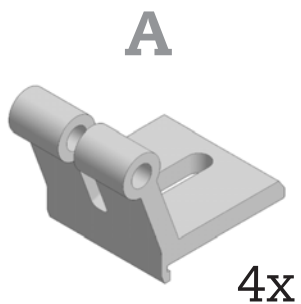
Panel: maximum dimensions 2100x1100 mm (24 kg)

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
27 m/s	36,0	82,0	36,0	82,0	36,0	82,0	36,0	82,0	36,0	82,0	kg
	4,0	9,5	4,0	9,5	4,0	9,5	4,0	9,5	4,0	9,5	tiles
30 m/s	36,0	106,0	36,0	106,0	36,0	106,0	36,0	106,0	36,0	106,0	kg
	4,0	12,0	4,0	12,0	4,0	12,0	4,0	12,0	4,0	12,0	tiles

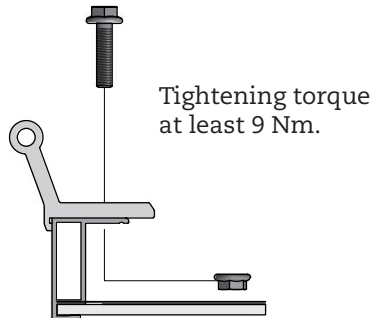
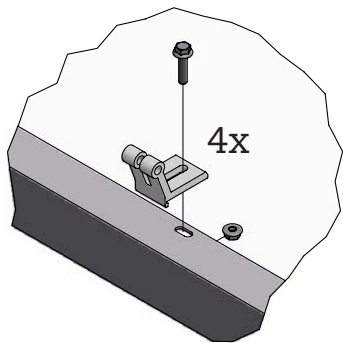
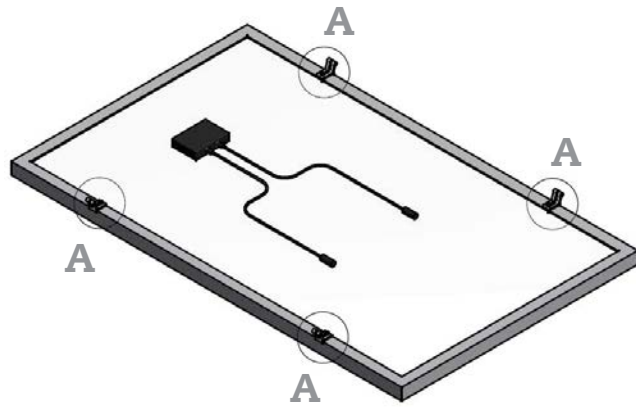
X = the required ballast is higher than will fit under the system. The system must be mechanically attached to the roof. Please contact Van der Valk Solar Systems.

* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Components



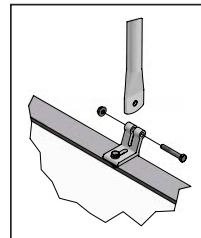
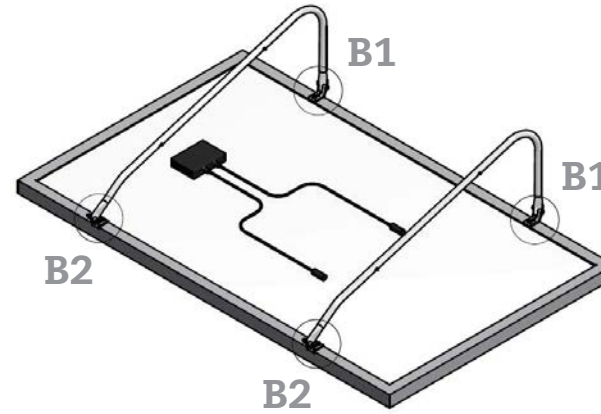
Step 1: Mounting the clevis



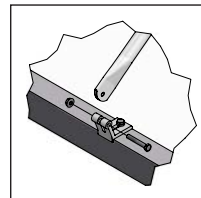
Step 2: Mounting the curved supports

The curved aluminum supports are suitable for panels with a width of 100 - 110 cm.

See other panel dimensions on next page.



Tighten the hinge bolts B1 by hand. These must be removed temporarily at step 4.



Tighten the hinge bolts B2 firmly, with a tightening moment of at least 9 Nm, until there is no play.

Option 1: Mounting panel

Suitable panel dimensions: 979 - 1005 mm
 (measured outside panel - outside panel)

Center to center mounting holes (panel frame): 959 - 985 mm

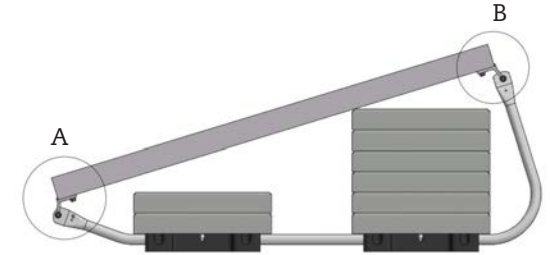
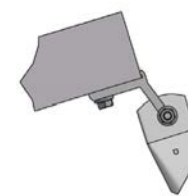
Under lip
 turned inwards

A (1 : 4)



Top lip facing
 inwards

B (1 : 4)



Option 2: Mounting panel

Suitable panel dimensions: 999 - 1025 mm
 (measured outer panel - inner frame)

Center to center mounting holes (panel frame): 999 - 1025 mm

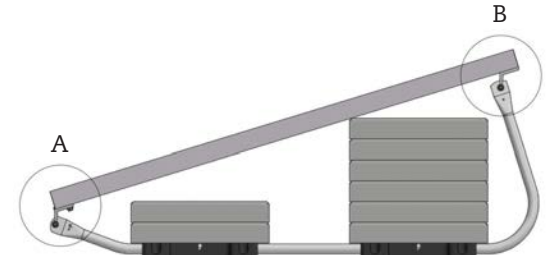
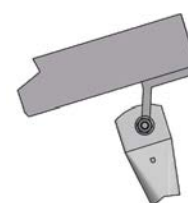
Under lip
 turned inwards

A (1 : 4)



Top lip facing
 out

B (1 : 4)



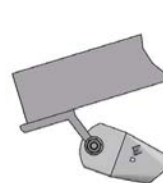
Option 3: Mounting panel

Suitable panel dimensions: 1019 - 1045 mm
 (measured within frame - within frame)

Center to center mounting holes (panel frame): 1039 - 1065 mm

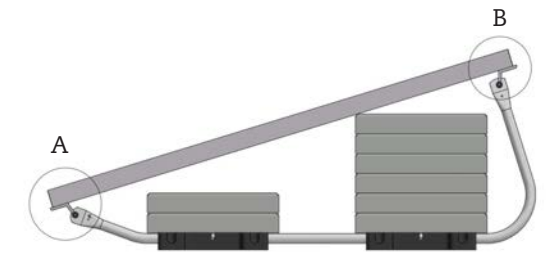
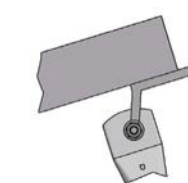
Under lip facing
 outwards

A (1 : 4)



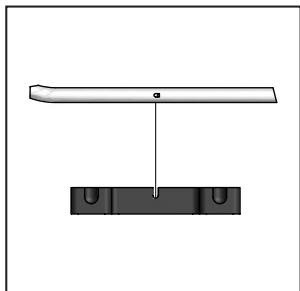
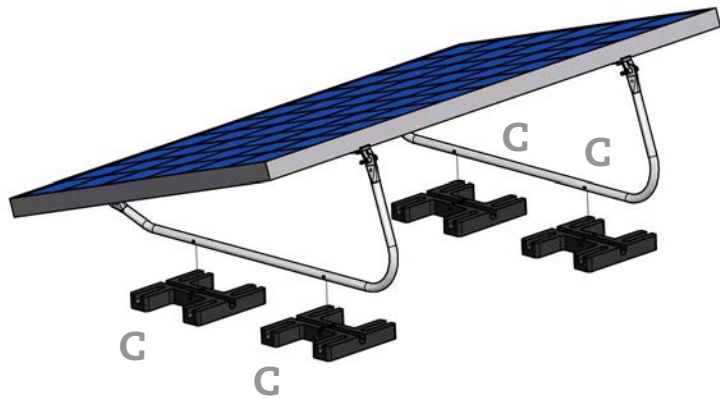
Top lip facing
 out

B (1 : 4)



Step 3: Placing the rubber tiles

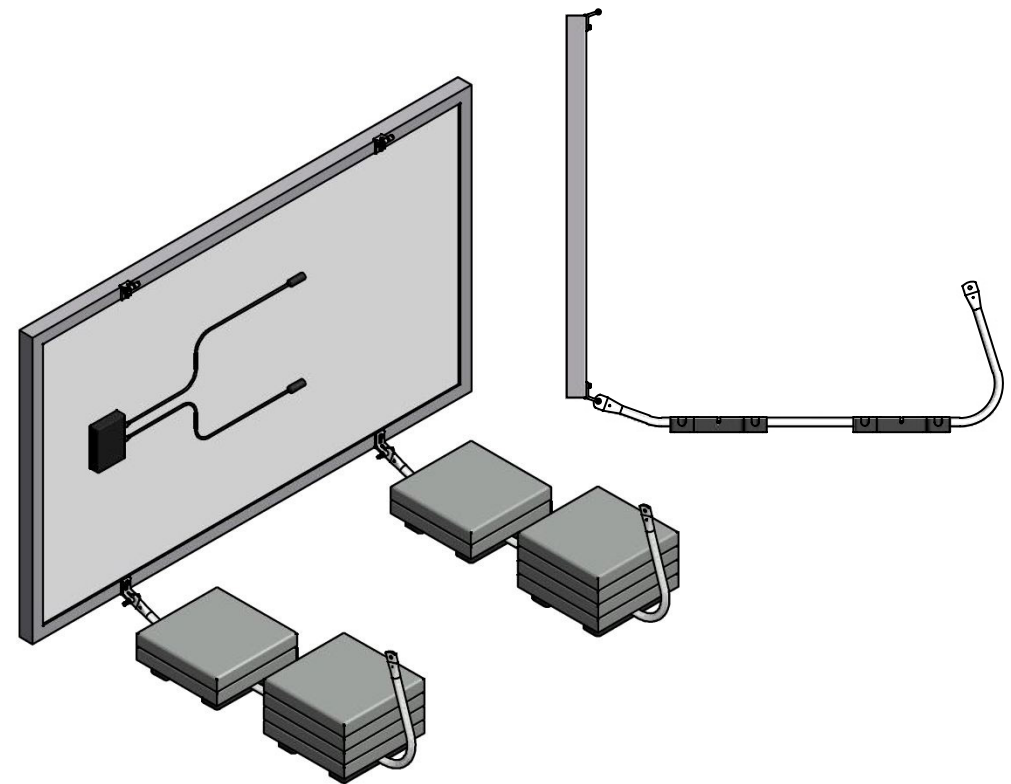
Turn over the panel and place it on the rubber tile carriers.



The projections on the curved aluminium supports must be placed in the grooves on the rubber tiles.

Step 4: Position the ballast

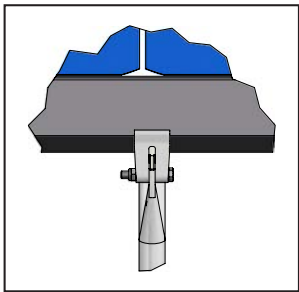
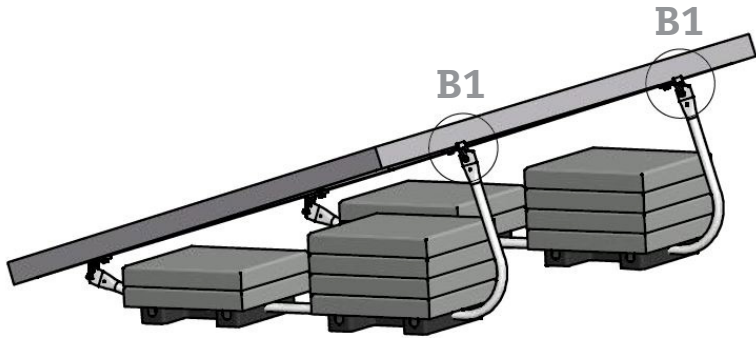
Remove the top hinge bolts B1 and place the panel in a vertical position. Make sure that you have some form of support in place or someone to hold the panel temporarily.



Position the ballast required.

Step 5: Tighten hinge bolts B1

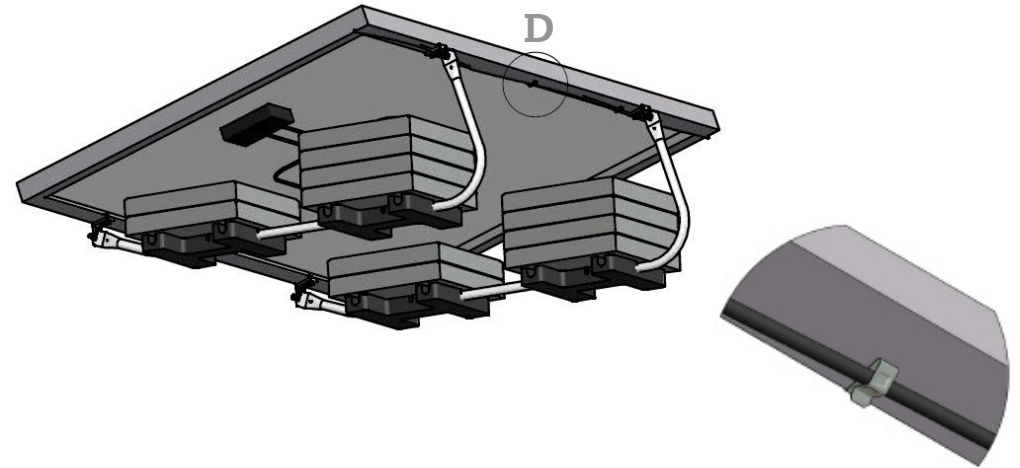
Attach the panel to the curved supports again and tighten hinge bolts B1.



Tighten hinge bolts B1 tightly, with a tightening moment of at least 9 Nm, until there is no play.

Step 6: Finish fitting the cables

The loose cables can be secured to the edge of the panel. Using the cable clamps supplied.



Step 7: Position the rows one behind each other

If a number of rows of panels are to be positioned one behind the other, we advise that an optimal pitch measure of 2.20 metres is observed; this will avoid any unwanted shadow. Optimal performance will be achieved if this pitch measure is used. Based on sun angle of 15 degrees.

