

ValkBox[®] 3

Installation manual



Van der Valk Solar Systems
Solar Mounting Systems

VAN DER VALK



Please note

- This manual is not project specific.
- This manual is not legally binding.
- No rights may be derived from this manual.
- Use this manual in combination with the ValkPVplanner project report.
- Check 'Datasheet Cable management' for cable suggestions.
- The system is placed in the middle zone of the roof.

Table of contents

Disclaimer	Page -
Required ballast	Page -
Installation manual	Page 02
Installation manual	Page 03

Table of contents ValkBox® 3

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Disclaimer

This installation manual must be seen in addition to the project report which shows you specific information about your project like a project drawing and ballast plan for flat roofs.

The project report is a result of the calculation tool, the ValkPVplanner. This online calculation tool and/or the project reports derived from this tool were composed with the greatest possible care. Nonetheless, it is possible that some information might not be entirely correct as the results for each project report can be based on default values, which values always need to be checked by you. The instructions provided in this project report must be observed at all times. All applicable standards and appendixes have been integrated in this online calculation tool.

All current structural, safety and building regulations must be observed. Solar mounting systems installed on roofs will be exposed to wind and snow. The building in question will be subject to a load as a result of the PV system. A design calculation must be used to establish whether or not the building will be able to withstand the extra load. Where necessary, modifications need to be made.

Flat roof systems should either be attached to the roof or need to be supported by ballast, to make sure that the system is unable to be lifted or tipped over. The ballast specified in the ValkPVplanner project report will be vital to ensure that the mounting system can be used. Flat roofs with an angle above 5 degrees must be attached to the roof.

The calculations in the online calculation tool do not take into account obstacles in the near surrounding like high buildings, cliffs and mountains. Restrictions also apply for the position of the system on a roof. The solar panels must be installed at a certain distance from edge of the roof as shown in this project report and the installation manual.

The standard warranty for pitched roof, flat roof and ground mount systems 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 and can be found on our website: www.valksolarsystems.nl.

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 the failure to observe the instruction provided in the project report and the installation manual and for possible incorrect results resulting from the use of this online calculation tool which was made available to you.

The 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

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Version: VALK-USER-GB-GB-ValkBox 3-Flat Roof

Van der Valk Solar Systems
Solar Mounting Systems

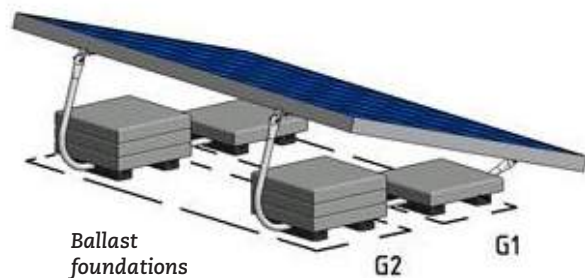


Required ballast | The Netherlands

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm
	Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

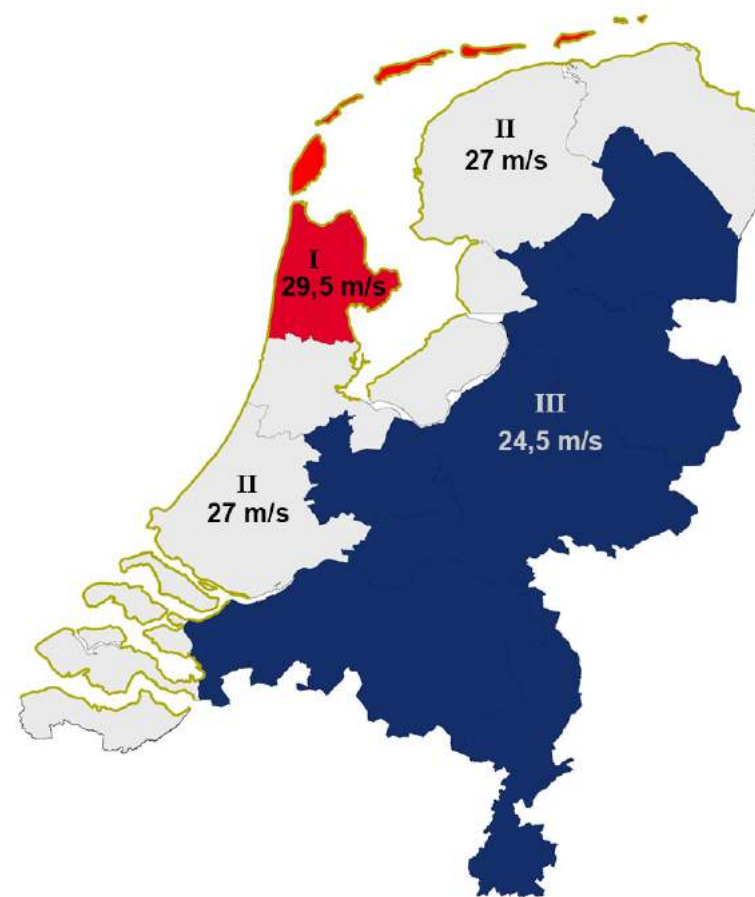
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
I (29,5 m/s)	18	81	18	81	18	96	36	100	36	111	kg
	2	9	2	9	2	11	4	11,5	na**	na**	tiles
II (27 m/s)	18	62	18	62	18	73	18	88	18	100	kg
	2	7	2	7	2	8,5	2	10	2	11,5	tiles
III (24,5 m/s)	18	48	18	48	18	56	18	65	18	73	kg
	2	5,5	2	5,5	2	6,5	2	7,5	2	8,5	tiles

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 The Netherlands



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

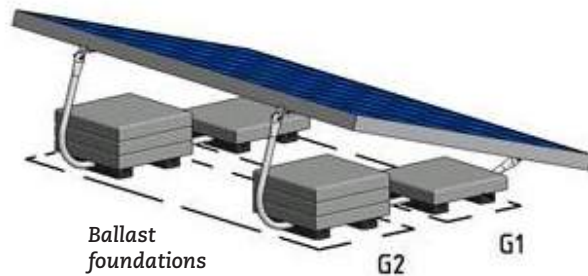
** Not available due to exceedance maximum number of tiles.

Required ballast | Belgium

General

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- 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm
	Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

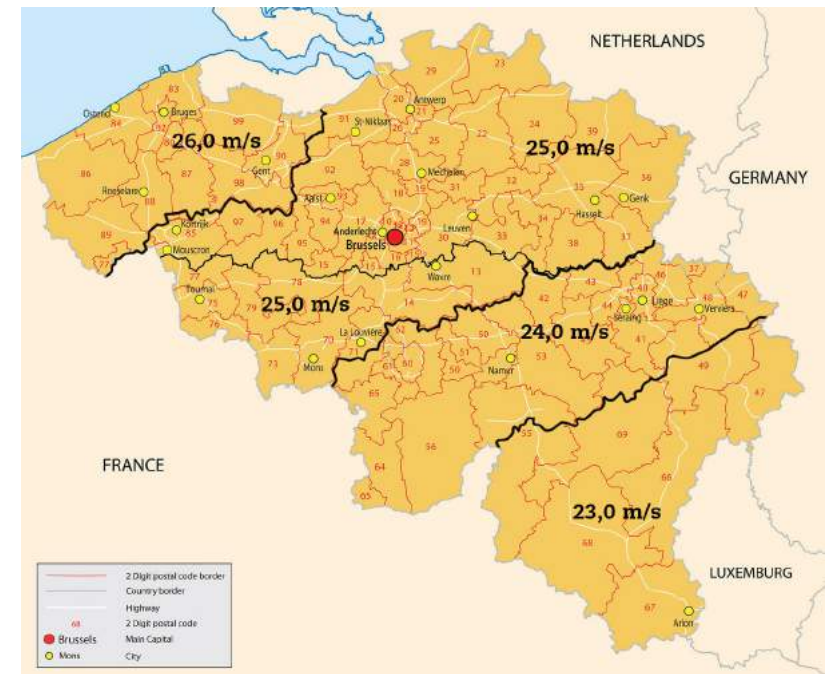
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
23 m/s	18	33	18	41	18	47	18	54	18	59	kg
	2	4	2	5	2	5,5	2	6	2	7	tiles
24 m/s	18	37	18	46	18	52	18	60	18	66	kg
	2	4,5	2	5,5	2	6	2	7	2	7,5	tiles
25 m/s	18	42	18	51	18	58	18	66	18	74	kg
	2	5	2	6	2	6,5	2	7,5	2	8,5	tiles
26 m/s	18	46	18	56	18	64	18	74	18	83	kg
	2	5,5	2	6,5	2	7,5	2	8,5	2	9,5	tiles

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



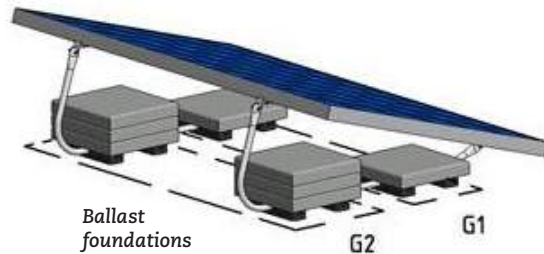
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | Germany

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Height above sea level	350 m (Excluding North German Lowland)
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

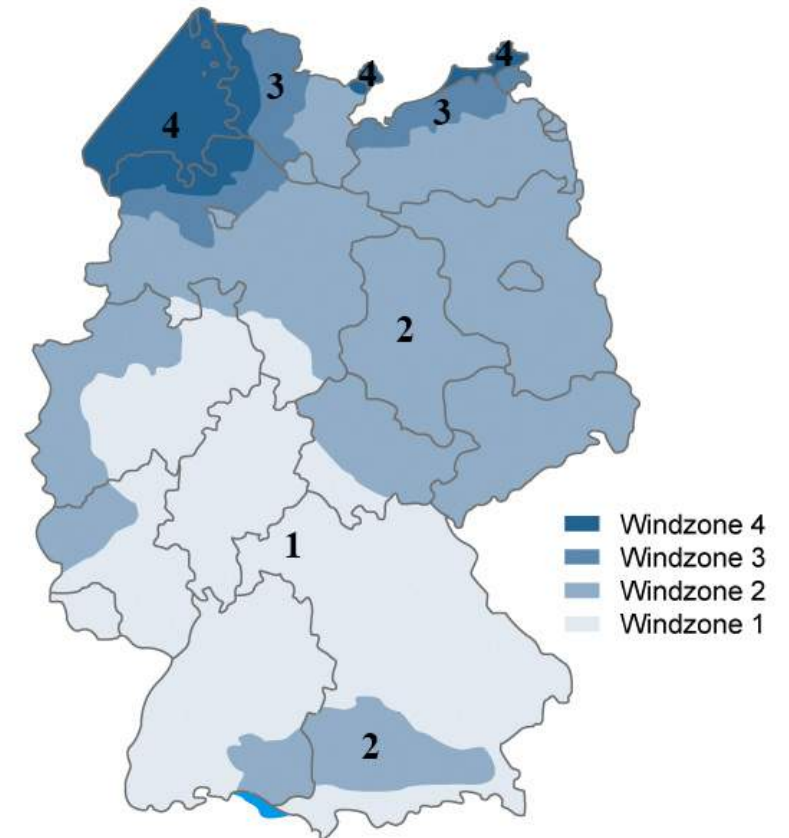
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1 (22,5 m/s)	18	34	18	34	18	34	18	34	18	34	kg
	2	4	2	4	2	4	2	4	2	4	tiles
2 (25 m/s)	18	45	18	45	18	45	18	45	18	45	kg
	2	5	2	5	2	5	2	5	2	5	tiles
3 (27,5 m/s)	18	58	18	58	18	58	18	58	18	58	kg
	2	6,5	2	6,5	2	6,5	2	6,5	2	6,5	tiles
4 (30 m/s)	18	72	18	72	18	72	18	72	18	72	kg
	2	8	2	8	2	8	2	8	2	8	tiles

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 Germany



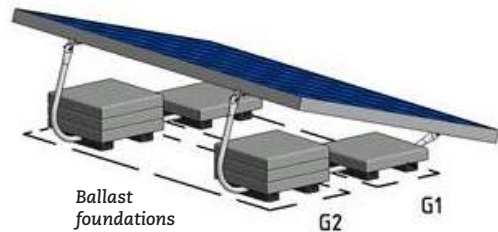
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | United Kingdom

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Height above sea level	50 m
Distance to coast line	5 km
Distance to city boarder	5 km
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

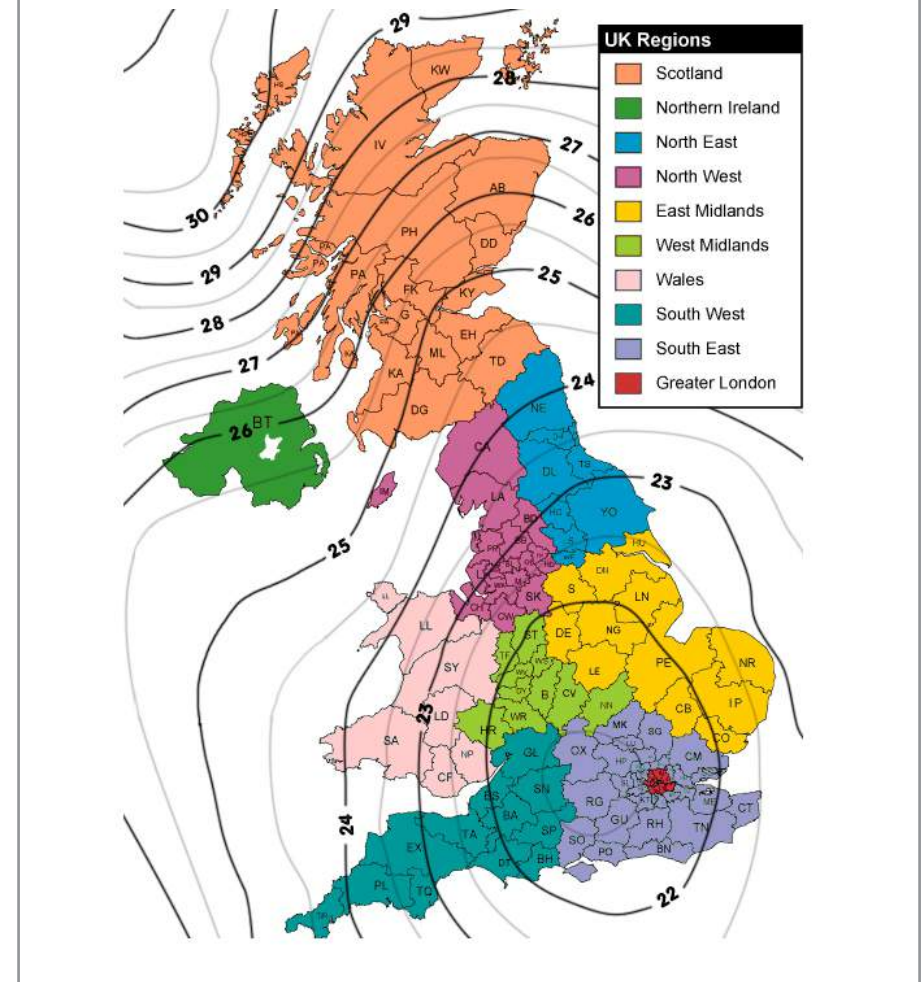
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		kg
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	18	49	18	62	18	67	18	86	18	86	kg
	2	5,5	2	7	2	7,5	2	10	2	10	tiles
23 m/s	18	55	18	69	18	76	18	98	18	98	kg
	2	6,5	2	8	2	8,5	2	11	2	11	tiles
24 m/s	18	61	18	78	18	86	36	97	36	97	kg
	2	7	2	9	2	10	4	11	4	11	tiles
25 m/s	18	67	18	88	18	97	36	107	36	107	kg
	2	7,5	2	10	2	11	4	12	4	12	tiles
26 m/s	18	75	18	99	18	108	36	119	36	119	kg
	2	8,5	2	11	2	12	na**	na**	na**	na**	tiles

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 United Kingdom



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

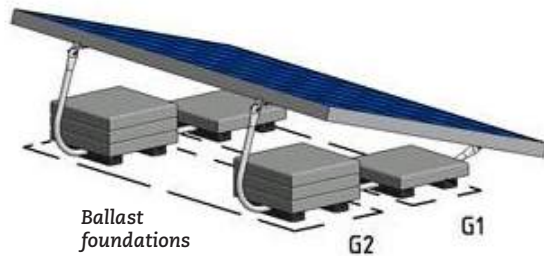
** Not available due to exceedance maximum number of tiles.

Required ballast | Ireland

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm
	Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Height above sea level	50 m
Distance to coast line	5 km
Distance to city boarder	5 km
<i>(Northern Ireland: see United Kingdom)</i>	
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

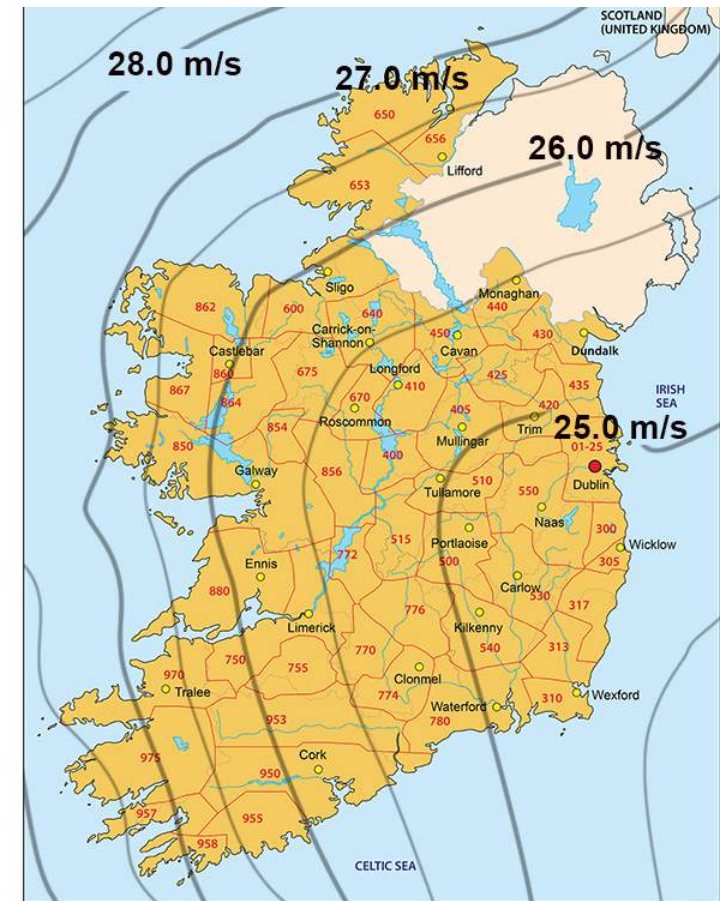
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		kg
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
25 m/s	18	67	18	88	18	97	36	107	36	107	kg
	2	7,5	2	10	2	11	4	12	4	12	tiles
26 m/s	18	75	18	99	18	108	36	119	36	119	kg
	2	8,5	2	11	2	12	na**	na**	na**	na**	tiles
27 m/s	18	84	36	97	36	104	36	133	36	133	kg
	2	9,5	4	11	4	12	na**	na**	na**	na**	tiles
28 m/s	18	94	36	105	36	114	36	148	36	148	kg
	2	10,5	4	12	na**	na**	na**	na**	na**	na**	tiles

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 Ireland



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

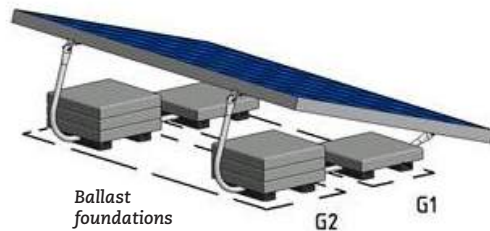
** Not available due to exceedance maximum number of tiles.

Required ballast | Norway

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Height above sea level	175 m
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

Height / Wind area**	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	
22 m/s	18	40	18	40	18	40	18	40	18	40	kg
	2	4,5	2	4,5	2	4,5	2	4,5	2	4,5	tiles
25 m/s	18	56	18	56	18	56	18	56	18	56	kg
	2	6,5	2	6,5	2	6,5	2	6,5	2	6,5	tiles
27 m/s	18	68	18	68	18	68	18	68	18	68	kg
	2	8	2	8	2	8	2	8	2	8	tiles
29 m/s	18	84	18	84	18	84	18	84	18	84	kg
	2	9,5	2	9,5	2	9,8	2	9,5	2	9,5	tiles
31 m/s	18	58	18	58	18	58	18	58	18	58	kg
	2	6,5	2	6,5	2	6,5	2	6,5	2	6,5	tiles

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).

Norway



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

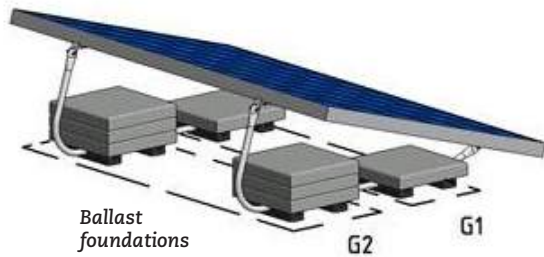
** To determine the wind area see next page.

Required ballast | Sweden

General

The ValkBox 3 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



Surrounding parameters

Panel size Length approx. 1650 mm - Width max 1005 mm
 Height 28-50 mm - Weight approx. 19 kg
 Position Middle zone roof
 Terrain category Built environment
 Roofing materials Bitumen
 Tile size* 30 x 30 x 4,5 cm á 9 kg
 Flat roof Max. 5% inclination

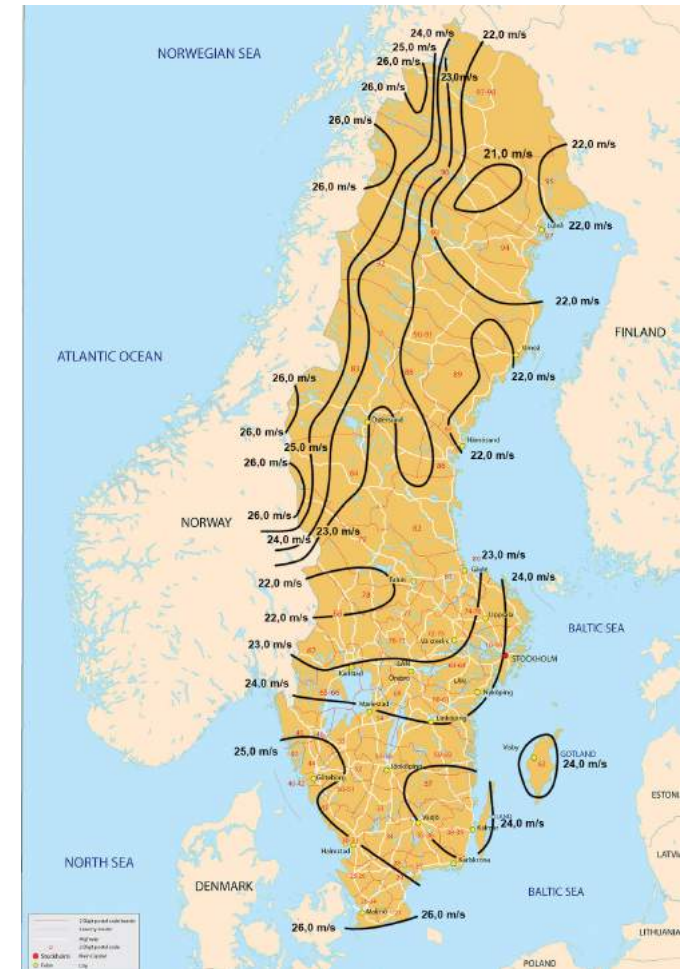
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	18	9,5	18	10	18	17	18	24	18	29	kg
	2	2	2	2	2	2	2	3	2	3,5	tiles
23 m/s	18	4	18	13	18	20	18	28	18	33	kg
	2	2	2	2	2	2,5	2	3,5	2	4	tiles
24 m/s	18	6	18	15	18	24	18	32	18	37	kg
	2	2	2	2	2	3	2	4	2	4,5	tiles
25 m/s	18	7	18	18	18	27	18	36	18	42	kg
	2	2	2	2	2	3	2	4	2	5	tiles
26 m/s	18	9	18	21	18	30	18	40	18	47	kg
	2	2	2	2,5	2	3,5	2	4,5	2	5,5	tiles

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 Sweden



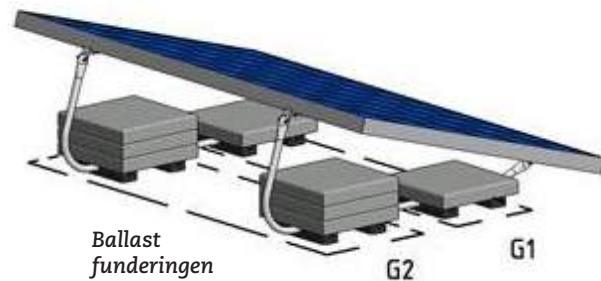
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | Finland

General

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- 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm
	Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Town
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

Height / Wind area	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	
21 m/s	18	29	18	29	18	29	18	33	18	39	kg
	2	3,5	2	3,5	2	3,5	2	4	2	4,5	tiles
22 m/s	18	33	18	33	18	33	18	38	18	44	kg
	2	4	2	4	2	4	2	4,5	2	5	tiles
26 m/s	18	52	18	52	18	52	18	59	18	71	kg
	2	6	2	6	2	6	2	7	2	8	tiles

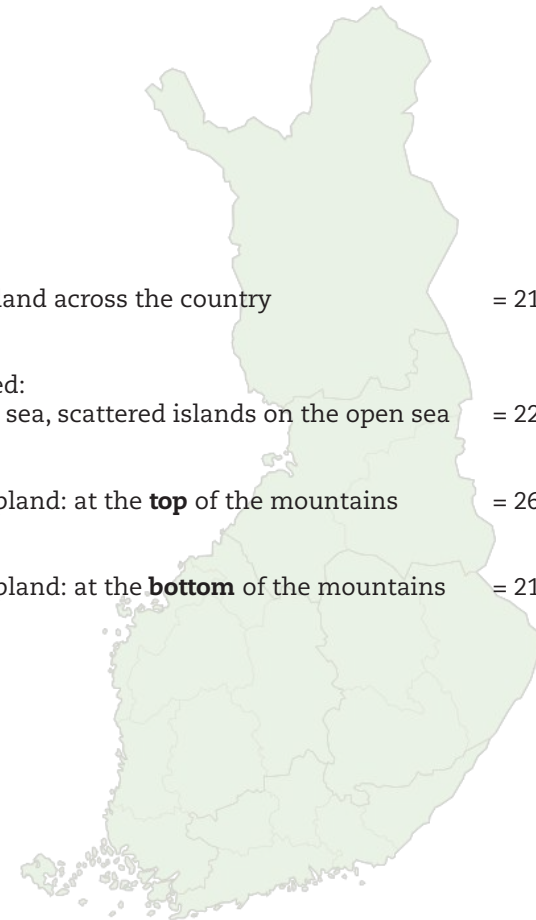
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).

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 Finland

- Mainland across the country = 21 m/s
- Seabed:
Open sea, scattered islands on the open sea = 22 m/s
- In Lapland: at the **top** of the mountains = 26 m/s
- In Lapland: at the **bottom** of the mountains = 21 m/s



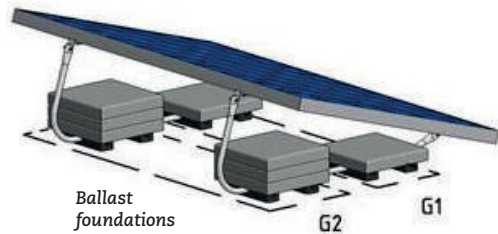
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | Poland

General

The ValkBox 3 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



Surrounding parameters

Panel size	Length approx. 1650 mm - Width max 1005 mm Height 28-50 mm - Weight approx. 19 kg
Position	Middle zone roof
Terrain category	Built environment
Height above sea level	250 m
Roofing materials	Bitumen
Tile size*	30 x 30 x 4,5 cm á 9 kg
Flat roof	Max. 5% inclination

Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		kg tiles
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1	18	44	18	49	18	53	18	58	18	63	kg
	2	5	2	5,5	2	6	2	6,5	2	7	tiles
2	18	67	18	75	18	83	18	93	18	101	kg
	2	7,5	2	8,5	2	9,5	2	10,5	2	11,5	tiles
3	18	44	18	49	18	53	18	58	18	63	kg
	2	5	2	5,5	2	6	2	6,5	2	7	tiles

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 Poland

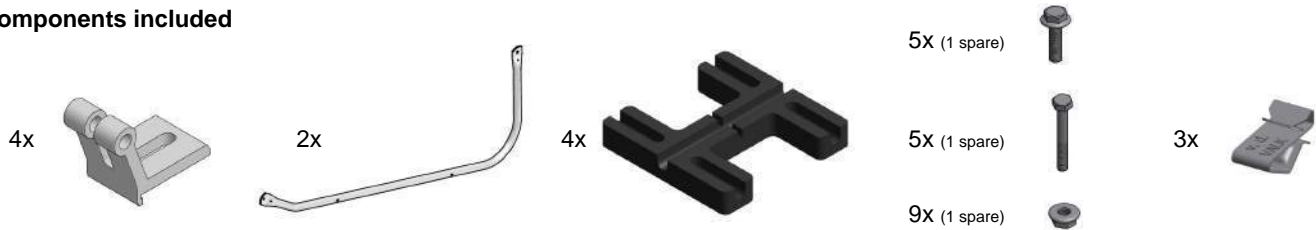


* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

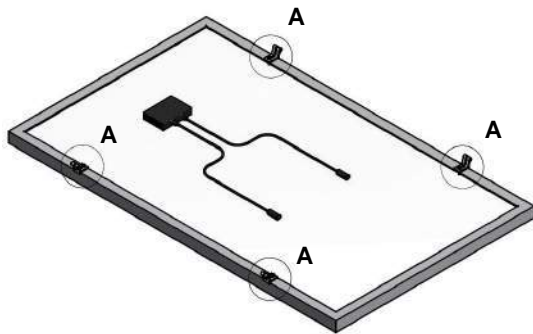


Installation manual

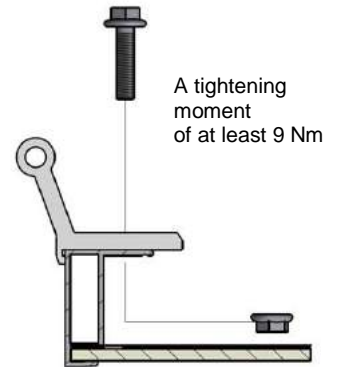
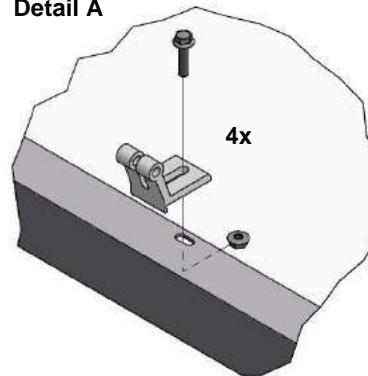
Components included



Step 1: Fit the support mounts



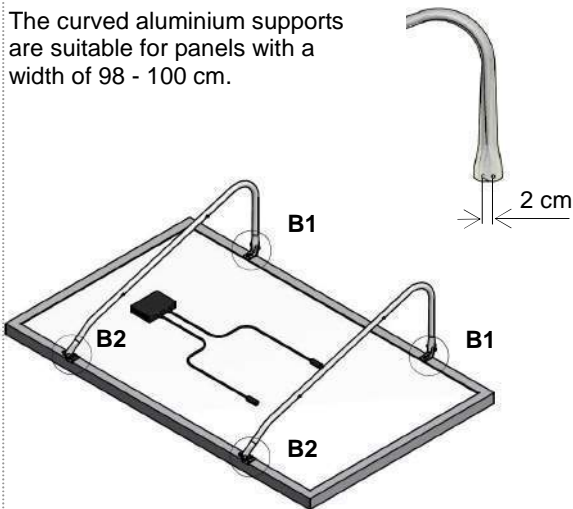
Detail A



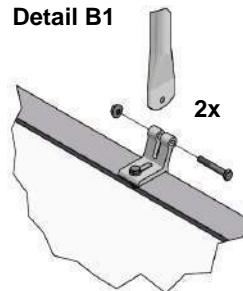
A tightening moment of at least 9 Nm

Step 2: Mount the curved supports

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

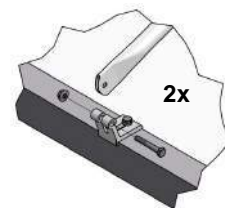


Detail B1



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

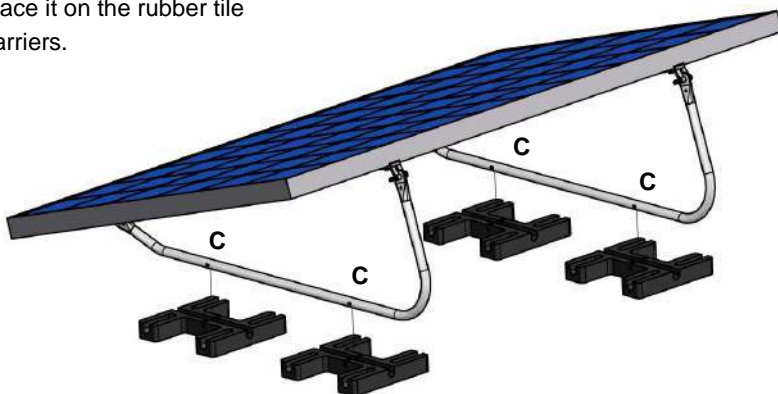
Detail B2



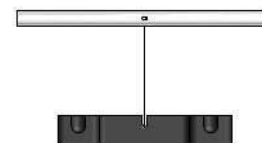
⚠ Tighten the hinge bolts B2 firmly, with a tightening moment of at least 9 Nm, until there is no play.

Step 3: Attach the rubber tiles

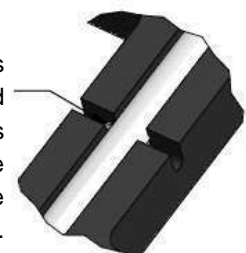
Turn over the panel and place it on the rubber tile carriers.



Detail C




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

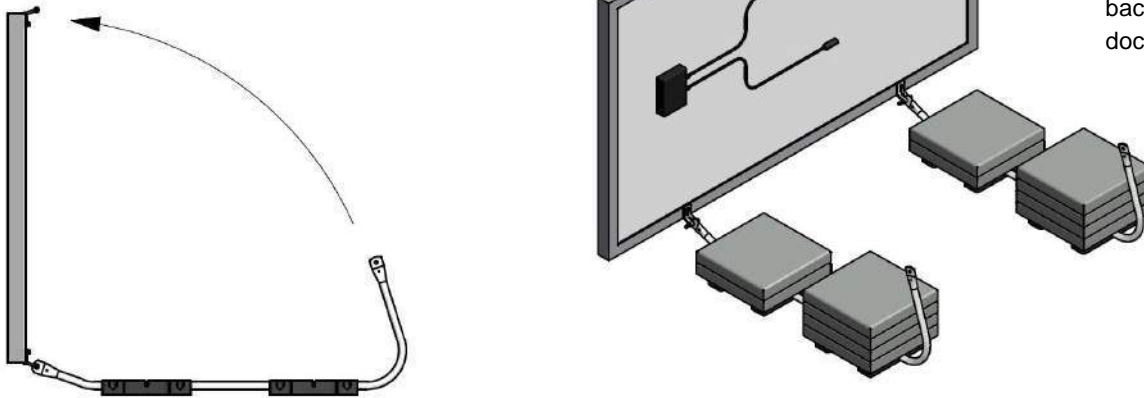




Step 4: Position the ballast

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.

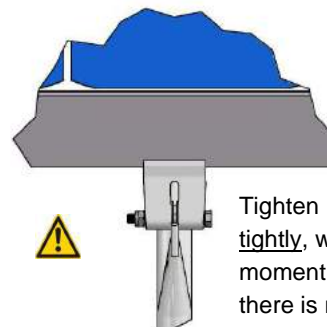
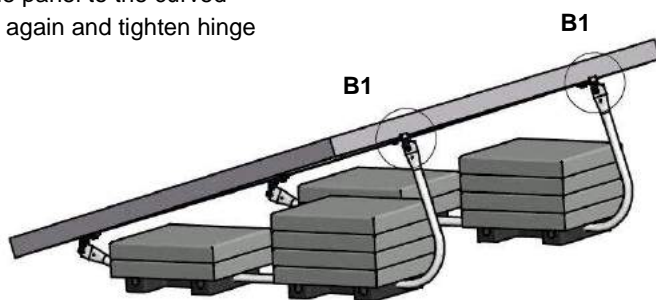
 Position the ballast required. See the information on the back of this document.



Step 5: Tighten hinge bolts B1

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

Detail B1

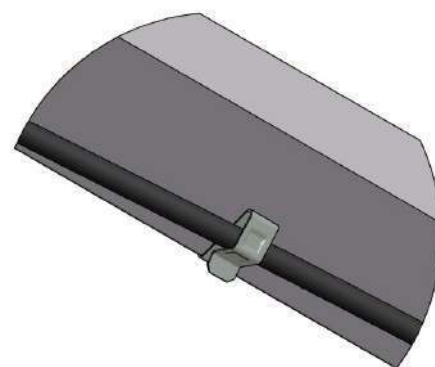
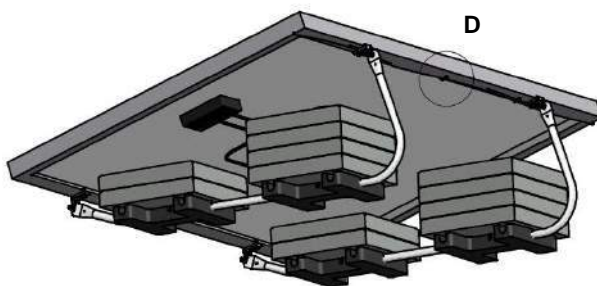


Tighten hinge bolts B1 tightly, with a tightening moment of at least 9 Nm, until there is no play.

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.

