VAN DER VALK SOLAR SYSTEMS

Installation manual ValkBox3

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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.

Installation manual ValkBox3

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
www.valksolarsystems.com

Installation manual ValkBox3

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
NEN7250:	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:	Up to max 2280 mm
Width panels:	926 - 1150 mm

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. This manual indicates how much ballast should be placed on the system based on maximum panel dimensions, wind area and roof height. 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.

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.com.

Required ballast | The Netherlands

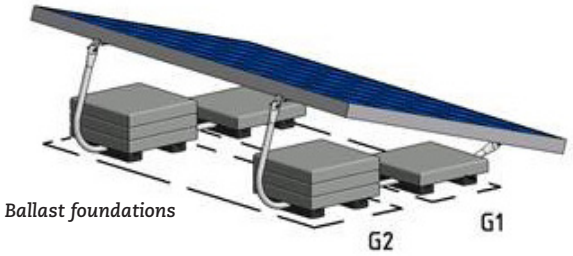
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

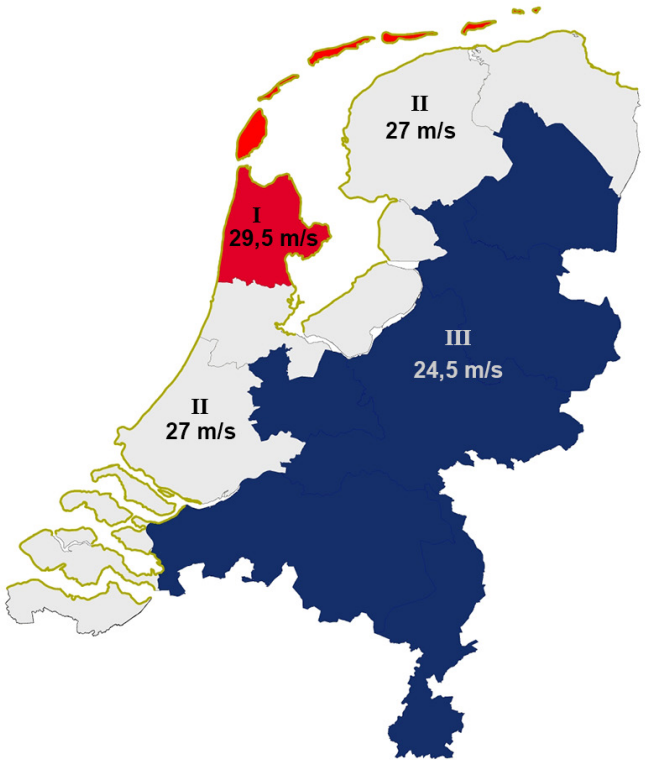
Environmental factors

Position	Middle zone roof
Terrain category	Builded environment
Roofing materials	Bitumen



Ballast foundations

Windmap The Netherlands



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
I (29,5 m/s)	36	97	36	97	X	X	X	X	X	X	kg
	4	11	4	11	X	X	X	X	X	X	tiles
II (27 m/s)	36	77	36	4	36	4	36	104	36	X	kg
	4	9	4	9	4	10	4	12	4	X	tiles
III (24,5 m/s)	36	59	36	59	36	69	36	81	36	90	kg
	4	7	4	7	4	8	4	9	4	10	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
I (29,5 m/s)	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles
II (27 m/s)	36	101	36	101	36	116	X	X	X	X	kg
	4	11,5	4	11,5	4	13	X	X	X	X	tiles
III (24,5 m/s)	36	78	36	78	36	90	36	105	X	X	kg
	4	9	4	9	4	10	4	12	X	X	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.*

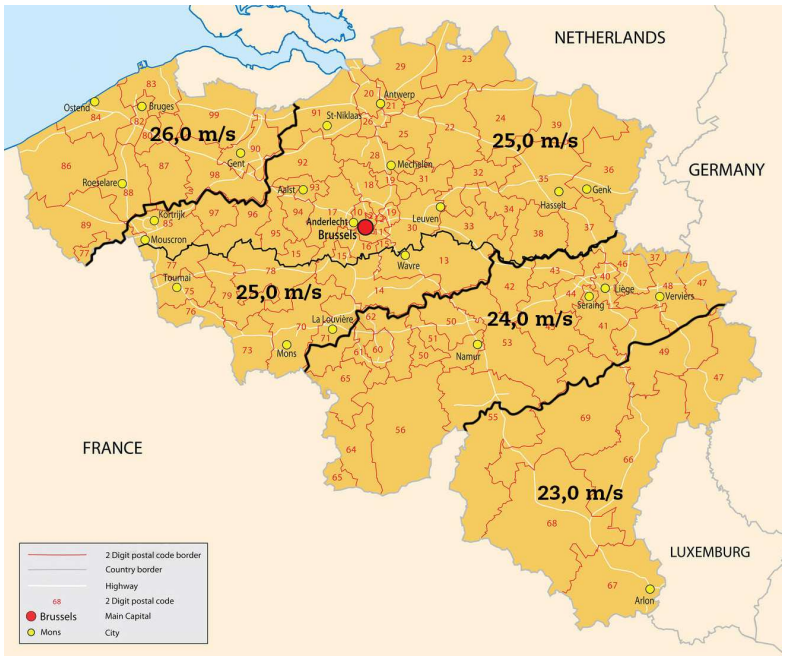
Required ballast | Belgium

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

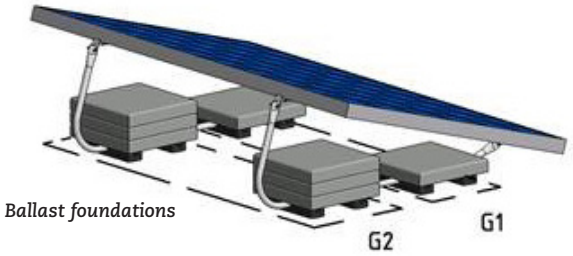
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).
Note 2: The ballast in G1 & G2 must be equally divided over the rubber ballast carriers.
Note 3: The max. of 20 tiles (4 in G1 and 16 in G2) can be placed for extra ballast (180 kg).

Windmap Belgium



Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Roofing materials	Bitumen



Ballast foundations

Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
23 m/s	36	40	36	50	36	57	36	66	36	74	kg
	4	4,5	4	6	4	6,5	4	7,3	4	8,5	tiles
24 m/s	36	46	36	56	36	64	36	74	36	82	kg
	4	5,5	4	6,5	4	7,5	4	8,5	4	9,5	tiles
25 m/s	36	51	36	63	36	71	36	82	36	90	kg
	4	6	4	7	4	8	4	9,5	4	10	tiles
26 m/s	36	57	36	69	36	79	36	90	36	99	kg
	4	6,5	4	8	4	9	4	10	4	11	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
23 m/s	36	54	36	66	36	76	36	87	36	96	kg
	4	6	4	7,5	4	8,5	4	10	4	11	tiles
24 m/s	36	61	36	74	36	84	36	97	36	107	kg
	4	7	4	8,5	4	9,5	4	11	4	12	tiles
25 m/s	36	68	36	82	36	93	36	107	X	X	kg
	4	8	4	9,5	4	10,5	4	12	X	X	tiles
26 m/s	36	75	36	91	X	X	X	X	X	X	kg
	4	8,5	4	10,5	X	X	X	X	X	X	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 | Germany

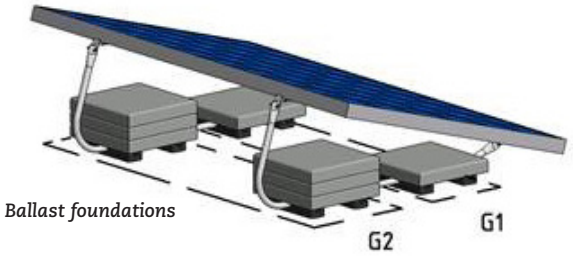
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

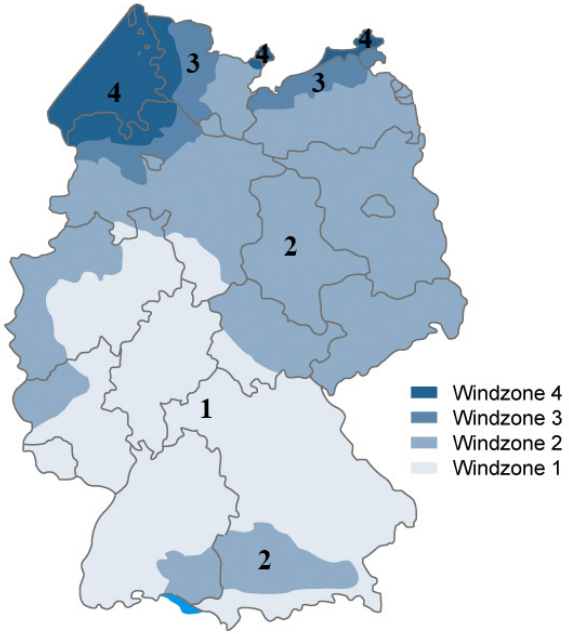
Environmental factors

Position	Middle zone roof
Terrain category	IV (city)
Height above sea level	350 m
Exclusief North German Lowland	
Roof materials	Bitumen



Ballast foundations

Windmap Germany



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1 (22,5 m/s)	36	41	36	41	36	41	36	41	36	41	kg
	4	5	4	5	4	5	4	5	4	5	tiles
2 (25 m/s)	36	56	36	56	36	56	36	56	36	56	kg
	4	6,5	4	6,5	4	6,5	4	6,5	4	6,5	tiles
3 (27,5 m/s)	36	72	36	72	36	72	36	72	36	72	kg
	4	8	4	8	4	8	4	8	4	8	tiles
4 (30 m/s)	36	89	36	89	36	89	36	89	36	89	kg
	4	10	4	10	4	10	4	10	4	10	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1 (22,5 m/s)	36	55	36	55	36	55	36	55	36	55	kg
	4	6,5	4	6,5	4	6,5	4	6,5	4	6,5	tiles
2 (25 m/s)	36	74	36	74	36	74	36	74	36	74	kg
	4	8,5	4	8,5	4	8,5	4	8,5	4	8,5	tiles
3 (27,5 m/s)	36	94	36	94	36	94	36	94	36	94	kg
	4	10,5	4	10,5	4	10,5	4	10,5	4	10,5	tiles
4 (30 m/s)	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	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 | United Kingdom

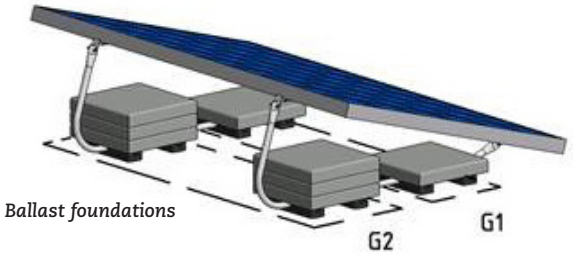
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

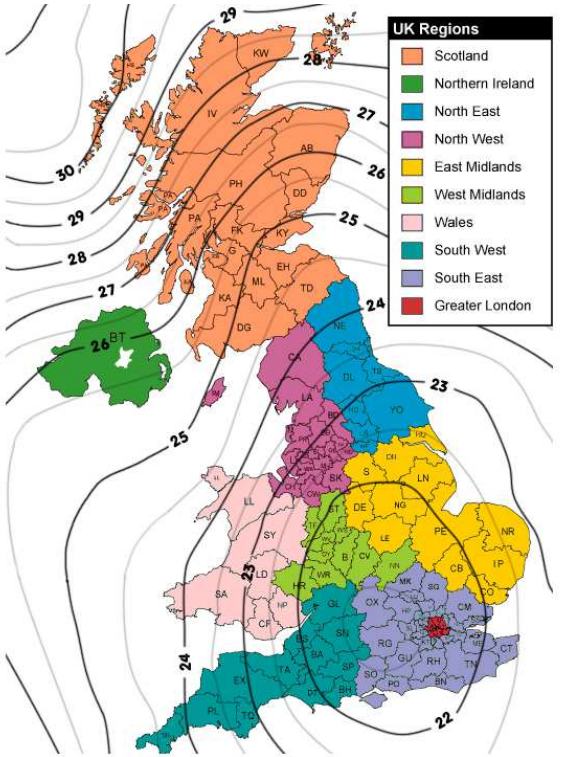
Environmental factors

Position	Middle zone roof
Terrain category	Builded environment
Height above sea level	50 m
Distance to coast line	5 km
Distance to city border	5 km
Roof materials	Bitumen



Ballast foundations

Windmap United Kingdom



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	60	36	76	36	83	36	102	36	102	kg
	4	7	4	8,5	4	9,5	4	11,5	4	11,5	tiles
23 m/s	36	67	36	85	36	92	X	X	X	X	kg
	4	7,5	4	9,5	4	10,5	X	X	X	X	tiles
24 m/s	36	75	36	94	36	102	X	X	X	X	kg
	4	8,5	4	10,5	4	11,5	X	X	X	X	tiles
25 m/s	36	83	36	104	X	X	X	X	X	X	kg
	4	9,5	4	12	X	X	X	X	X	X	tiles
26 m/s	36	92	X	X	X	X	X	X	X	X	kg
	4	10,5	X	X	X	X	X	X	X	X	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	79	36	100	36	108	X	X	X	X	kg
	4	9	4	11,5	4	12	X	X	X	X	tiles
23 m/s	36	88	X	X	X	X	X	X	X	X	kg
	4	10	X	X	X	X	X	X	X	X	tiles
24 m/s	36	98	X	X	X	X	X	X	X	X	kg
	4	11	X	X	X	X	X	X	X	X	tiles
25 m/s	36	108	X	X	X	X	X	X	X	X	kg
	4	12	X	X	X	X	X	X	X	X	tiles
26 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	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 | Ireland

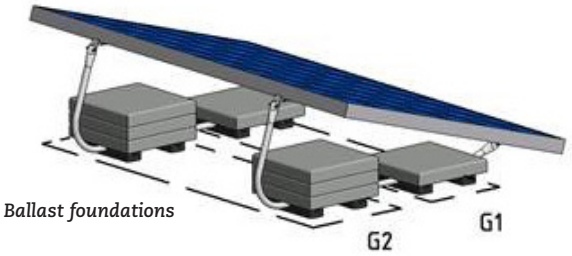
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

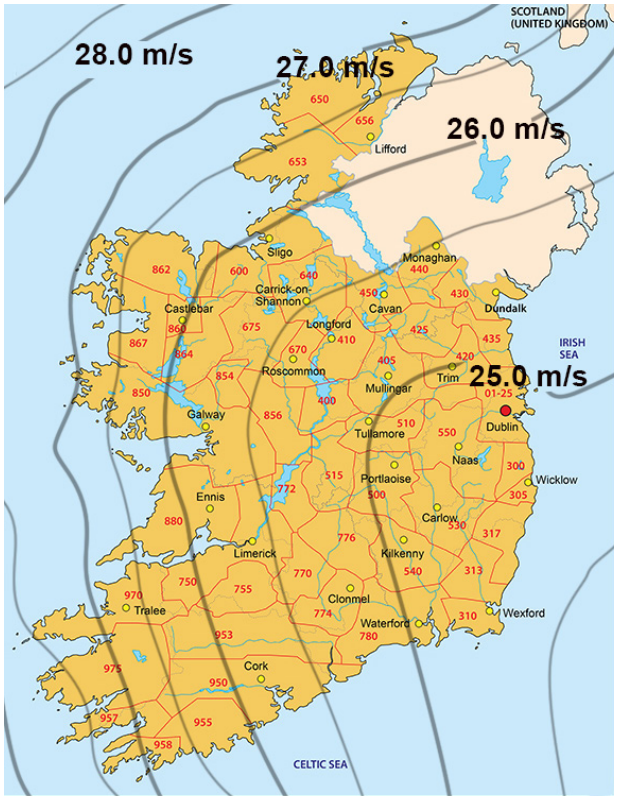
Environmental factors

Position	Middle zone roof
Terrain category	Builded environment
Height above sea level	50 m
Distance to coast line	5 km
Distance to city border	5 km
Roof materials	Bitumen



Ballast foundations

Windmap Ireland



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
25 m/s	36	83	36	104	X	X	X	X	X	X	kg
	4	9,5	4	12	X	X	X	X	X	X	tiles
26 m/s	36	92	X	X	X	X	X	X	X	X	kg
	4	10,5	X	X	X	X	X	X	X	X	tiles
27 m/s	36	100	X	X	X	X	X	X	X	X	kg
	4	11,5	X	X	X	X	X	X	X	X	tiles
28 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
25 m/s	36	108	X	X	X	X	X	X	X	X	kg
	4	12	X	X	X	X	X	X	X	X	tiles
26 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles
27 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles
28 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	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 | Norway

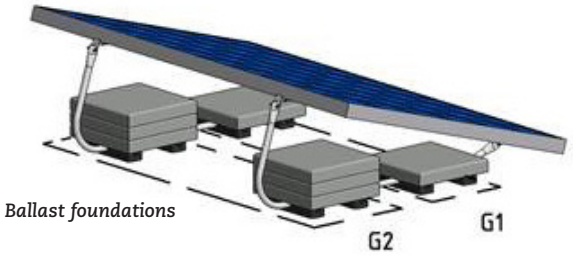
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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	175 m
Roofing materials	Bitumen



Ballast foundations

Windmap Norway

For determining the wind area see next page.

Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	53	36	53	36	56	36	65	36	72	kg
	4	6	4	6	4	6,5	4	7,5	4	8	tiles
25 m/s	36	74	36	74	36	78	36	89	36	98	kg
	4	8,5	4	8,5	4	9	4	10	4	11	tiles
27 m/s	36	89	36	89	36	94	36	108	X	X	kg
	4	10	4	10	4	10,5	4	12	X	X	tiles
29 m/s	36	106	X	X	X	X	X	X	X	X	kg
	4	12	X	X	X	X	X	X	X	X	tiles
31 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	70	36	70	36	74	36	85	36	94	kg
	4	8	4	8	4	8,5	4	9,5	4	10,5	tiles
25 m/s	36	96	36	96	36	102	X	X	X	X	kg
	4	11	4	11	4	11,5	X	X	X	X	tiles
27 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles
29 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles
31 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	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.*

Wind area | Norway

	m/s
Provincie Østfold	**22**
Except Municipalities:	
Halden	24
Moss	24
Rygge	24
Råde	24
Sarpsborg	24
Våler	24
Fredrikstad	26
Hvaler	27
Provincie Akershus	**22**
Except Municipality:	
Vestby	24
Provincie Oslo	**22**
Provincie Hedmark	**22**
Except Municipalities:	
Alvdal	24
Folldal	24
Folldal near Trøndelag	24
Os	24
Os near Trøndelag	24
Tolga	24
Tynset	24
Tynset Kvikne	24
Tynset near Trøndelag	24
Provincie Oppland	**22**
Except Municipalities:	
Vågå	23
Dovre	24
Dovre near Trøndelag	24
Lom	24
Lom near Sogn og Fj.	24
Vang	24
Vang near Sogn og Fj.	24
Lesja	25
Lesja near Trøndelag/ Møre og Romsdal	25
Skjåk	25
Skjåk near Sogn og Fj./ Møre og Romsdal	25
Provincie Buskerud	**22**
Except Municipalities:	
Hemsedal	24
Hemsedal near Sogn og Fj.	24
Hol	24
Hol near Hordeland / Sogn og Fjordane	24
Hurum	24

	m/s
Nore og Uvdal	24
Nore og Uvdal near Hordeland	24
Ål	24
Ål near Sogn og Fj.	24
Provincie Vestford	**23**
Except Municipalities:	
Hof	22
Lardal	22
Nøtterøy	24
Sandefjord	24
Stokke	24
Tønsberg	24
Larvik	25
Tjøme	26
Provincie Telemark	**22**
Except Municipalities:	
Bamble	23
Porsgrunn	23
Fyresdal	24
Kragerø	24
Tinn	24
Tokke	24
Vinje	24
Vinje near Rogaland/Hordaland	24
Provincie Aust-Agder	**24**
Except Municipalities:	
Arendal	26
Grimstad	26
Lillesand	26
Risør	26
Tvedestrand	26
Provincie Vest-Agder	**24**
Except Municipalities:	
Flekkefjord	26
Flekkefjord near Rogaland	26
Kristiansand	26
Lyngdal	26
Søngne	26
Farsund	28
Lindesnes	28
Mandal	28
Provincie Rogaland	**26**
Except Municipalities:	
Hjelmeland	24
Sauda	24
Suldal	24
Vindafjord	24
Eigersund	27

	m/s
Sokndal	27
Bokn	28
Haugesund	28
Klepp	28
Randaberg	28
Rennesøy	28
Sola	28
Time	28
Hå	29
Kvitsøy	29
Karmøy	30
Utsira	30
Ølen	*Municipality isn't in the Wind standard*
Provincie Hordaland	**26**
Except Municipalities:	
Etne	24
Etne near the Folgefonna	24
Granvin	24
Kvam	24
Modalen	24
Samnanger	24
Ulvik	24
Vaksdal	24
Voss	24
Osterøy	25
Radøy	27
Austevoll	28
Austrheim	28
Bømlo	28
Fjell	28
Sund	28
Øygarden	29
Fedje	30
Provincie Sogn og Fjordane	**24**
Except Municipalities:	
Aurland	25
Eid	26
Fjaler	26
Førde	26
Førde near the Jostedalsbreen	26
Gaular	26
Gloppen	26
Gloppen near the Ålfotbreen and Jostedalsbreen	26
Hornindal	26
Hyllestad	26
Høyanger	26
Lærdal	26
Naustdal	26
Askvoll	28

	m/s
Flora	28
Gulen	28
Bremanger	29
Bremanger near the Ålfotbreen	29
Solund	29
Selje	31
Vågsøy	31
Provincie Møre og Romsdal	**30**
Except Municipalities:	
Rindal	25
Surnadal	25
Nesset	26
Norddal	26
Stordal	26
Stranda	26
Sunndal	27
Gjemnes	28
Rauma	28
Sykkylven	28
Tingvoll	28
Volda	28
Ørskog	28
Ørsta	28
Eide	29
Halsa	29
Hareid	29
Molde	29
Skodje	29
Sula	29
Ålesund	29
Sandøy	31
Frei	*Municipality isn't in the Wind standard*
Tustna	*Municipality isn't in the Wind standard*
Provincie Sør-Trøndelag	**25**
Except Municipalities:	
Malvik	26
Oppdal	26
Rennebu	26
Trondheim	26
Agdenes	27
Rissa	27
Snillfjord	27
Hemne	28
Bjugn	29
Osen	29
Roan	29
Åfjord	29
Frøya	30
Hitra	30
Ørland	30

	m/s
Provincie Nord-Trøndelag	**26**
Except Municipalities:	
Lierne	24
Meråker	25
Røyrvik	25
Snåsa	25
Flatanger	29
Fosnes	29
Leka	29
Leka on the mainland	29
Nærøy	29
Vikna	30
Provincie Nordland	**29**
Except Municipalities:	
Beiarn	26
Evenes	26
Fauske	26
Grane	26
Hattfjelldal	26
Hemnes	26
Rana	26
Saltdal	26
Sørfold	26
Ballangen	27
Tjeldsund	27
Tysfjord	27
Hamarøy	28
Narvik	28
Sortland	28
Vefsn	28
Vefsn along the fjord	28
Vefsn Mosjøen	28
Vevelstad	28
Alstahaug	30
Bindal	30
Bodø	30
Dønna	30
Flakstad	30
Herøy	30
Leirfjord	30
Lurøy	30
Lurøy on the mainland	30
Nesna	30
Sømna	30
Vega	30
Vestvågøy	30
Andøy	31
Moskenes	31
Røst	31
Træna	31
Værøy	31
Skjerstad	*Municipality isn't in the Wind standard*

	m/s
Provincie Troms	**26**
Except Municipalities:	
Bardu	24
Målselv	24
Strofjord	24
Gáivuona/Kåfjord	25
Balsfjord	26
Gratangen	26
Ibestad	26
Lavangen	26
Lyngen	26
Salangen	26
Skånland	26
Sørreisa	26
Dyrøy	27
Harstad	27
Lenvik	27
Nordreisa	27
Tranøy	27
Tromsø	27
Bjarkøy	28
Kvænangen	28
Skjervøy	28
Karlsøy	29
Berg	30
Torsken	30
Provincie Finnmark	**29**
Except Municipalities:	
Kárájoga / Karasjok	24
Guovdageaidnu / Kautokeino	24
Deanu/Tana	27
Porsanger	27
Unjárgga / Nesseby	27
Alta	28
Berlevåg	30
Gamvik	30
Hasvik	30
Måsøy	30
Nordkapp	30
Vardø	30
Provincie Svalbard	**30**

Required ballast | Sweden

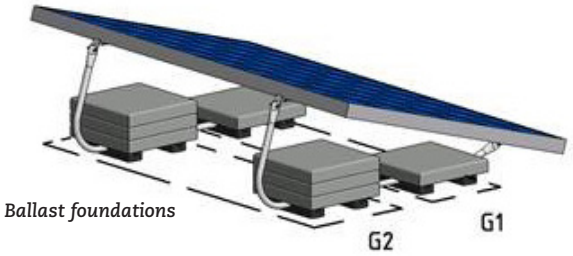
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

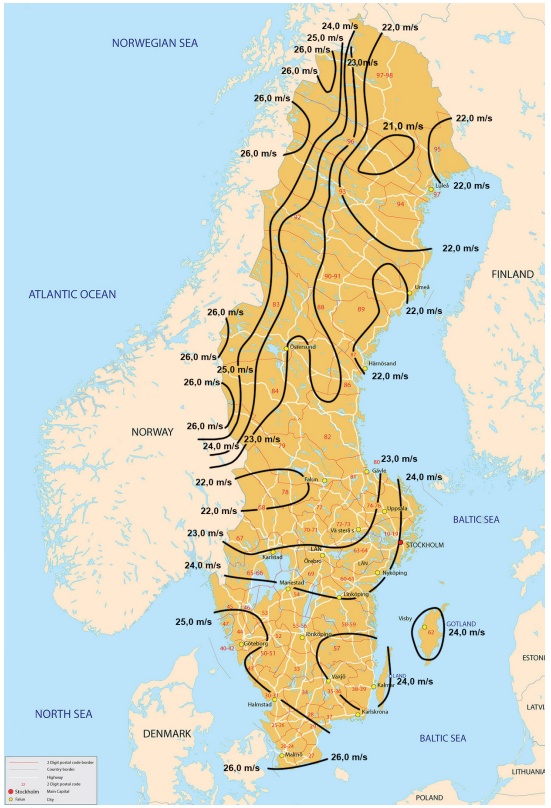
Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Roofing materials	Bitumen



Ballast foundations

Windmap Sweden



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	29	36	37	36	44	36	51	36	57	kg
	4	3,5	4	4,5	4	5	4	6	4	6,5	tiles
23 m/s	36	34	36	43	36	49	36	58	36	64	kg
	4	4	4	5	4	5,5	4	6,5	4	7,5	tiles
24 m/s	36	39	36	48	36	56	36	64	36	72	kg
	4	4,5	4	5,5	4	6,5	4	7,5	4	8	tiles
25 m/s	36	44	36	54	36	62	36	72	36	79	kg
	4	5	4	6	4	7	4	8	4	9	tiles
26 m/s	36	49	36	60	36	69	36	79	36	87	kg
	4	5,5	4	7	4	8	4	9	4	10	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	36	40	36	50	36	58	36	68	36	75	kg
	4	4,5	4	6	4	6,5	4	8	4	8,5	tiles
23 m/s	36	46	36	57	36	66	36	76	36	84	kg
	4	5,5	4	6,5	4	7,5	4	8,5	4	9,5	tiles
24 m/s	36	52	36	64	36	73	36	85	36	94	kg
	4	6	4	7,5	4	8,5	4	9,5	4	10,5	tiles
25 m/s	36	58	36	71	36	81	36	94	36	103	kg
	4	6,5	4	8	4	9	4	10,5	4	11,5	tiles
26 m/s	36	65	36	79	36	90	36	103	X	X	kg
	4	7,5	4	9	4	10	4	11,5	X	X	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 | Finland

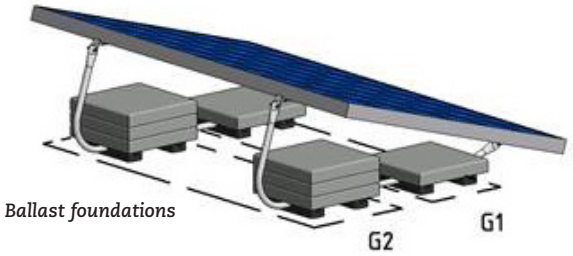
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

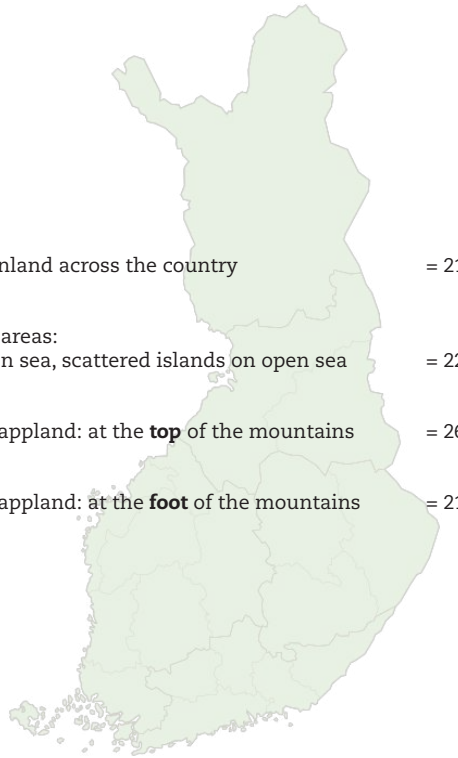
Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Roofing materials	Bitumen



Ballast foundations

Windmap Finland



- Mainland across the country = 21 m/s
- Sea areas:
  Open sea, scattered islands on open sea = 22 m/s
- In Lappland: at the **top** of the mountains = 26 m/s
- In Lappland: at the **foot** of the mountains = 21 m/s

Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
21 m/s	36	40	36	50	36	57	36	66	36	73	kg
	4	4,5	4	6	4	6,5	4	7,5	4	8,5	tiles
22 m/s	36	46	36	57	36	65	36	74	36	82	kg
	4	5,5	4	6,5	4	7,5	4	8,5	4	9,5	tiles
26 m/s	36	72	36	87	36	98	X	X	X	X	kg
	4	8	4	10	4	11	X	X	X	X	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
21 m/s	36	54	36	66	36	75	36	86	36	95	kg
	4	6	4	7,5	4	8,5	4	10	4	11	tiles
22 m/s	36	61	36	75	36	85	36	97	36	107	kg
	4	7	4	8,5	4	9,5	4	11	4	12	tiles
26 m/s	36	94	X	X	X	X	X	X	X	X	kg
	4	10,5	X	X	X	X	X	X	X	X	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 | Poland

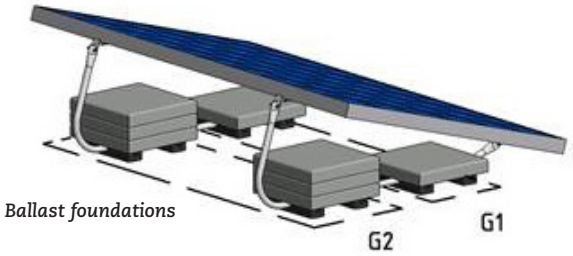
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

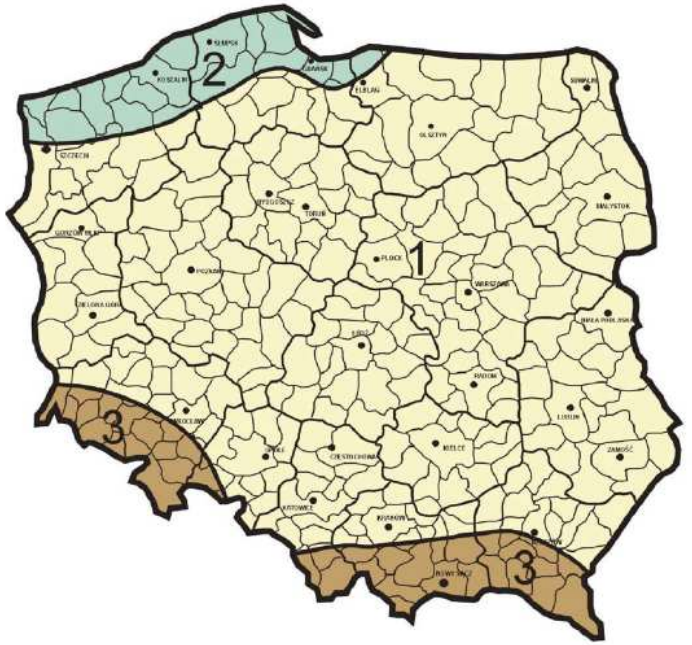
Environmental factors

Position	Middle zone roof
Terrain category	III (villages, suburban terrain, permanent forest)
Roofing materials	Bitumen



Ballast foundations

Windmap Poland



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1	36	54	36	60	36	66	36	72	36	78	kg
	4	6	4	7	4	7,5	4	8	4	9	tiles
2	36	83	36	92	36	100	X	X	X	X	kg
	4	9,5	4	10,5	4	11,5	X	X	X	X	tiles
3	36	54	36	60	36	66	36	72	36	78	kg
	4	6	4	7	4	7,5	4	8	4	9	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1	36	71	36	79	36	86	36	95	36	102	kg
	4	8	4	9	4	10	4	11	4	11,5	tiles
2	36	108	X	X	X	X	X	X	X	X	kg
	4	12	X	X	X	X	X	X	X	X	tiles
3	36	71	36	79	36	86	36	95	36	102	kg
	4	8	4	9	4	10	4	11	4	11,5	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 | Spain

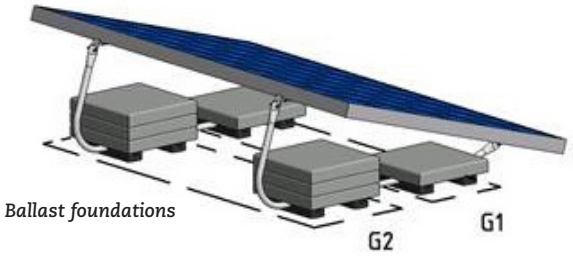
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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

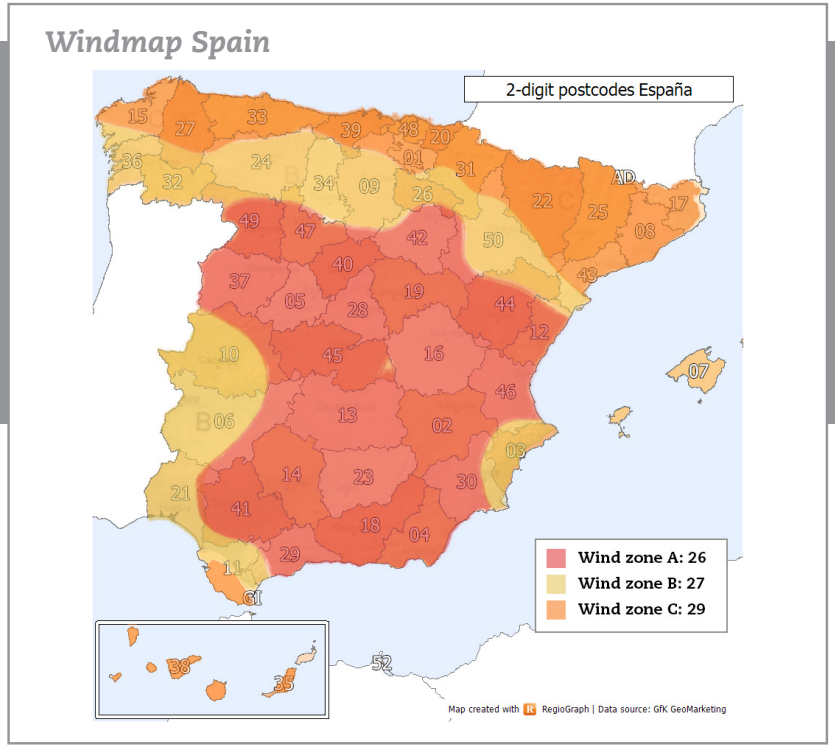
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).
Note 2: The ballast in G1 & G2 must be equally divided over the rubber ballast carriers.
Note 3: The max. of 20 tiles (4 in G1 and 16 in G2) can be placed for extra ballast (180 kg).

Environmental factors

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



Ballast foundations



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
26 m/s	36	65	36	65	36	65	36	65	36	65	kg
	4	7,5	4	7,5	4	7,5	4	7,5	4	7,5	tiles
27 m/s	36	72	36	72	36	72	36	72	36	72	kg
	4	8	4	8	4	8	4	8	4	8	tiles
29 m/s	36	86	36	86	36	86	36	86	36	86	kg
	4	10	4	10	4	10	4	10	4	10	tiles

Panel: maximum dimensions 2280x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
26 m/s	36	86	36	86	36	86	36	86	36	86	kg
	4	10	4	10	4	10	4	10	4	10	tiles
27 m/s	36	94	36	94	36	94	36	94	36	94	kg
	4	10,5	4	10,5	4	10,5	4	10,5	4	10,5	tiles
29 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	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

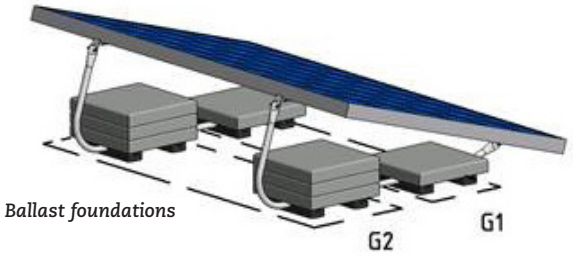
General
The ValkBox3 mounting system must be reinforced by means of tiles, which must be placed on the indicated ballast foundations. In three steps you can easily calculate the required ballast;

- 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).

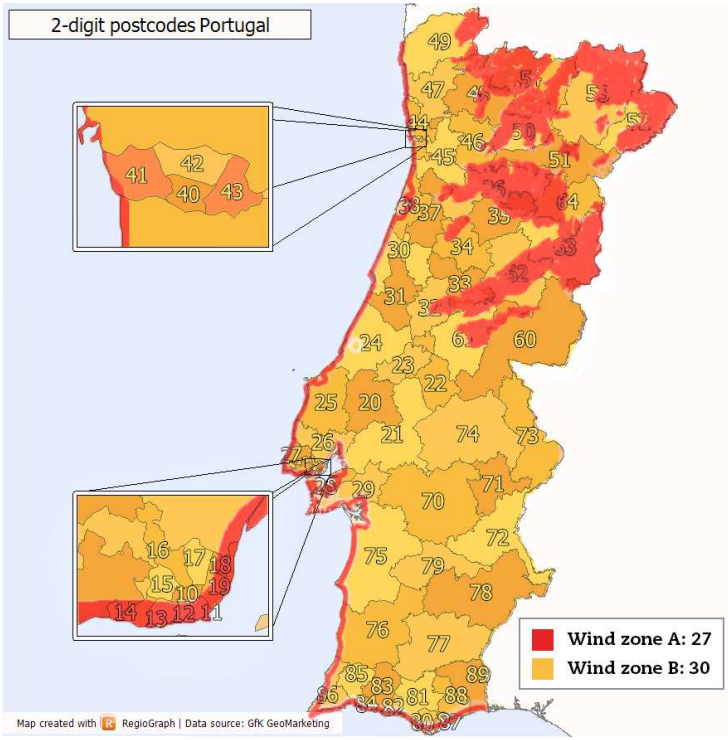
Environmental factors

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



Ballast foundations

Windmap Portugal



Panel: maximum dimensions 1800x1150 mm

Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
27 m/s	36	72	36	72	36	72	36	72	36	72	kg
	4	8	4	8	4	8	4	8	4	8	tiles
30 m/s	36	93	36	93	36	93	36	93	36	93	kg
	4	10,5	4	10,5	4	10,5	4	10,5	4	10,5	tiles

Panel: maximum dimensions 2280x1150 mm

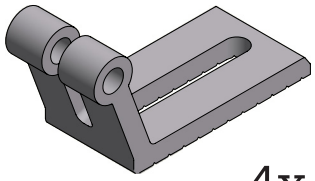
Building height	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
Wind area	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
27 m/s	36	94	36	94	36	94	36	94	36	94	kg
	4	10,5	4	10,5	4	10,5	4	10,5	4	10,5	tiles
30 m/s	X	X	X	X	X	X	X	X	X	X	kg
	X	X	X	X	X	X	X	X	X	X	tiles

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.*

Installation manual ValkBox3

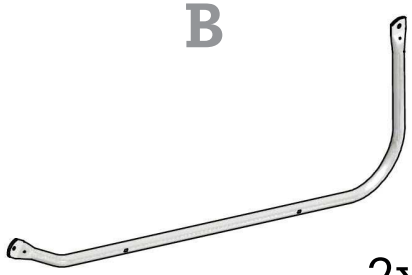
Components

A



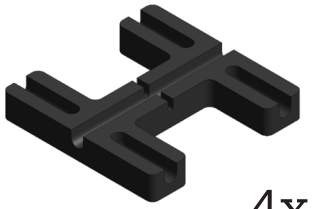
4x

B



2x

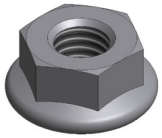
C



4x

5x (1 spare)

5x (1 spare)

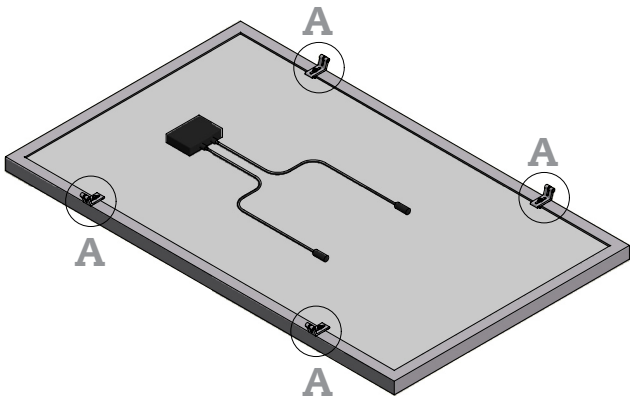


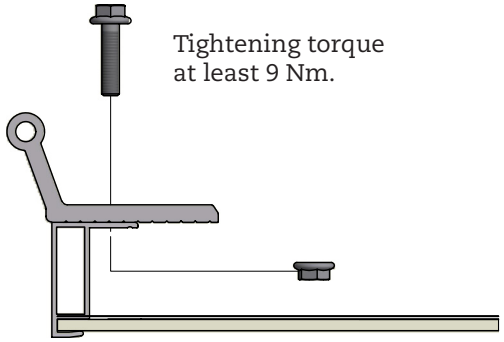
9x (1 spare)

3x

Installation manual ValkBox3

Step 1: Mounting the clevis

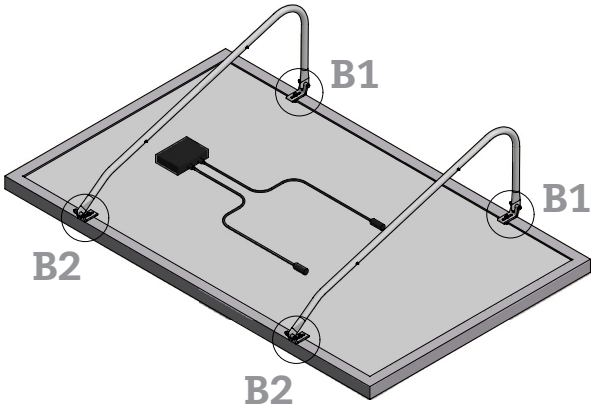


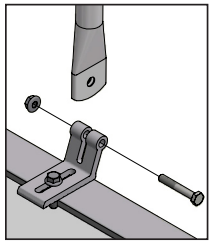


Tightening torque
at least 9 Nm.

Step 2: Mounting the curved supports

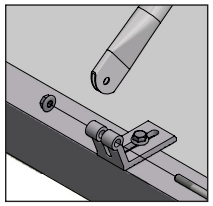
The curved aluminum supports are suitable for panels with a width of 926 - 1150 mm.





Depending on the panel width, the clamps B1 and B2 must be positioned inwards or outwards. The correct orientation for each panel width is shown on the 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.

Installation manual ValkBox3

Option 1: Mounting panel

For panel width 926 - 990 mm

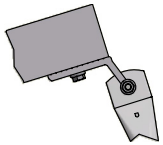
Center to center mounting holes (panel frame): 896 - 970 mm

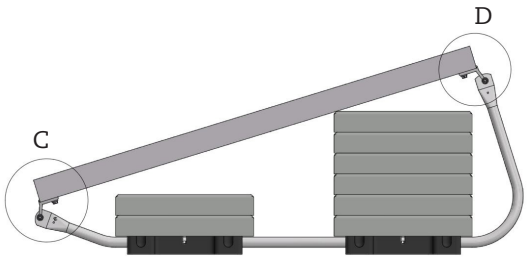
Under lip turned inwards

C (1 : 4)

Top lip facing inwards

D (1 : 4)





Option 2: Mounting panel

For panel width 991 - 1070 mm

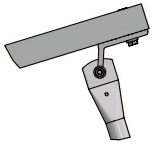
Center to center mounting holes (panel frame): 970 - 1050 mm

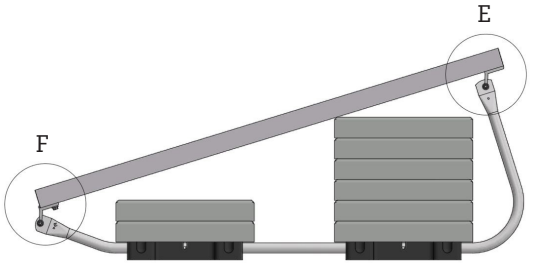
Under lip turned inwards

F (1 : 4)

Top lip facing out

E (1 : 4)





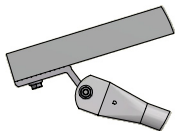
Option 3: Mounting panel

For panel width 1071 - 1150 mm

Center to center mounting holes (panel frame): 1050 - 1124 mm

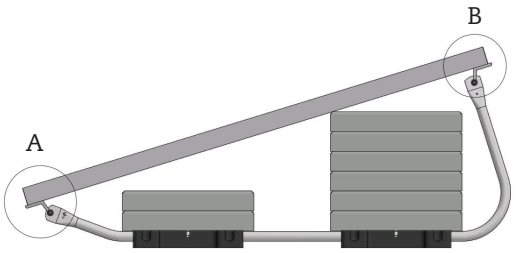
Under lip facing outwards

A (1 : 4)



Top lip facing out

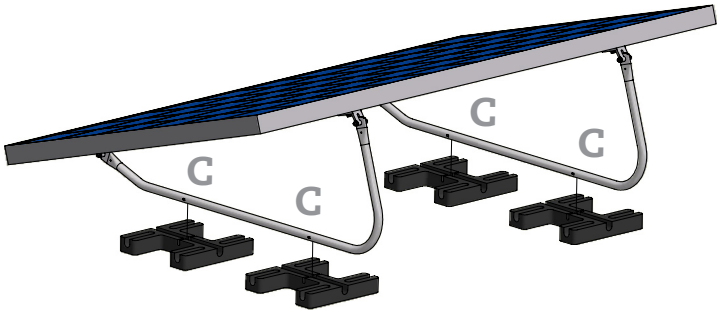
B (1 : 4)

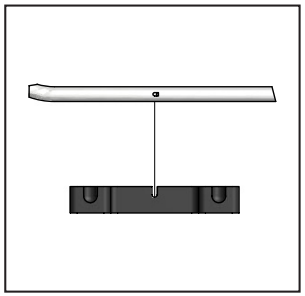


Installation manual ValkBox3

Step 3: Placing the rubber tiles

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

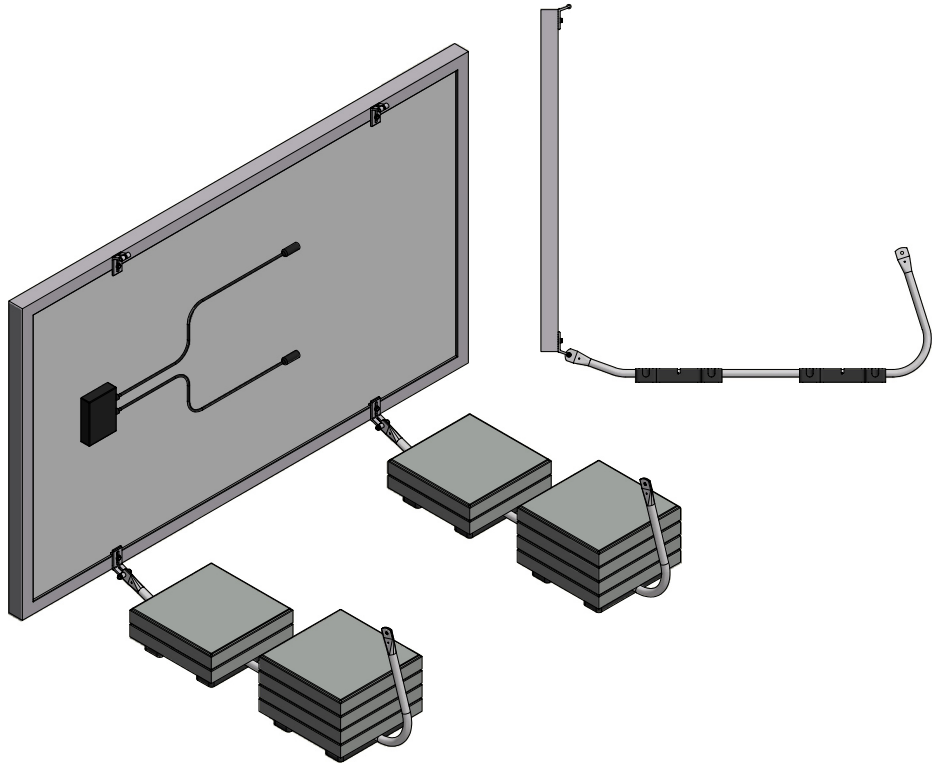




The projections on the curved aluminium supports must be placed in the grooves on the rubber tiles.

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.

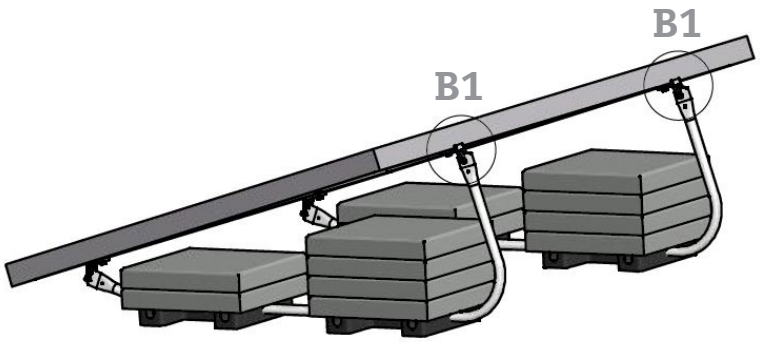


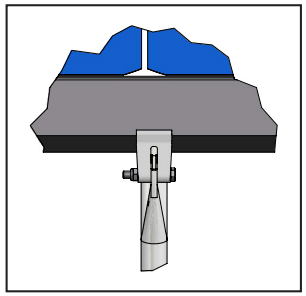
Position the ballast required.

Installation manual ValkBox3

Step 5: Tighten hinge bolts B1

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

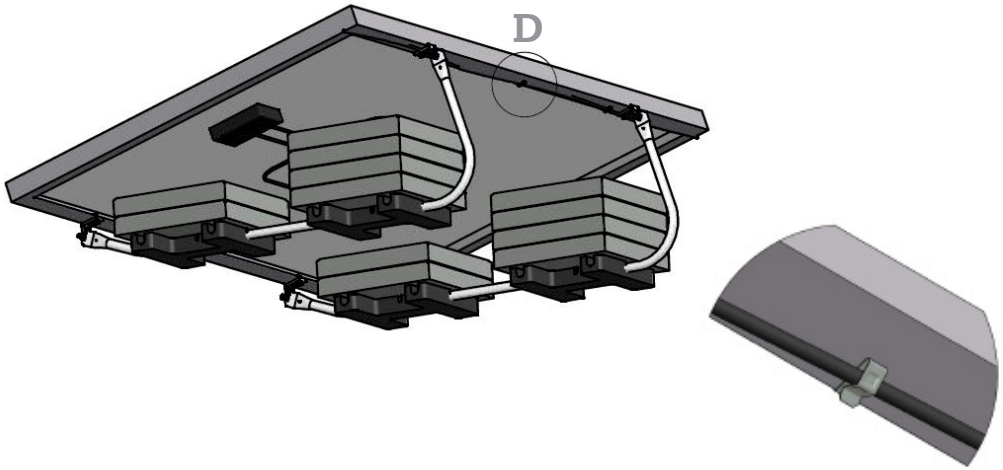




Tighten hinge bolts B1 tightly, with a tightening moment of at least 9 Nm, until there is no play.

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.