

ValkBox[®] 3

Installation manual



Van der Valk Solar Systems
Solar Mounting Systems



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.

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Solar Mounting Systems

VAN DER VALK



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

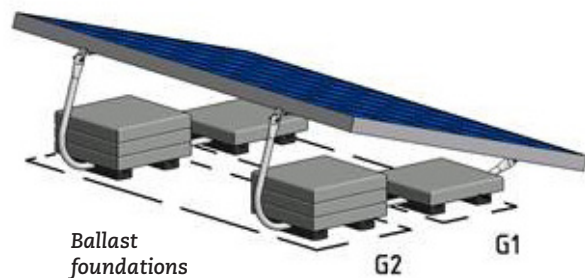


Required ballast | The Netherlands

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

Panelsize	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

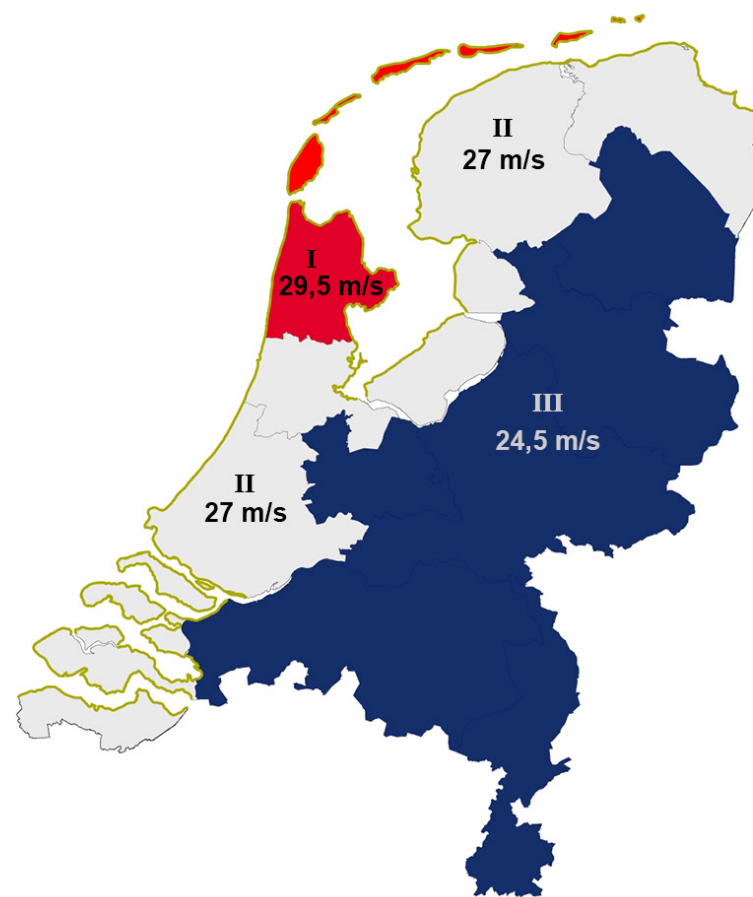
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
I (29,5 m/s)	18	81	18	81	18	96	36	100	36	111	kg
	2	9	2	9	2	11	4	11,5	na**	na**	tiles
II (27 m/s)	18	62	18	62	18	73	18	88	18	100	kg
	2	7	2	7	2	8,5	2	10	2	11,5	tiles
III (24,5 m/s)	18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

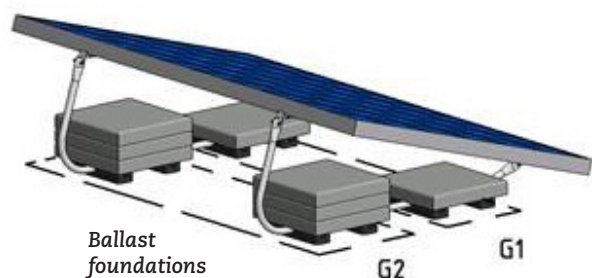
** Not available due to exceedance maximum number of tiles.

Required ballast | Belgium

General

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;

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- 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

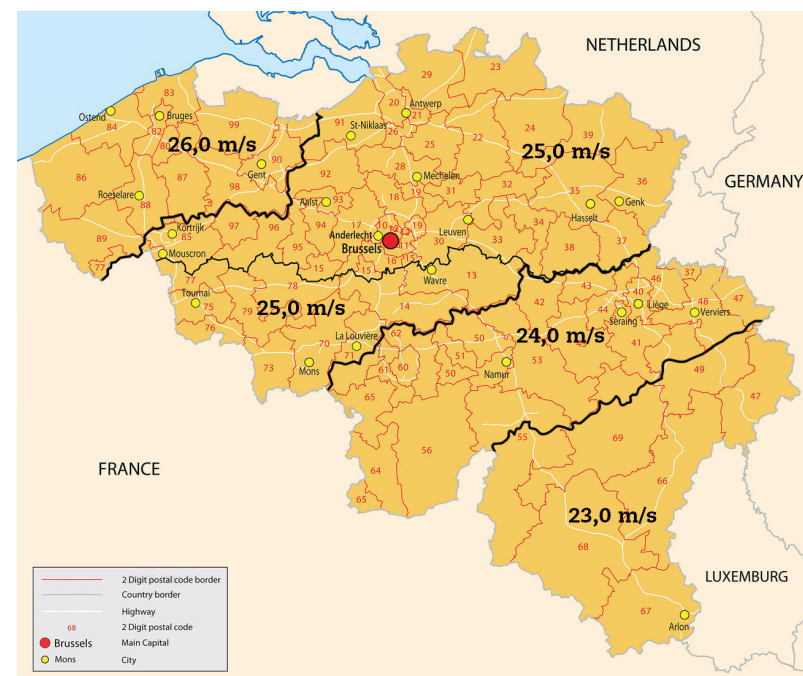
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
23 m/s	18	33	18	41	18	47	18	54	18	59	kg
	2	4	2	5	2	5,5	2	6	2	7	tiles
24 m/s	18	37	18	46	18	52	18	60	18	66	kg
	2	4,5	2	5,5	2	6	2	7	2	7,5	tiles
25 m/s	18	42	18	51	18	58	18	66	18	74	kg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



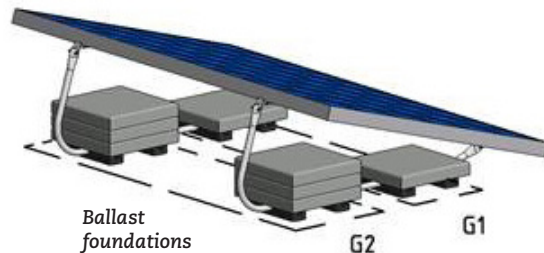
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

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

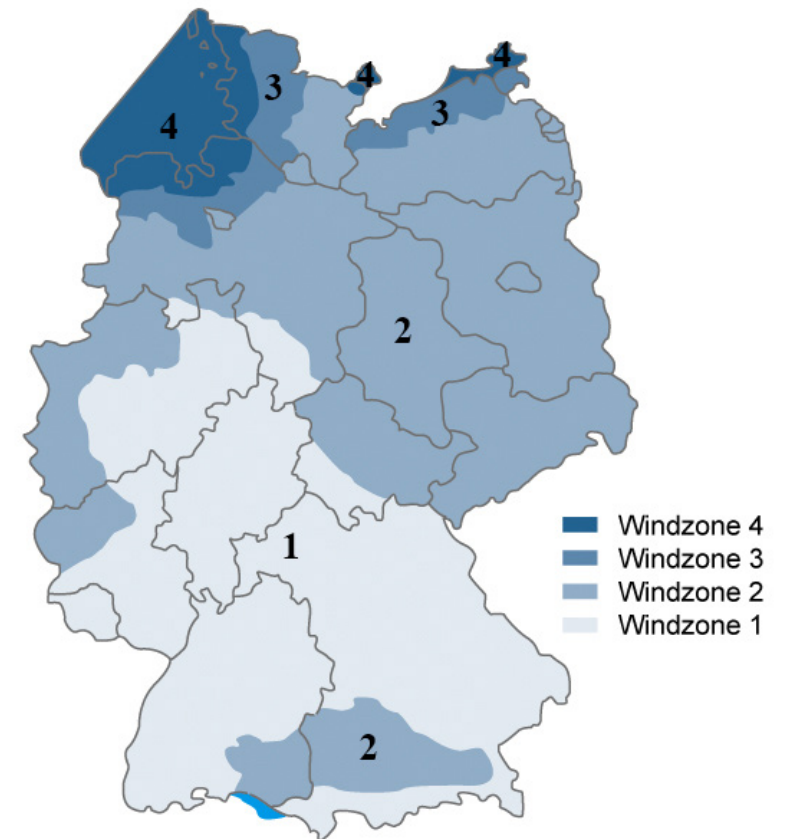
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
1 (22,5 m/s)	18	34	18	34	18	34	18	34	18	34	kg
	2	4	2	4	2	4	2	4	2	4	tiles
2 (25 m/s)	18	45	18	45	18	45	18	45	18	45	kg
	2	5	2	5	2	5	2	5	2	5	tiles
3 (27,5 m/s)	18	58	18	58	18	58	18	58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



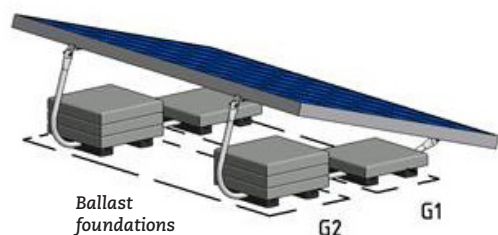
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

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

Panelsize	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

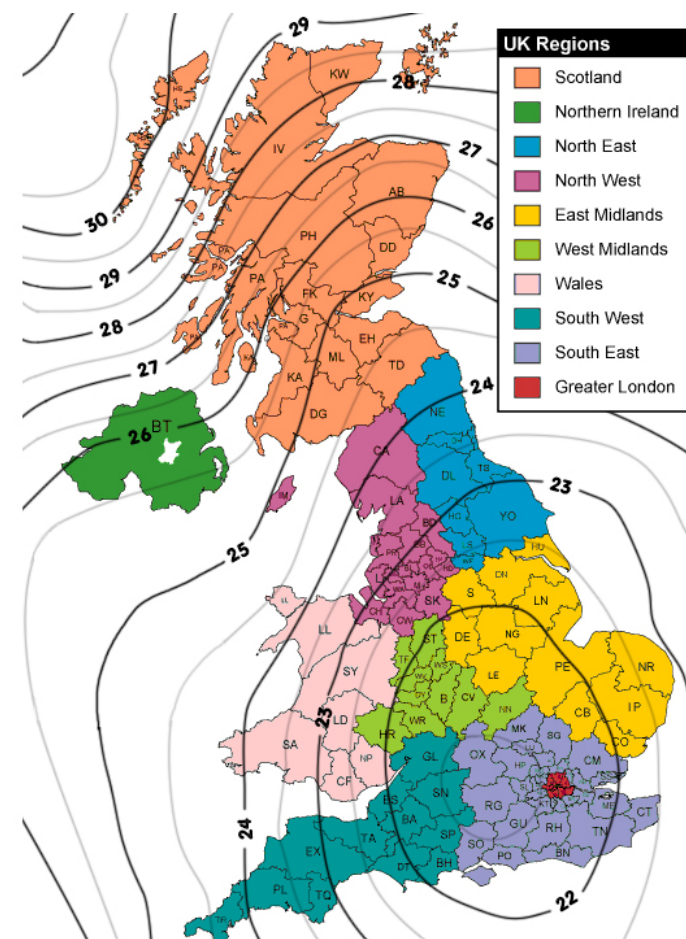
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	18	49	18	62	18	67	18	86	18	86	kg
	2	5,5	2	7	2	7,5	2	10	2	10	tiles
23 m/s	18	55	18	69	18	76	18	98	18	98	kg
	2	6,5	2	8	2	8,5	2	11	2	11	tiles
24 m/s	18	61	18	78	18	86	36	97	36	97	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.

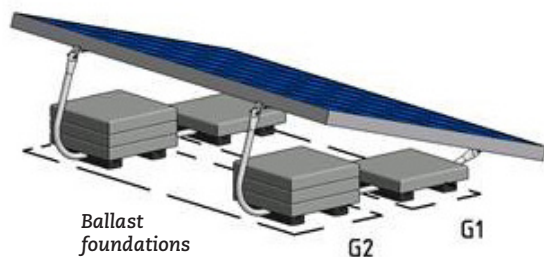
** Not available due to exceedance maximum number of tiles.

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

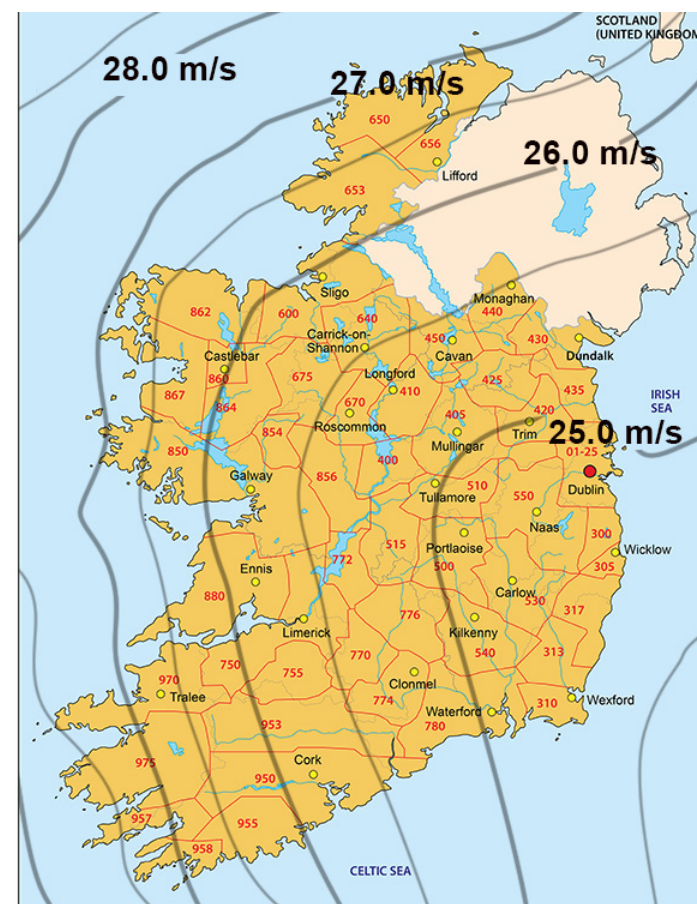
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
25 m/s	18	67	18	88	18	97	36	107	36	107	kg
	2	7,5	2	10	2	11	4	12	4	12	tiles
26 m/s	18	75	18	99	18	108	36	119	36	119	kg
	2	8,5	2	11	2	12	na**	na**	na**	na**	tiles
27 m/s	18	84	36	97	36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

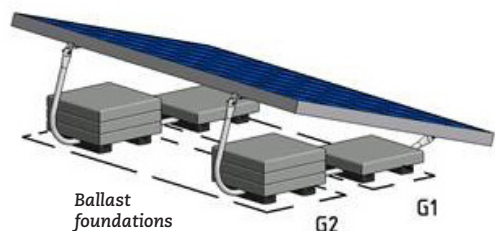
** Not available due to exceedance maximum number of tiles.

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

Panelsize	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



To determine the wind area
see next page.

* 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.

Wind area Norway

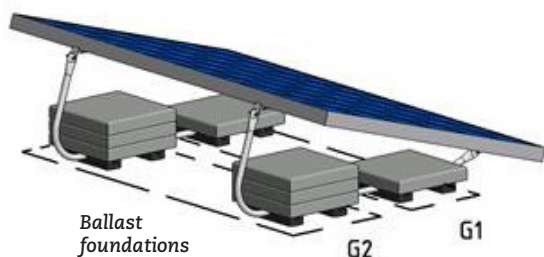
	m/s		m/s		m/s		m/s		m/s		m/s
Province Østfold	22	Province Vestfold	23	Kvitsøy	29	Province Møre og Romsdal	30	Province Nord-Trøndelag	26	Province Troms	26
<i>Except Municipalities:</i>		<i>Except Municipalities:</i>		Karmøy	30	<i>Except Municipalities:</i>		<i>Except Municipalities:</i>		<i>Except Municipalities:</i>	
Halden	24	Hof	22	Utsira	30	Rindal	25	Lierne	24	Bardu	24
Moss	24	Lardal	22	Ølen	Municipality isn't in the Wind standard	Sumadal	25	Meråker	25	Målselv	24
Rygge	24	Nøtterøy	24			Nesset	26	Røyrvik	25	Stroffjord	24
Råde	24	Sandefjord	24			Norddal	26	Snåsa	25	Gáivuona/Kåfjord	25
Sarpsborg	24	Stokke	24	Province Hordaland	26	Stordal	26	Flatanger	29	Balsfjord	26
Våler	24	Tønsberg	24	<i>Except Municipalities:</i>		Stranda	26	Fosnes	29	Gratangen	26
Fredrikstad	26	Larvik	25	Etne	24	Sunnal	27	Leka	29	Ibestad	26
Hvaler	27	Tjøme	26	Etne near the Folgefonna	24	Gjemnes	28	Leka on the mainland	29	Lavangen	26
				Granvin	24	Rauma	28	Nærøy	29	Lyngen	26
Province Akershus	22	Province Telemark	22	Kvam	24	Sykkylven	28	Vikna	30	Salangen	26
<i>Except Municipality:</i>		<i>Except Municipalities:</i>		Modalen	24	Tingvoll	28			Skånland	26
Vestby	24	Bamble	23	Samnanger	24	Volda	28	Province Nordland	29	Sørreisa	26
		Porsgrunn	23	Ulvik	24	Ørskog	28	<i>Except Municipalities:</i>		Dyrøy	27
Province Oslo	22	Fyresdal	24	Vaksdal	24	Ørsta	28	Beiar	26	Harstad	27
		Kragerø	24	Voss	24	Eide	29	Evenes	26	Lenvik	27
Province Hedmark	22	Tinn	24	Osterøy	25	Halsa	29	Fauske	26	Nordreisa	27
<i>Except Municipalities:</i>		Tokke	24	Radøy	27	Hareid	29	Grane	26	Tranøy	27
Alvdal	24	Vinje	24	Austevoll	28	Molde	29	Hattfjelldal	26	Tromsø	27
Folldal	24	Vinje near Rogaland/Hordaland	24	Austrheim	28	Skodje	29	Hemnes	26	Bjarkøy	28
Folldal near Trøndelag	24			Bømlo	28	Sula	29	Rana	26	Kvænangen	28
Os	24	Province Aust-Agder	24	Fjell	28	Ålesund	29	Saltdal	26	Skjervøy	28
Os near Trøndelag	24	<i>Except Municipalities:</i>		Sund	28	Sandøy	31	Sørfold	26	Karlsøy	29
Tolga	24	Arendal	26	Øygarden	29	Frei	Municipality isn't in the Wind standard	Ballangen	27	Berg	30
Tynset	24	Grimstad	26	Fedje	30	Tustna	Municipality isn't in the Wind standard	Tjeldsund	27	Torsken	30
Tynset Kvikne	24	Lillesand	26					Tysfjord	27		
Tynset near Trøndelag	24	Risør	26	Province Sogn og Fjordane	24			Hamarøy	28	Province Finnmark	29
		Tvedestrand	26	<i>Except Municipalities:</i>				Narvik	28	<i>Except Municipalities:</i>	
Province Oppland	22			Aurland	25	Province Sør-Trøndelag	25	Sortland	28	<i>Except Municipalities:</i>	
<i>Except Municipalities:</i>		Province Vest-Agder	24	Eid	26	<i>Except Municipalities:</i>		Vefsn	28	Kárájoga / Karasjok	24
Vågå	23	<i>Except Municipalities:</i>		Fjaler	26	Malvik	26	Vefsn along the fjord	28	Guovdageaidnu / Kautokeino	24
Dovre	24	Flekkefjord	26	Førde	26	Oppdal	26	Vefsn Mosjøen	28	Deanu/Tana	27
Dovre near Trøndelag	24	Flekkefjord near Rogaland	26	Førde near the Jostedalsbreen	26	Rennebu	26	Vevelstad	28	Porsanger	27
Lom	24	Kristiansand	26	Gaular	26	Trondheim	26	Alstahaug	30	Unjárgga / Nesseby	27
Lom near Sogn og Fj.	24	Lyngdal	26	Gloppen	26	Agdenes	27	Bindal	30	Alta	28
Vang	24	Søgne	26	Gloppen near the Ålfotbreen		Rissa	27	Bodø	30	Berlevåg	30
Vang near Sogn og Fj.	24	Farsund	28	and Jostedalsbreen	26	Snillfjord	27	Dønna	30	Gamvik	30
Lesja	25	Lindesnes	28	Hornindal	26	Hemne	28	Flakstad	30	Hasvik	30
Lesja near Trøndelag/		Mandal	28	Hyllestad	26	Bjugn	29	Herøy	30	Måsøy	30
Møre og Romsdal	25			Høyanger	26	Osen	29	Leirfjord	30	Nordkapp	30
Skjåk	25	Province Rogaland	26	Lærdal	26	Roan	29	Lurøy	30	Vardø	30
Skjåk near Sogn og Fj./		<i>Except Municipalities:</i>		Naustdal	26	Åfjord	29	Lurøy on the mainland	30		
Møre og Romsdal	25	Hjelmeland	24	Askvoll	28	Frøya	30	Nesna	30	Province Svalbard	30
		Sauda	24	Flora	28	Hitra	30	Sømna	30		
Province Buskerud	22	Suldal	24	Gulen	28	Ørland	30	Vega	30		
<i>Except Municipalities:</i>		Vindafjord	24	Bremanger	29			Vestvågøy	30		
Hemsedal	24	Eigersund	27	Bremanger near the Ålfotbreen	29			Andøy	31		
Hemsedal near Sogn og Fj.	24	Sokndal	27	Solund	29			Moskenes	31		
Hol	24	Bokn	28	Selje	31			Røst	31		
Hol near Hordeland /		Haugesund	28	Vågsøy	31			Træna	31		
Sogn og Fjordane	24	Klepp	28					Værøy	31		
Hurum	24	Randaberg	28					Skjerstad	Municipality isn't in the Wind standard		
Nore og Uvdal	24	Rennesøy	28								
Nore og Uvdal near Hordeland	24	Sola	28								
Ål	24	Time	28								
Ål near Sogn og Fj.	24	Hå	29								

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

Panelsize	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

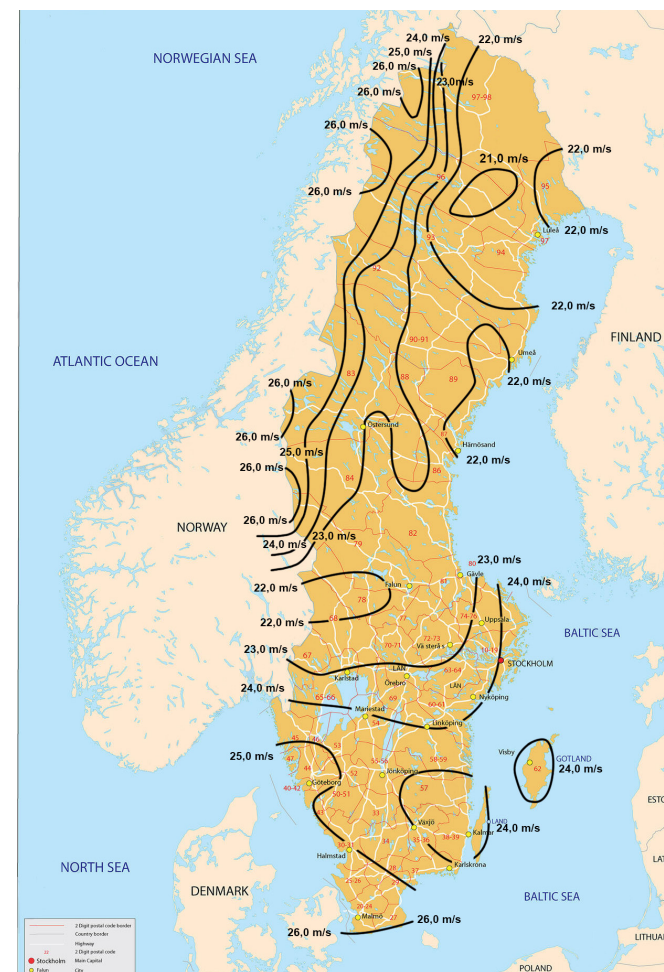
Height / Wind area	0 - 5 meter		5 - 7 meter		7 - 9 meter		9 - 12 meter		12 - 15 meter		
	G1	G2	G1	G2	G1	G2	G1	G2	G1	G2	
22 m/s	18	9,5	18	10	18	17	18	24	18	29	kg
	2	2	2	2	2	2	2	3	2	3,5	tiles
23 m/s	18	4	18	13	18	20	18	28	18	33	kg
	2	2	2	2	2	2,5	2	3,5	2	4	tiles
24 m/s	18	6	18	15	18	24	18	32	18	37	kg
	2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



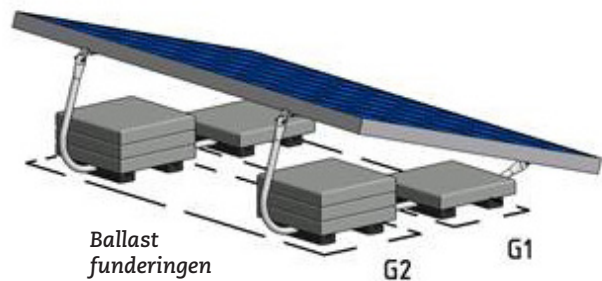
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Required ballast | Finland

General

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

Panelsize	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

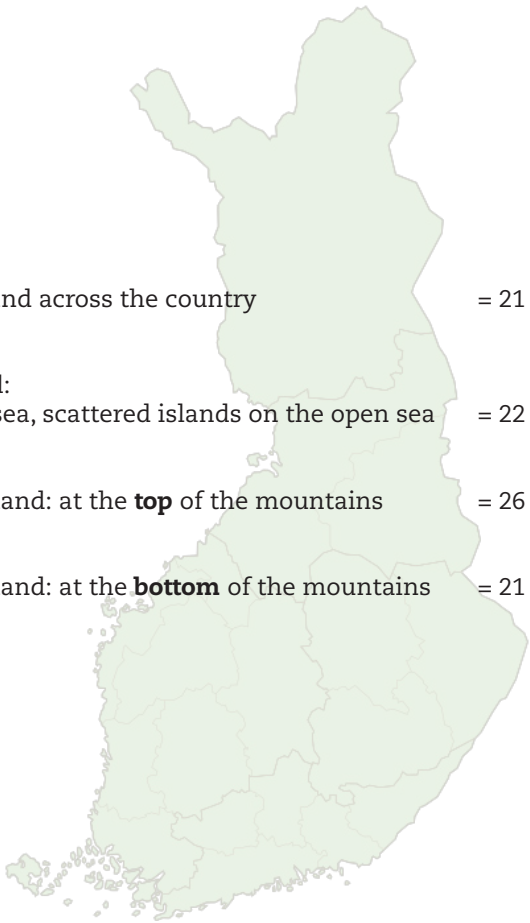
Note 1: Min. extra ballast in G1 & G2 has to be 2 x 1 tile (2 x 9 kg).

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

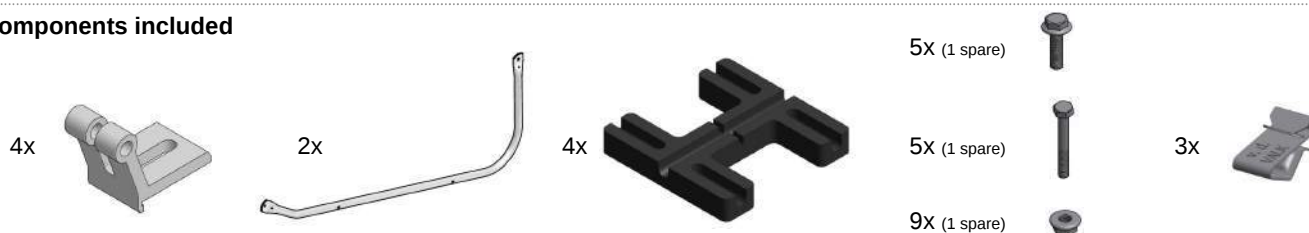
- Mainland across the country = 21 m/s
- Seabed:
Open sea, scattered islands on the open sea = 22 m/s
- In Lapland: at the **top** of the mountains = 26 m/s
- In Lapland: at the **bottom** of the mountains = 21 m/s



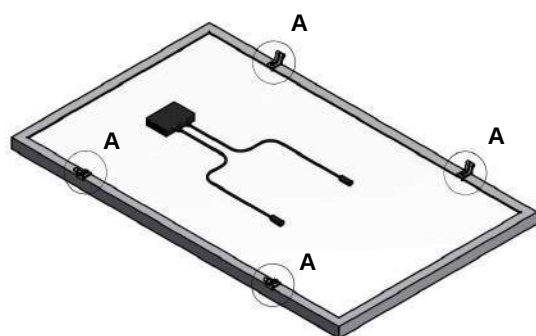
* If you use tiles of different sizes and thus another weight, you need to adjust the number of tiles to get the right weight.

Installation manual

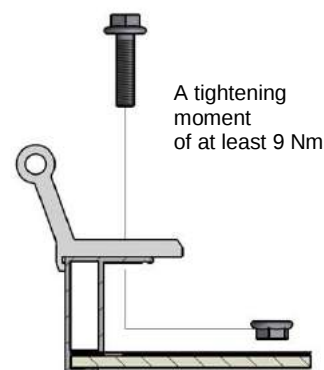
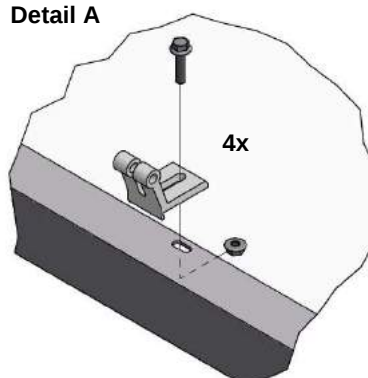
Components included



Step 1: Fit the support mounts

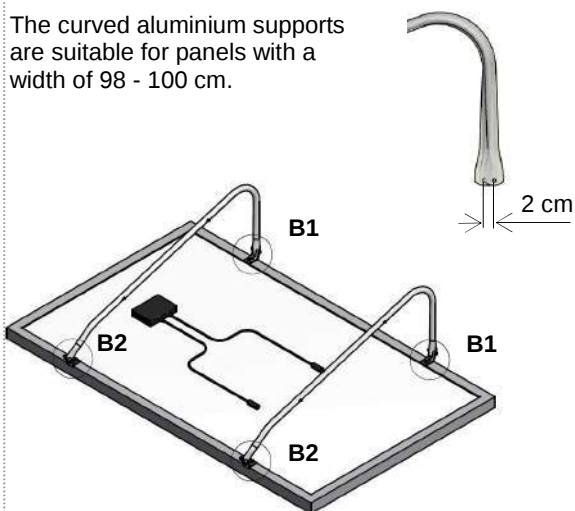


Detail A

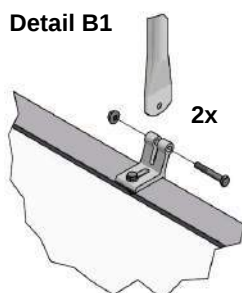


Step 2: Mount the curved supports

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

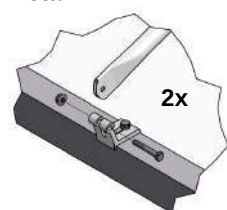


Detail B1



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

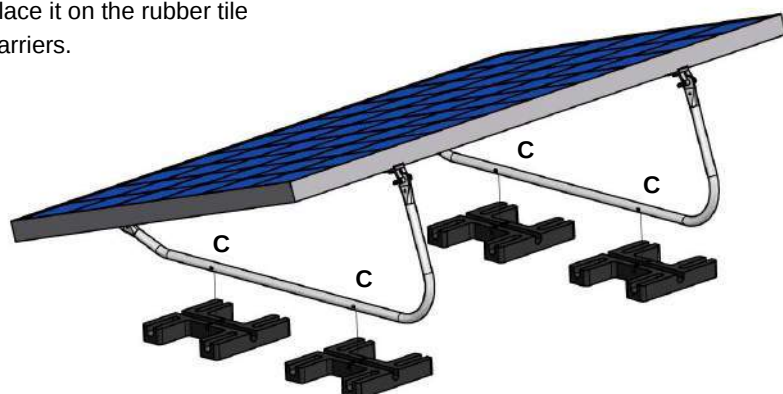
Detail B2



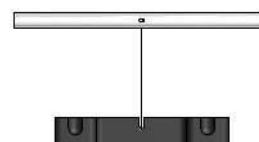
 Tighten the hinge bolts B2 firmly, with a tightening moment of at least 9 Nm, until there is no play.

Step 3: Attach the rubber tiles

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



Detail C

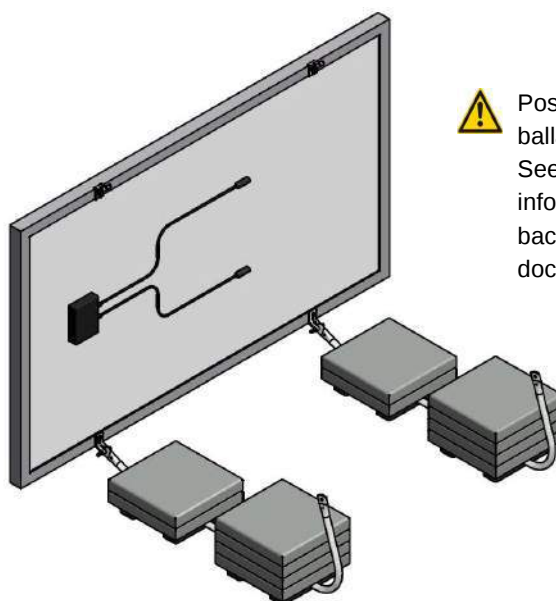
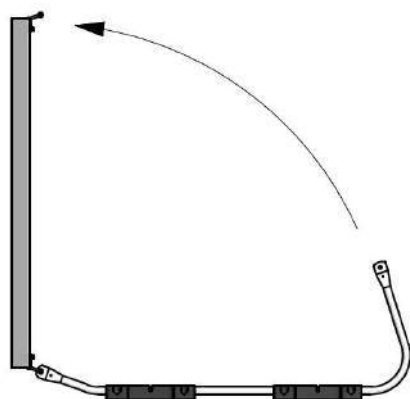


 The projections on the curved aluminium supports must be placed in the grooves on the rubber tiles.



Step 4: Position the ballast

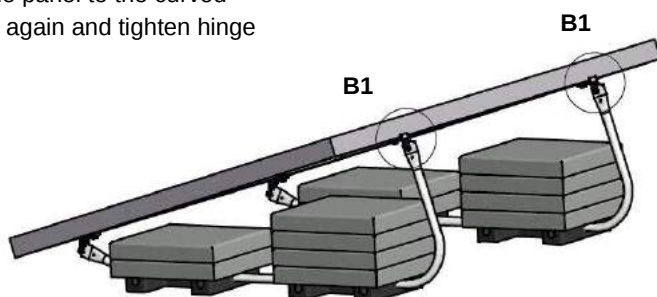
Remove the top hinge bolts B1 and place the panel in a vertical position. Make sure that you have some form of support in place or someone to hold the panel temporarily.



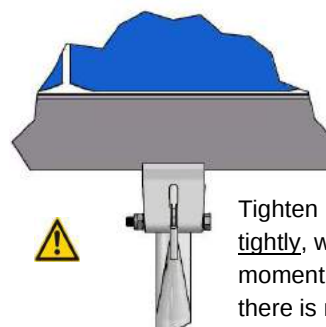
Position the ballast required. See the information on the back of this document.

Step 5: Tighten hinge bolts B1

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



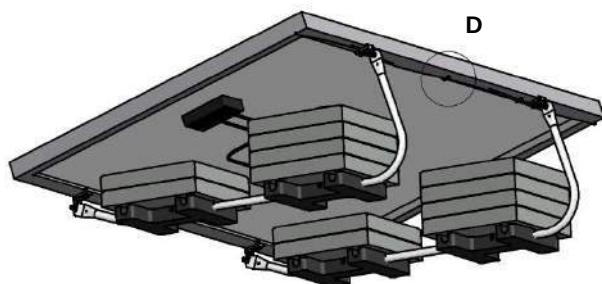
Detail B1



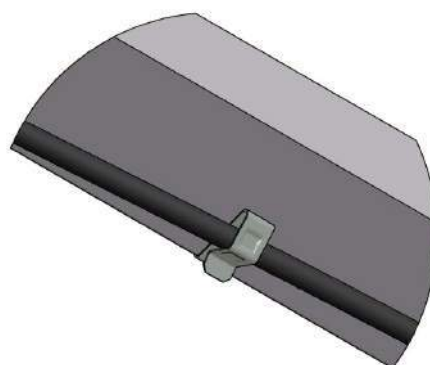
Tighten hinge bolts B1 tightly, with a tightening moment of at least 9 Nm, until there is no play.

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.

