



Universal installation system for flat roofs

Congratulations on buying the ValkBox® 3 mounting system and on helping the environment by deciding to install solar panels.

The ValkBox® 3 mounting system is a universal mounting system for one standard solar panel in a landscape set-up, with a tilt angle of 20°, on a flat roof with a height up to 10 m. The components supplied do not include the ballast required, which will be a number of standard size tiles (measuring 30 x 30 x 4.5 cm).

The number of tiles required per position, per type of solar panel, per roof area and per building height is specified in the tables on the back of this document. See Pages 2 and 3 for an explanation of how the system should be installed.

**Safety instructions**

The ValkBox® 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 ValkBox® 3 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 ValkBox® 3 mounting system:

The standards applied

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

Panel design :	Standard solar panels with an aluminium frame, with mounting holes for M6 bolts upwards.
Panel length :	Approx. 165 cm or approx. 200 cm
Panel width :	98 -100 cm
Thickness of the aluminium frame :	3 - 5 cm
Panel weight :	Approx. 20 kg (length approx. 165 cm) or approx. 25 kg (length approx. 200 cm)

Types of roof

The ValkBox® 3 mounting system can be used to mount panels on flat roofs. The following starting points apply:

Type of roof covering : bitumen, EPDM and concrete (for the ballast applicable per type of roof covering, see the tables on the back of this document).

Before installing the ValkBox® 3 mounting system, make sure that you carefully sweep the roof area.

The ballast calculation for the ValkBox® 3 mounting system (see the back of the 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 ValkBox® 3 mounting system needs to be supported by ballast, to make sure that the system is unable to move, lift or tip over. See the back of this document for details of which ballast should be used for each type of solar panel, each region, 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 instructions on the ballast required on the back of this document.

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.

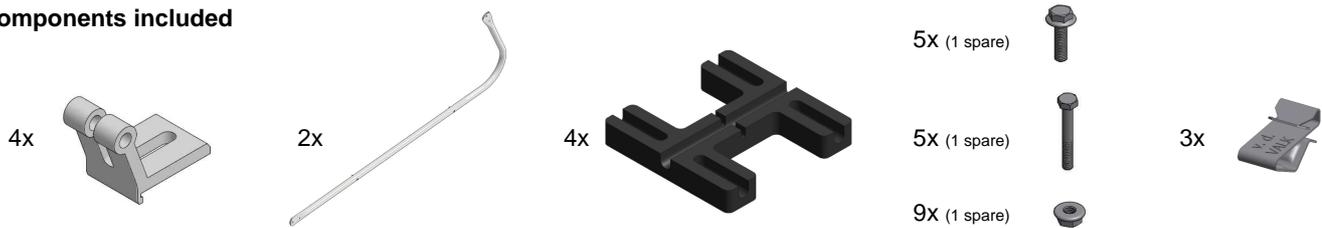
So, if a roof is 6 meters high, a free edge zone of 120 cm will be necessary. The guarantee provided is subject to the guarantee conditions stated in the general terms and conditions stipulated by Van der Valk Solar Systems BV. Our terms and conditions can be found on our website: www.valksolarsystems.nl

The ValkBox® 3 mounting system is a product that has been produced by: Van der Valk Solar Systems B.V.,
Registered with the chamber of commerce for Haaglanden
under number 27355116. Internet: www.valksolarsystems.nl

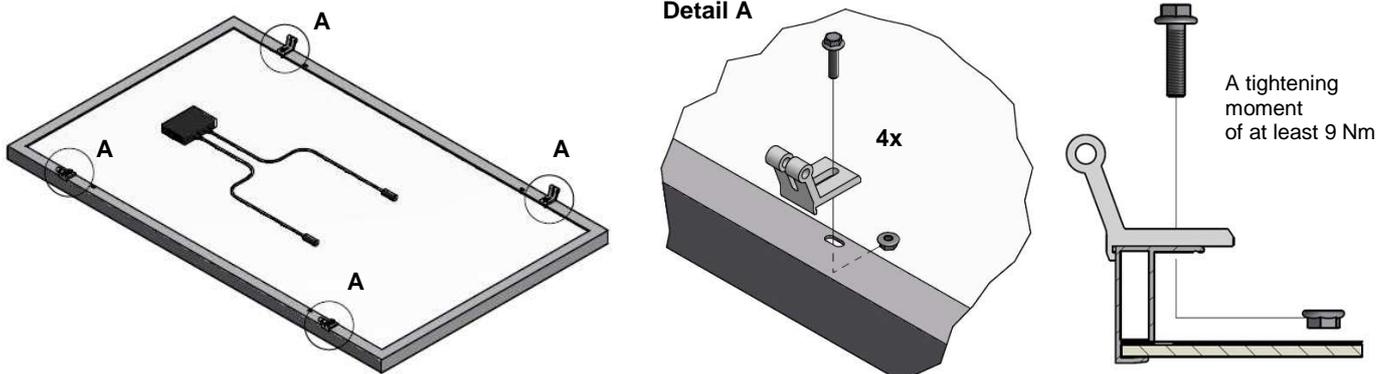
Issue date : August 2013
Version: VALK-USER-GB-GB-ValkBox 3-Flat Roof-2013-08

Installation manual

Components included

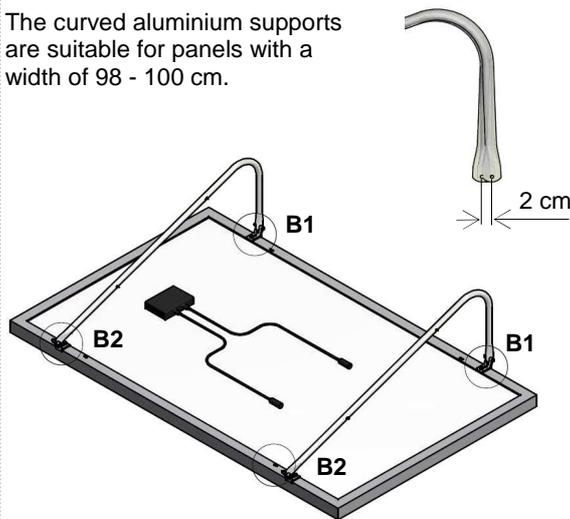


Step 1: Fit the support mounts

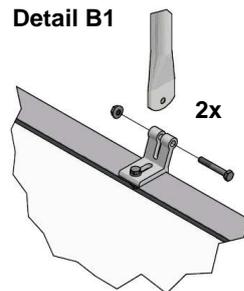


Step 2: Mount the curved supports

The curved aluminium supports are suitable for panels with a width of 98 - 100 cm.

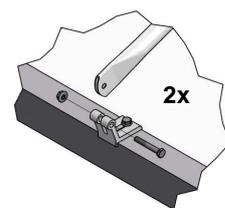


Detail B1



Tighten the hinge bolts B1 by hand. These must be removed temporarily in Step 4.

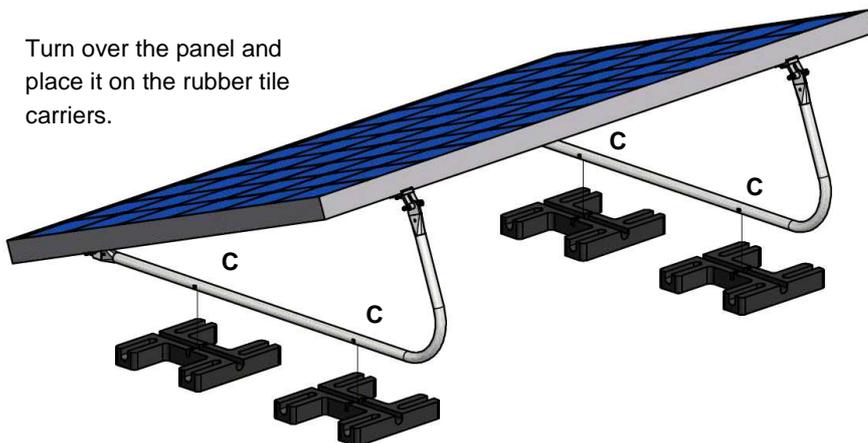
Detail B2



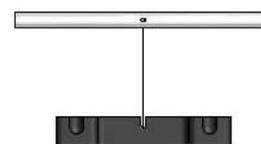
! Tighten the hinge bolts B2 firmly, with a tightening moment of at least 9 Nm, until there is no play.

Step 3: Attach the rubber tiles

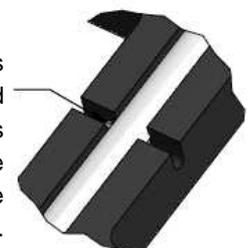
Turn over the panel and place it on the rubber tile carriers.



Detail C



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

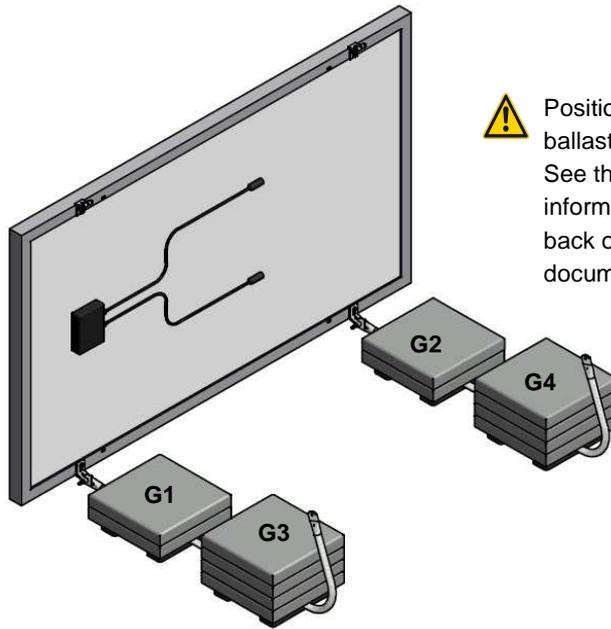
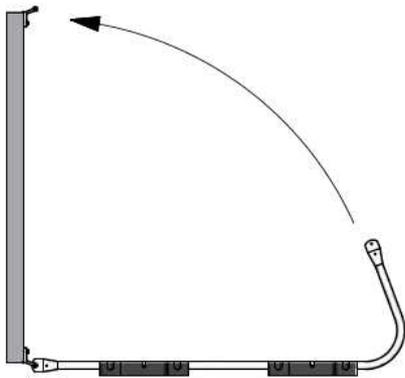




Step 4: Position the ballast

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.

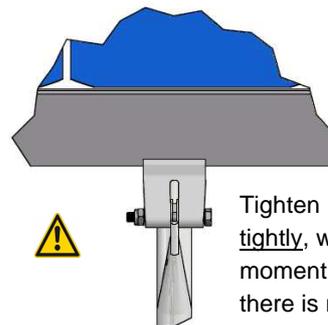
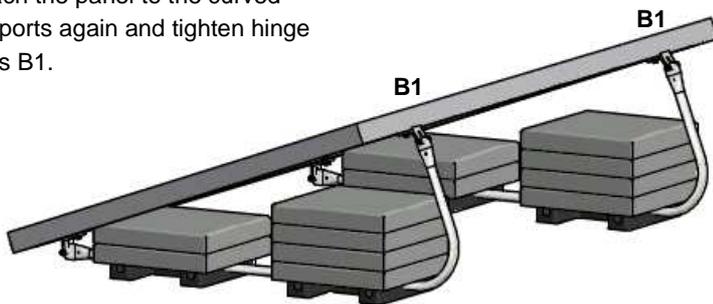
 Position the ballast required. See the information on the back of this document.



Step 5: Tighten hinge bolts B1

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

Detail B1

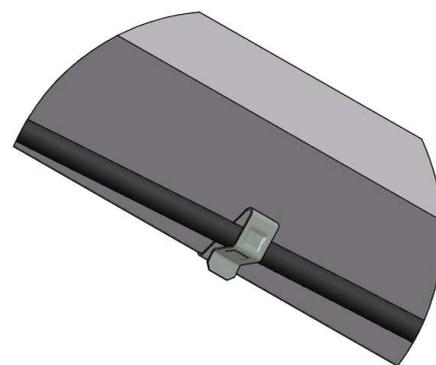
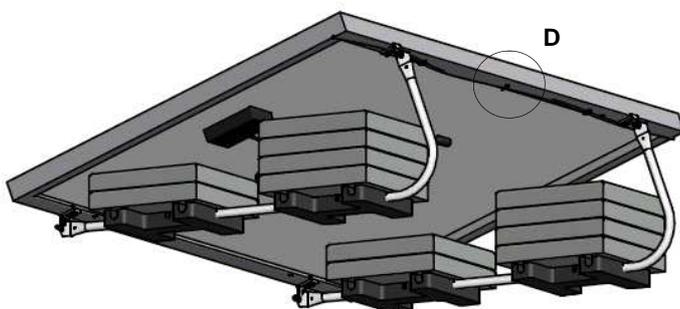


Tighten hinge bolts B1 tightly, with a tightening moment of at least 9 Nm, until there is no play.

Step 6: Finish fitting the cables

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

Detail D

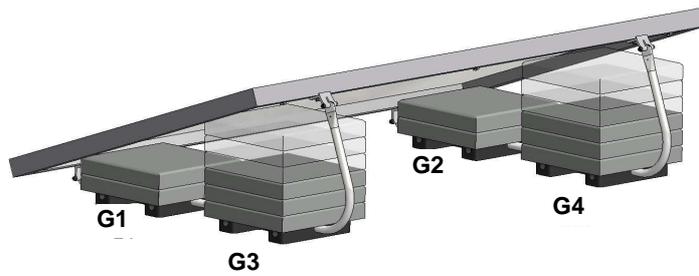


Step 7: position the rows one behind each other

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.



Ballast requirements



General

The ValkBox® 3 mounting system must be weighted down by tiles, which will be placed at positions G1, G2, G3 and G4.

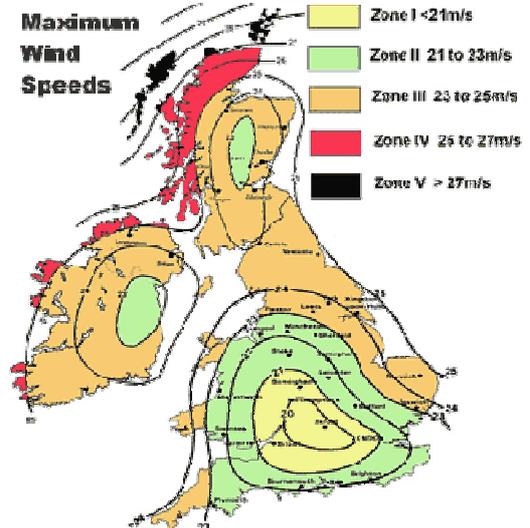
Start by choosing the wind area in which the system will be installed from the overview below.

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, G2, G3 and G4.

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.



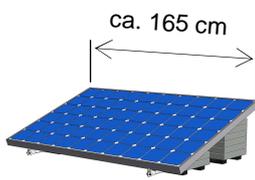
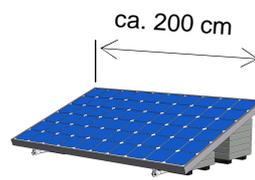
Selection table: Minimum number of tiles per position G1, G2, G3 and G4

Based on: tile dimensions 30 x 30 x 4,5 cm, tile weight 9 kg

Category: Town (sites more than 1km 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

Wind speed	Heights	 ca. 165 cm				 ca. 200 cm			
		Panel height Appx. 165 cm (panelwidth 98 -100 cm)		Panel height Appx. 200 cm (panelwidth 98 - 100 cm)		Panel height Appx. 165 cm (panelwidth 98 -100 cm)		Panel height Appx. 200 cm (panelwidth 98 - 100 cm)	
		Bitumen + EPDM		Concrete		Bitumen + EPDM		Concrete	
		Position		Position		Position		Position	
		G1 and G2	G3 and G4	G1 and G2	G3 and G4	G1 and G2	G3 and G4	G1 and G2	G3 and G4
21,5 m/s	0 - 5 meter	1 tile	3,5 tiles *)	1 tile	3,5 tiles *)	1 tile	4,5 tiles *)	1 tile	4,5 tiles *)
	5 - 10 meter	1 tile	5 tiles	1 tile	5,5 tiles *)	1 tile	6,5 tiles *)	1 tile	6,5 tiles *)
22,0 m/s	0 - 5 meter	1 tile	3,5 tiles *)	1 tile	4 tiles	1 tile	4,5 tiles *)	1 tile	5 tiles
	5 - 10 meter	1 tile	5,5 tiles *)	1 tile	5,5 tiles *)	2 tiles	6 tiles	2 tiles	6 tiles
23,0 m/s	0 - 5 meter	1 tile	4 tiles	1 tile	4,5 tiles *)	1 tile	5,5 tiles *)	1 tile	5,5 tiles *)
	5 - 10 meter	1 tile	6 tiles	1 tile	6,5 tiles *)	2 tiles	6,5 tiles *)	X	X
24,0 m/s	0 - 5 meter	1 tile	4,5 tiles *)	1 tile	5 tiles	1 tile	6 tiles	2 tiles	5 tiles
	5 - 10 meter	2 tiles	6 tiles	2 tiles	6 tiles	X	X	X	X

*) The number of tiles indicated is the minimum number of tiles required. This means that it is possible to use whole tiles instead of half tiles. For example, 4 tiles instead of 3.5 tiles.

X Not possible because of height tiles