

**VAN DER VALK**



**SOLAR SYSTEMS**

# Installation manual



## ValkPro+ P10° South

Version: v1.2.2  
Date: 15-11-2021

## Disclaimer

This installation manual needs to be used in conjunction with a project specific "Project report". This project report is the result of the use of the online calculation tool of Van der Valk Solar Systems B.V., called the "ValkPVplanner", which project report shows you specific information about your project such as, amongst other, a project drawing and ballast plan for flat roofs (the "Project Report"). This ValkPVplanner and the Project Report(s) derived from this ValkPVplanner are 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 entered into this ValkPVplanner by you, which values always need to be checked and validated by you. The instructions provided in this Project Report must be strictly observed at all times, in addition to and in conjunction with the installation manual provided by us (the "Installation Manual"), and vice versa.

At all times all currently applicable structural, safety and building regulations must be observed when using the ValkPVplanner and/or Installation Manual. 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. 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 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. For each project, the required ballast weight per panel needs to be calculated using the ValkPVplanner software. The ballast specified in the Project Report is vital to ensure 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 in the ValkPVplanner 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 as shown in the respective 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 at all times and can be found on our website:

<http://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 the Project Report and/or the Installation Manual and for possible incorrect results resulting from the use of this ValkPVplanner which was made available to you. The use of the ValkPVplanner, the derived Project Report and the Installation Manual will at all times be subject to Dutch law.

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## Please note

- This manual is not project specific.
- This manual is not legally binding.
- No right 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 can be placed both in the middle zone and the edges/corners of the roof.
- Side plates are optional in the middle zone and mandatory in the edges/corners of the roof.
- The need of mass carriers depends on the amount of ballast needed or when the side plates are used.

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## Placement conditions

In order to ensure a safe installation and use of the The ValkPro+ system, the following conditions must be respected:

- The inclination of the roof must be less than 5°.
- The roof can have a maximum height of 25 meters, in case the project has been calculated using the ValkPVplanner and is corresponding with the roof height in the project report. For installations on roofs higher than 25 meters, please contact Van der Valk Solar Systems.
- Check prior to installation if the roof membrane and/or insulation is suitable for the loads and thermal expansion of the PV-system. For example: make sure the maximum point loads of the system as shown in the ValkPVplanner project report are compatible.
- In case the mounting system is to be placed on a roof with mechanically fixed roof membrane, the risk of the membrane bulging due to wind suction needs to be mitigated. The bulging can cause unwanted lifting of the mounting system or disposition of the ballast under extreme wind suction situations. It is the responsibility of the installer to prevent bulging of the roof membrane. This can be done by adding fixation points or placing additional weight (for example tiles) on the membrane in the edge zones of the roof and around the PV-system.
- After the ValkPro+ mounting system has been placed, it is of greatest importance to check if the ballast has been placed according to the ballast plan in the project report. Ballast tiles need to be neatly stacked in order to ensure the weight is properly supported by the tile carriers, mass carriers and/or ballast wings.
- The coupled ValkPro+ system shall not be placed over a ridge or gutter. In these positions a diltation is mandatory.
- Side plates are mandatory when the system is placed in the edge / corner zones of the roof.
- In coastal areas the mounting system must be placed at a distance of at least 500 meters from open water, to prevent corrosion due to salt water spray. In case there is a building in between the open water and the roof, a distance of 250 meters can be applied.

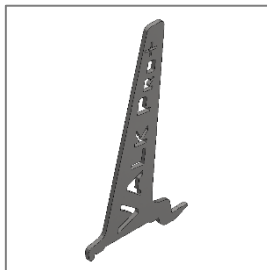
### Suitable panel dimensions:

- Length 900 - 1500 mm
- Width 1559 - 2200 mm suitable for pitch 2100 mm  
1559 - 2200 mm suitable for pitch 2200 mm  
1559 - 2200 mm suitable for pitch 2300 mm  
1559 - 2200 mm suitable for pitch 2400 mm
- Height 28 - 50 mm

## Required tools for installing ValkPro+



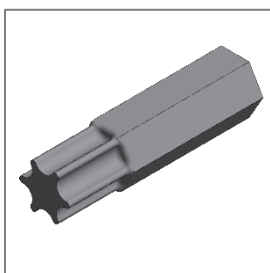
Cordless drill



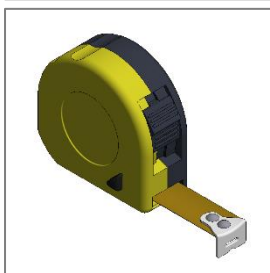
Disassembly key  
(743000)



Socket 13mm  
Wrench 13mm



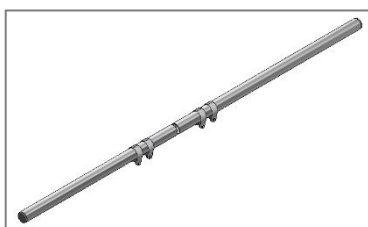
Torx bit T-30  
(789530)



Measuring tape



Alignment key roof carriers  
(739010)



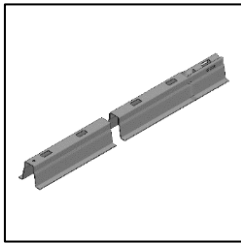
Alignment set  
(743220)

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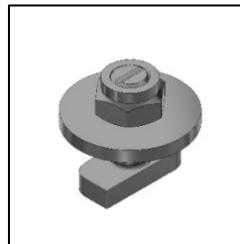




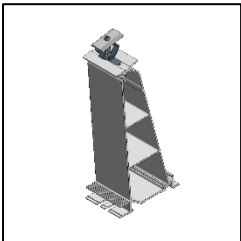
## Basic materials for installing ValkPro+ P10 [South]



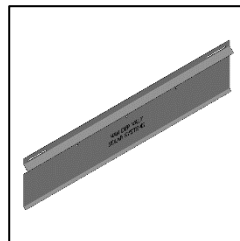
Roof carrier profile  
741802300



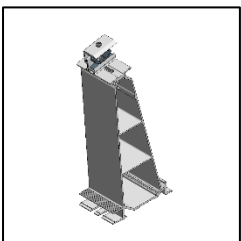
Coupling set  
774221



Back foot middle  
724670



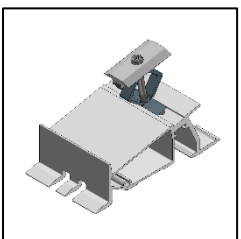
Back panel  
742520 - [for panel length 900-1100mm]  
742521 - [for panel length 1100-1300mm]  
742522 - [for panel length 1300-1500mm]



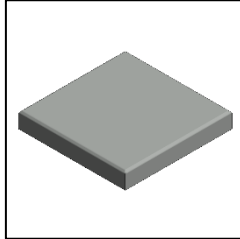
Back foot side  
724671



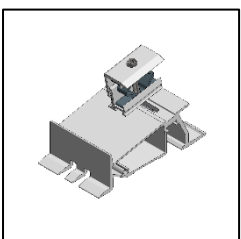
Thread forming bolt  
773310



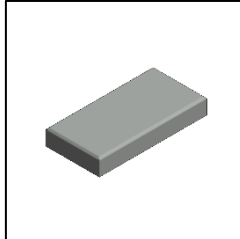
Front foot middle  
724660



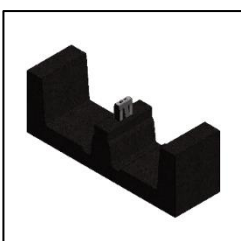
Tile 9 kg (300x300x45mm)  
7506303045



Front foot side  
724661



Tile 4,5 kg (300x150x45mm)  
7506301545



Tile carrier  
729622 - for Bitumen / TPO / EPDM roofs  
729623 - for PVC roofs

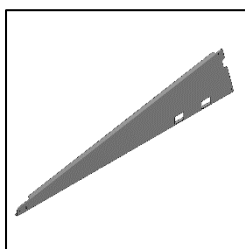
For the 'optional' materials, see next page.

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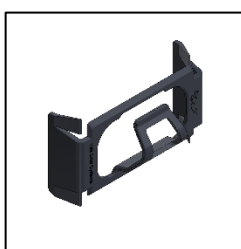


## Optional materials:

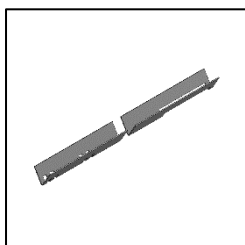
The optional materials can be used to optimize the system to specific situations and wishes.



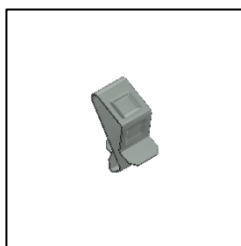
Side plate  
742532 - left  
742533 - right



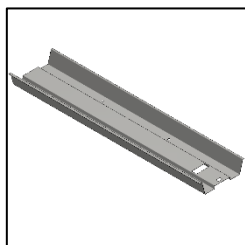
Cable clamp for rear feet  
732011



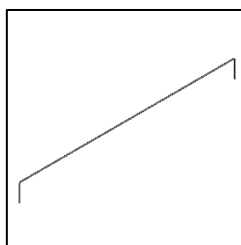
Mass carrier  
742548 - [for panel length 900-1100mm]  
742547 - [for panel length 1100-1300mm]  
742546 - [for panel length 1300-1500mm]



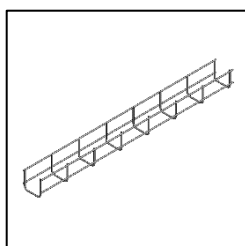
Cable clamp for fixation to panel frame  
732001



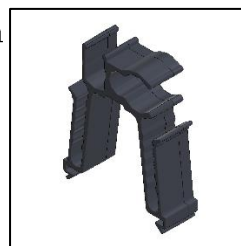
Ballast tray  
742620 - [for panel length 900-1100mm]  
742621 - [for panel length 1100-1300mm]  
742622 - [for panel length 1300-1500mm]



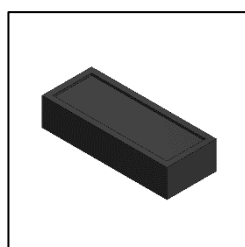
Dilatation wire  
732020



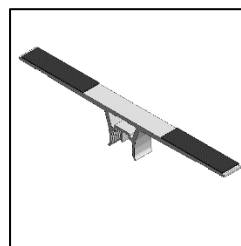
Cable basket 50x60mm, length 3000mm  
(76010050603000)



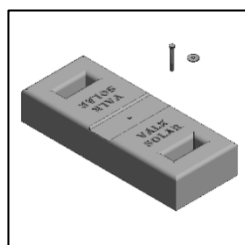
Multi-wire / connector clip for roof carrier  
732012



Elevation block for gravel roofs  
729627



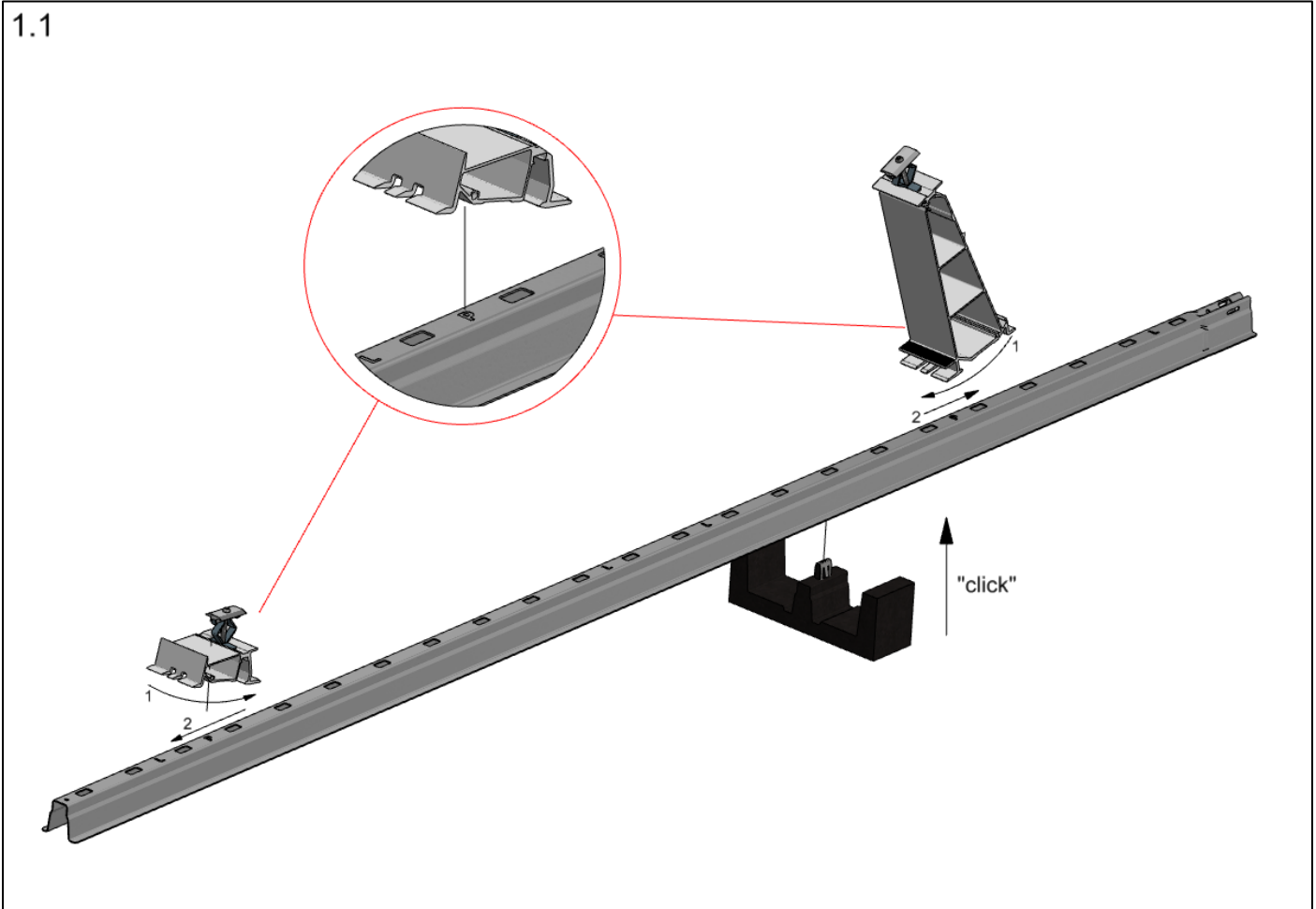
Ballast wing  
725150



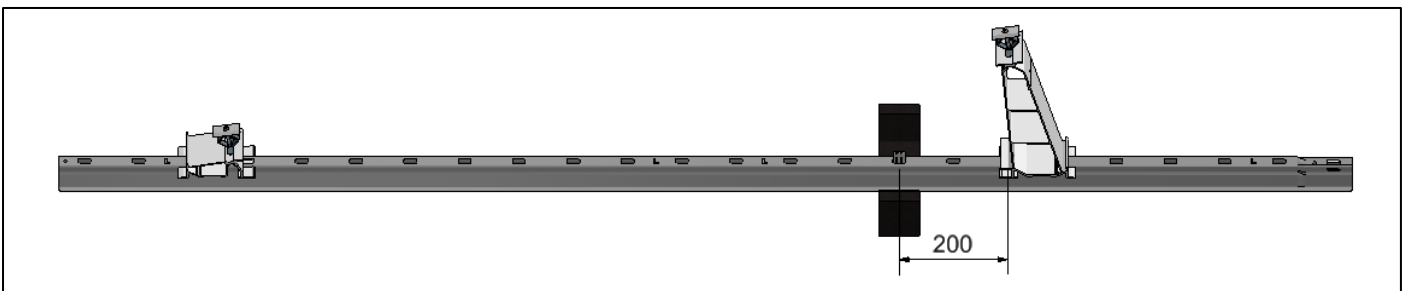
Mass block  
(750520)

## Pre-assembly of roof carriers sets

A fast and convenient way of working can be best achieved by mounting the feet and tile carriers on the roof carriers prior to placing them on the roof. This method can save a lot of time. The aluminium feet should be placed in the position where the letter "P" is visible on top of the roof carrier. The rubber tile carriers are placed in the second rectangular hole in front of the aluminium back foot.



Side view



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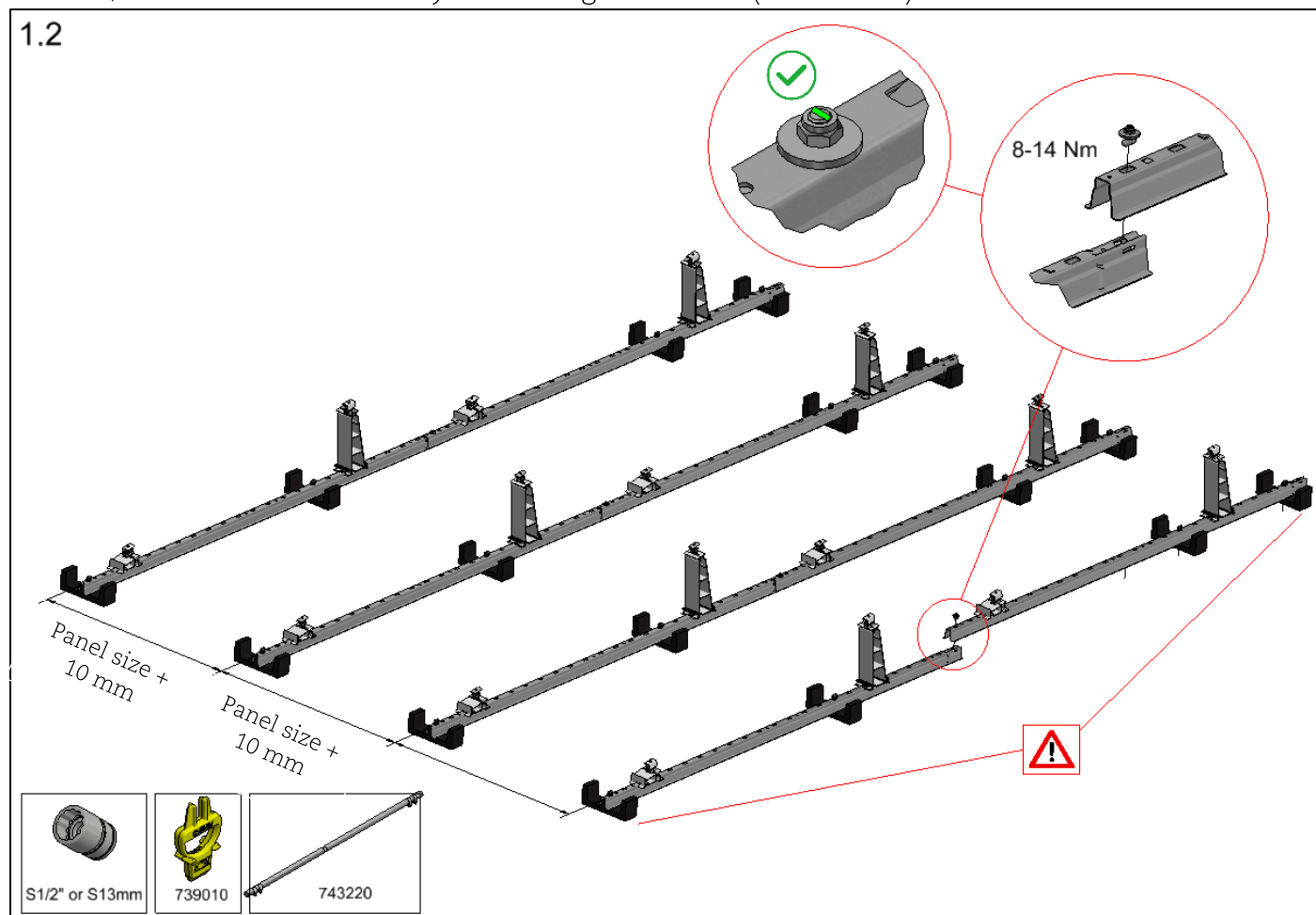




## Alignment of roof carriers

Place the roof carriers on the roof in the desired layout or starting point. Connect the roof carriers by placing the end of the first roof carrier over the reduced end of the next roof carrier. The roof carriers are then fastened with the coupling set. (see 1.3)

The center-to-center distance between the roof carrier rows depends on the panel size. The following formula must be applied: panel size + 10 mm. For fast and easy alignment of the roof carriers, we advise to use the adjustable alignment tool (art. 743220).



In the first and last oblong-hole of the roof carrier row (incl. reduced part) an extra rubber tile carrier must always be placed.

### Dilatations

The coupled system has to be dilatated after certain measurements, this needs to be done because of the thermal expansion/contraction. For the South-North direction this is 60 meters, for the East-West direction this is 30 meters.

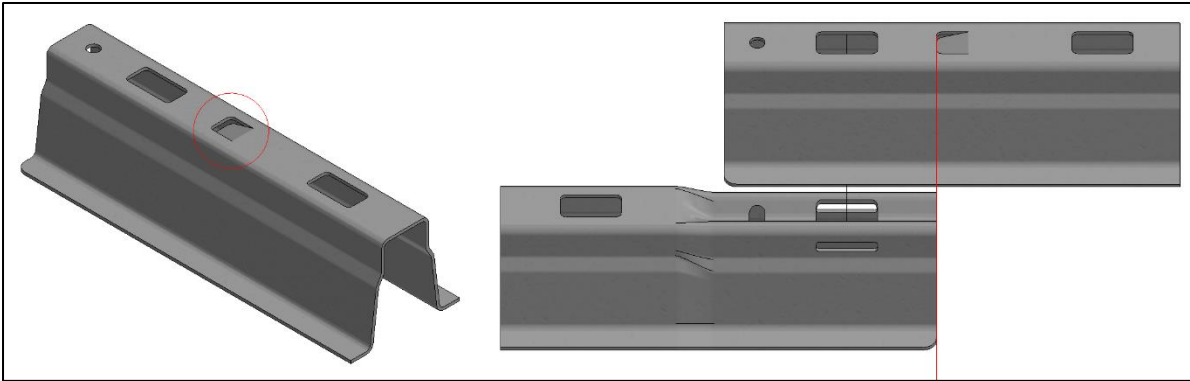
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## Tools for alignment of roof carriers

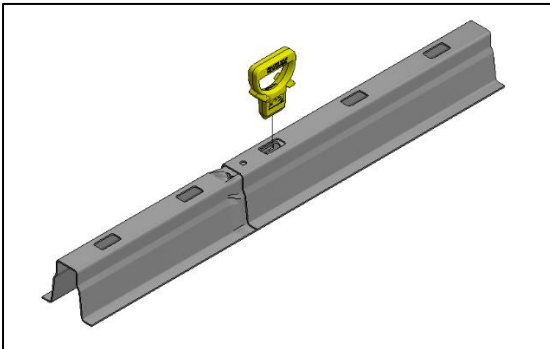
Aligning the roof carriers can be done quick and easy using the following tools:

### Alignment lip roof carrier



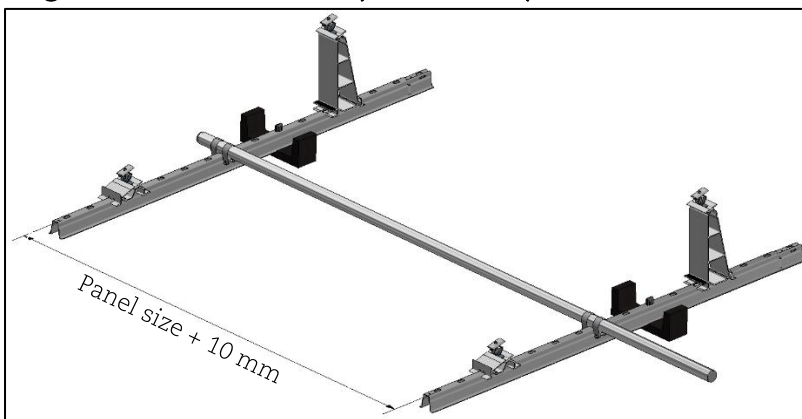
The smooth side of each roof carrier is provided with a lip which can be used when aligning / coupling the roof carriers. The swaged end of the roof carrier can be placed against the lip, this makes sure the roof carriers are always aligned properly.

### Alignment key ValkPro+ (art. 739010)



The alignment key can be used to align the overlapping oblong hole of the roof carriers.

### Alignment set ValkPro+ (art. 743220)



The alignment set can be used to make sure the roof carrier rows are placed at the correct pitch beside each other.

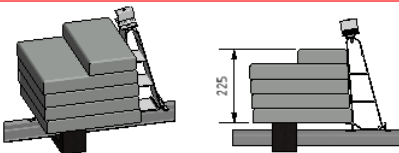
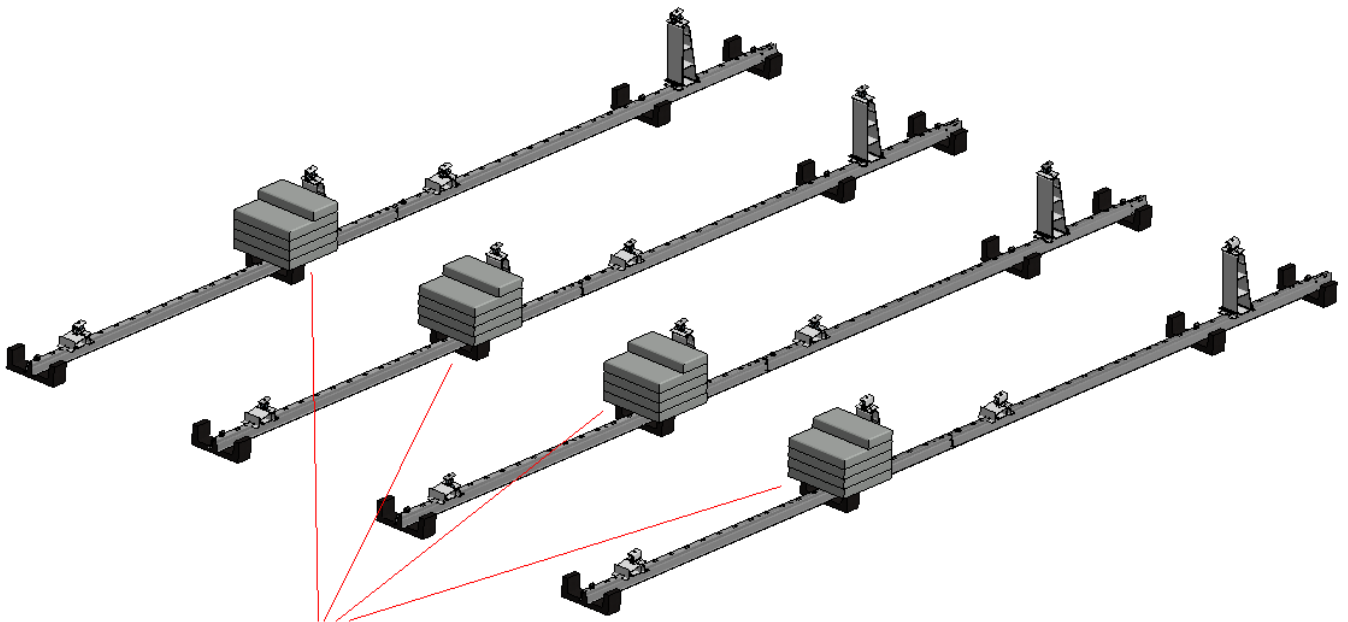
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## Placing ballast

The ballast can be placed on the rubber tile carriers or on the mass carriers (only when necessary). Check the ValkPVplanner projectreport for the required ballast weight per panel.

2.1

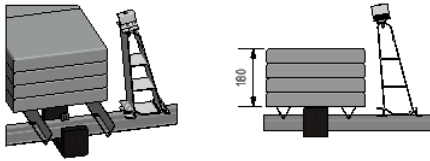
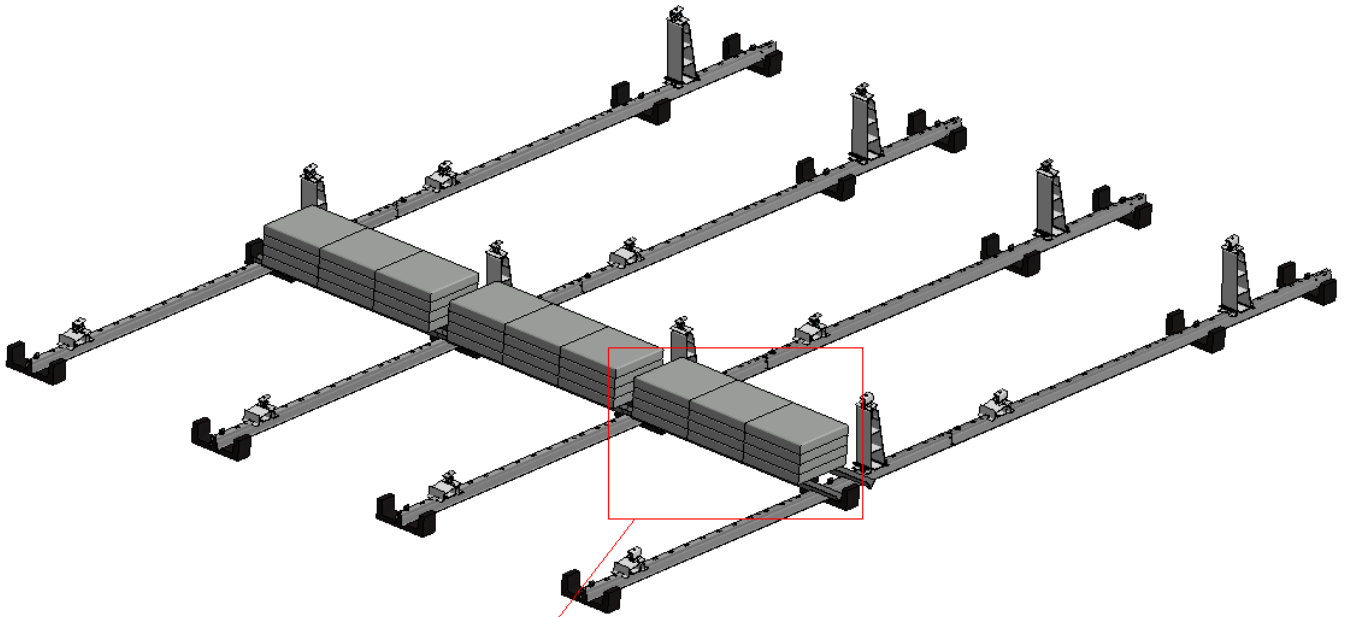



Max. no. of tiles on rubber tile carriers: 4,5 tiles (40,5 kg)

## Mass carriers

In case the required ballast is more than 4,5 tiles or if the ballast cannot be placed due to side plates, mass carriers are required. The mass carriers are placed on both sides of the rubber tile carrier. The mass carriers provide the support for the tiles (see image 2.2).

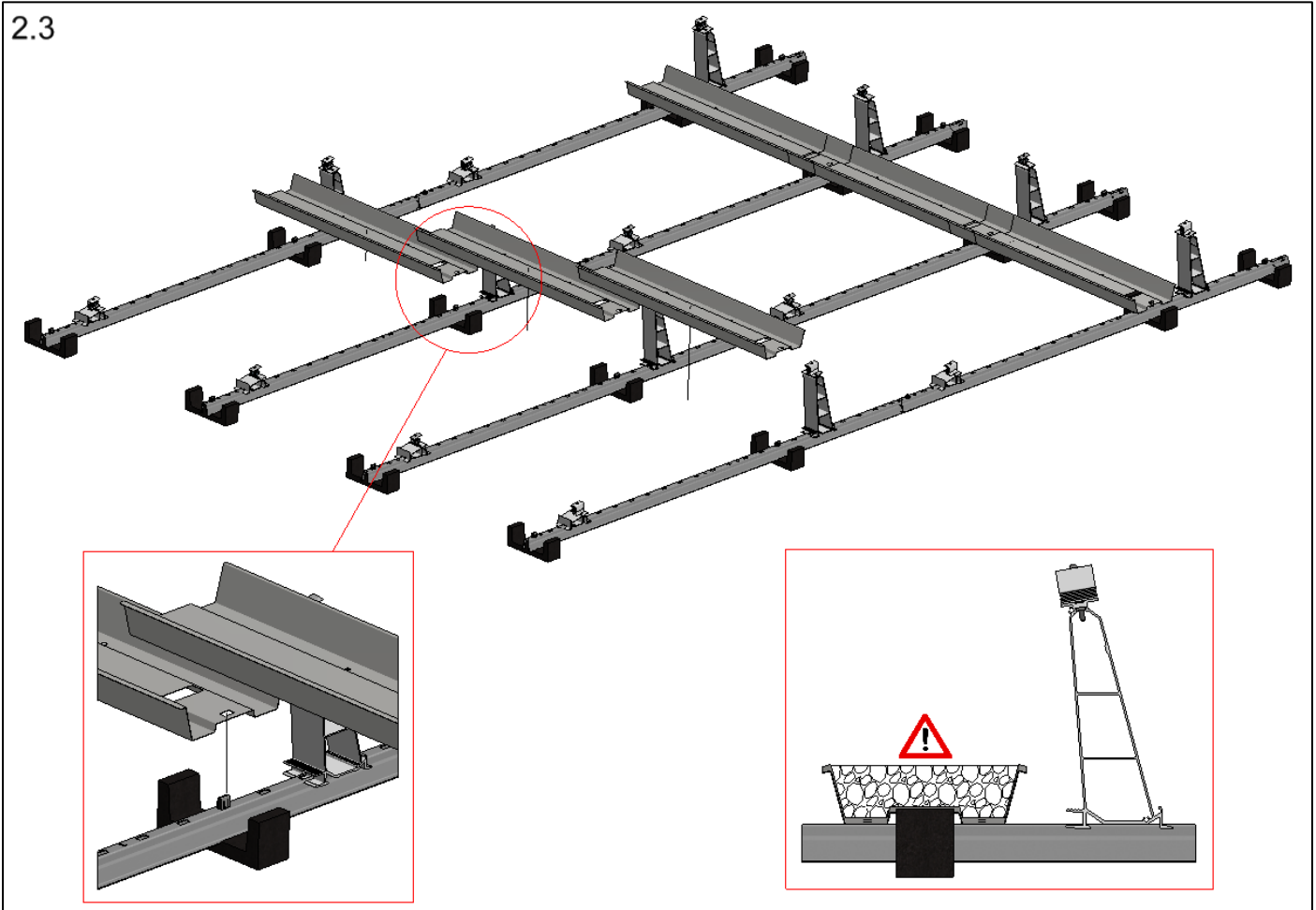
2.2



 Max. no. of tiles on mass carriers:  
12 tiles (108 kg)

## Ballast trays

In case gravel (coming from the roof on which the system is placed) or pavers are used for ballast, ballast trays can be applied. The ballast trays are placed over the roof carriers. The slots in the ballast trays on one side will fit the rubber tile carriers so that the ballast trays cannot move. The other side of the ballast tray can be placed in the next ballast tray.



The max load per tray in case it is filled to the maximum with gravel:

Art. 742620 (1160 mm) – Max. 24,7 kg (of 0,0165 m<sup>3</sup>)

Art. 742621 (1360 mm) – Max. 29,0 kg (of 0,0193 m<sup>3</sup>)

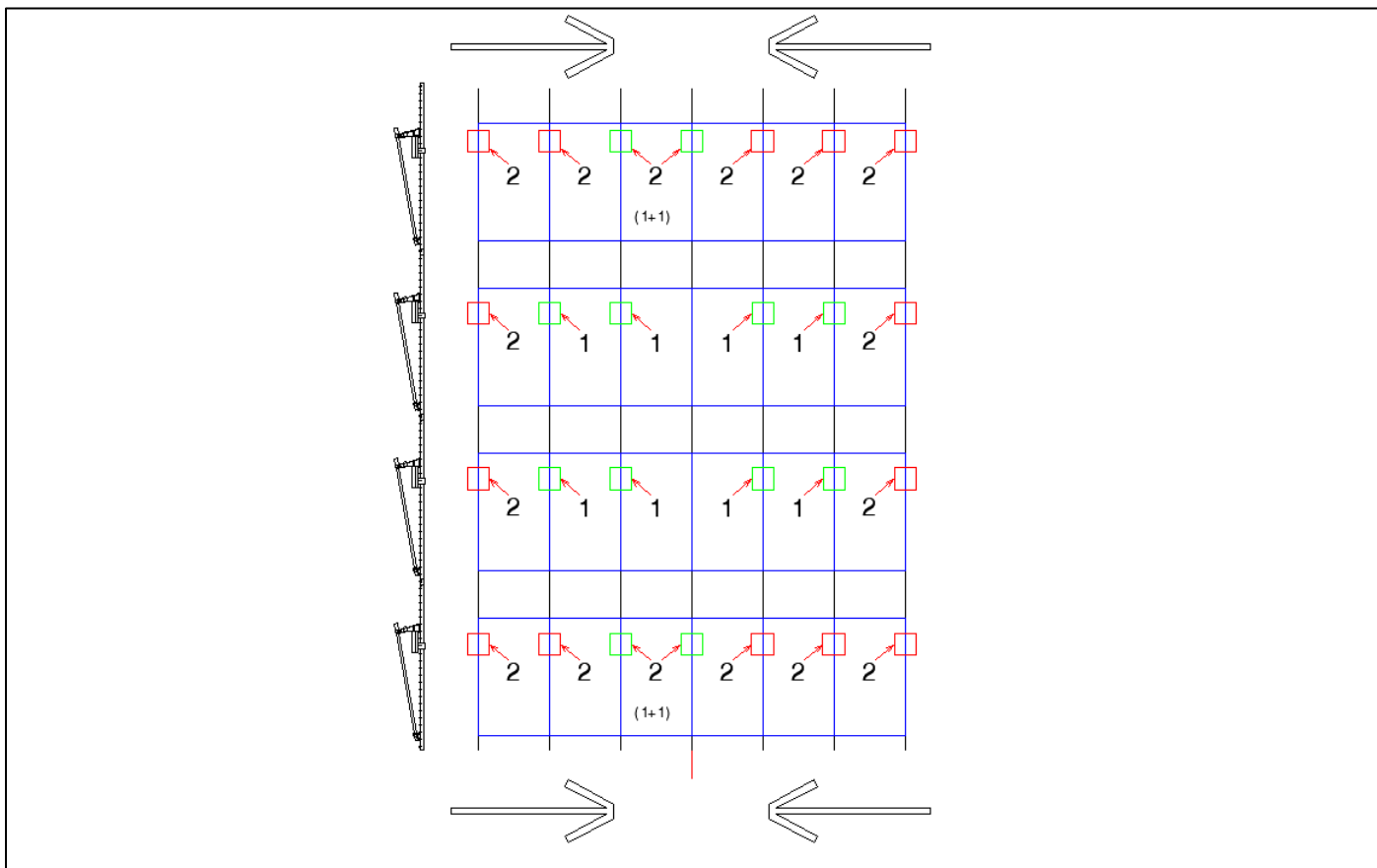
Art. 742622 (1560 mm) – Max. 33,3 kg (of 0,0222 m<sup>3</sup>)

In the calculation above a gravel density of 1500 kg/m<sup>3</sup> is used.

## Distributing ballast

The ballast is placed according to the ballast plan in the project report. The project report indicates the required ballast per panel. Without mass carriers the ballast is to be divided over the ballast points under the individual panel. The next image shows how the ballast should be divided over the different ballast points.

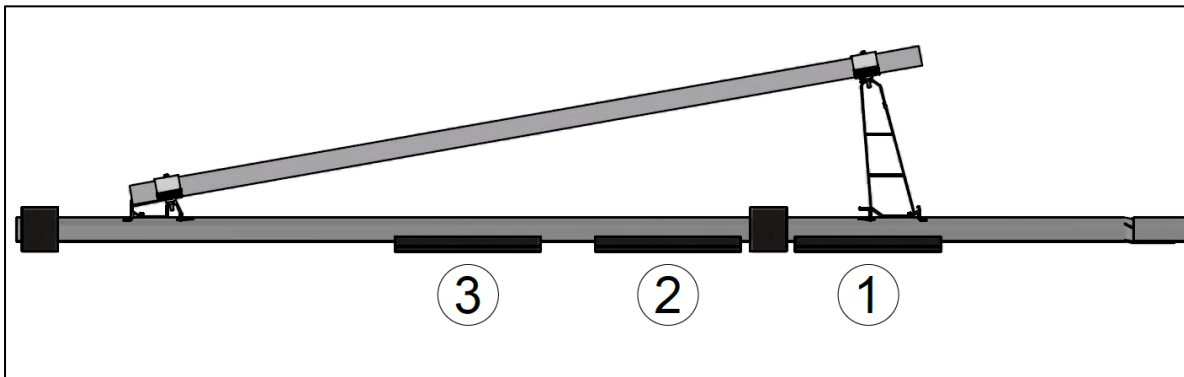
**PLEASE NOTE! Image below is an example.**



The required number of tiles is indicated per panel (same as the project report). The ballast is always placed starting from the outside toward the centre of the system. Therefore the middle row of the system doesn't have any ballast (see red line). If possible there may be ballast placed on those foundation points as well.



When using the rubber pressure dividers, it is important that these are placed in the correct positions. The numbers in the image below represent the order of the pressure dividers when using 1, 2 or 3 pieces. For more information, please refer to the datasheet.

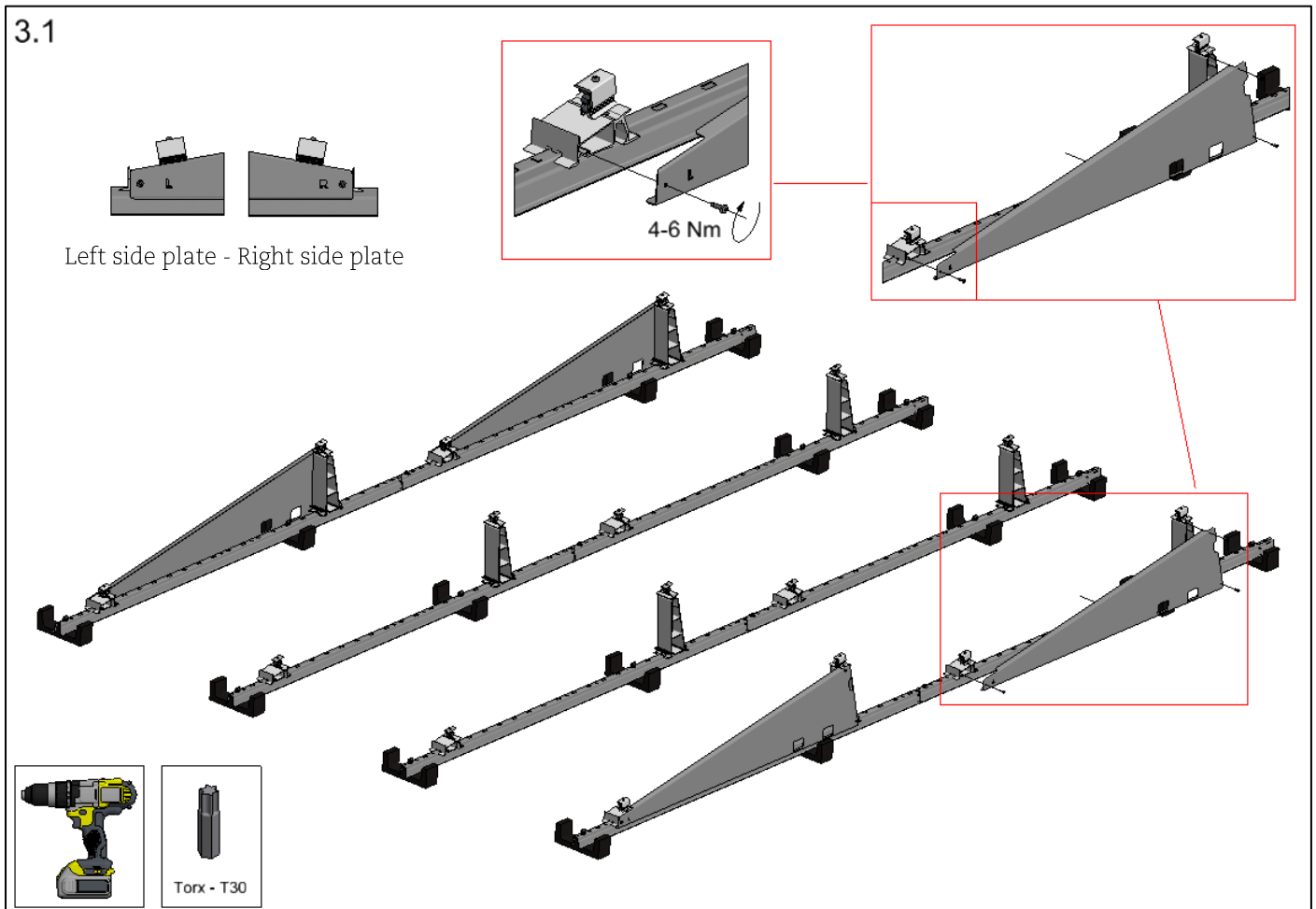


## Mounting side plates

The use of side plates is optional, in case the mounting system is placed in the middle zone of the roof. Side plates are mandatory in case the following is applicable:

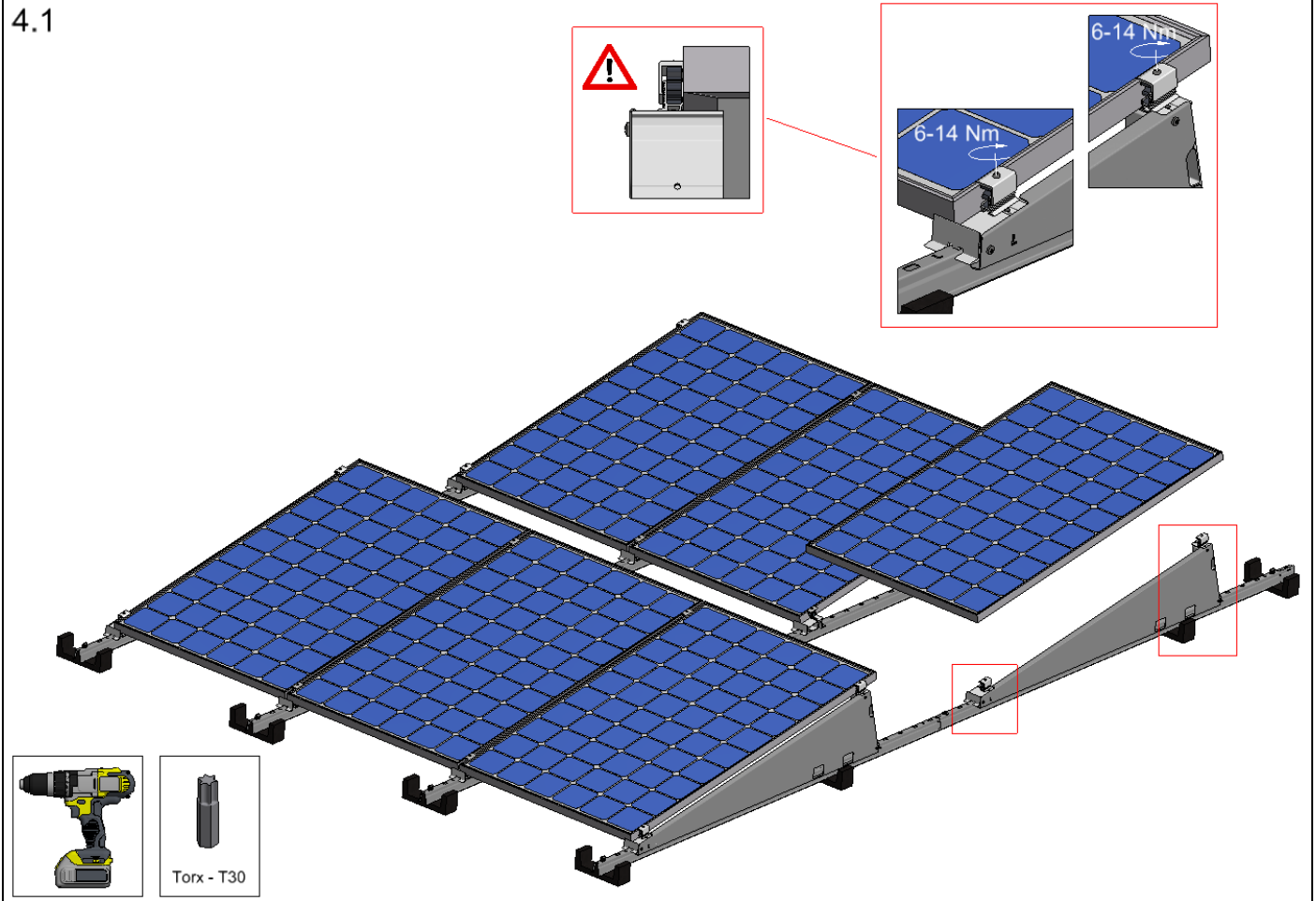
- The mounting system is partially placed in the edge / corner zones of the roof.
- Roof height is 25m or higher

Each side plate is fixed to the sides of the aluminium feet using three thread forming bolts M6 x 10 mm. (see image 3.1)

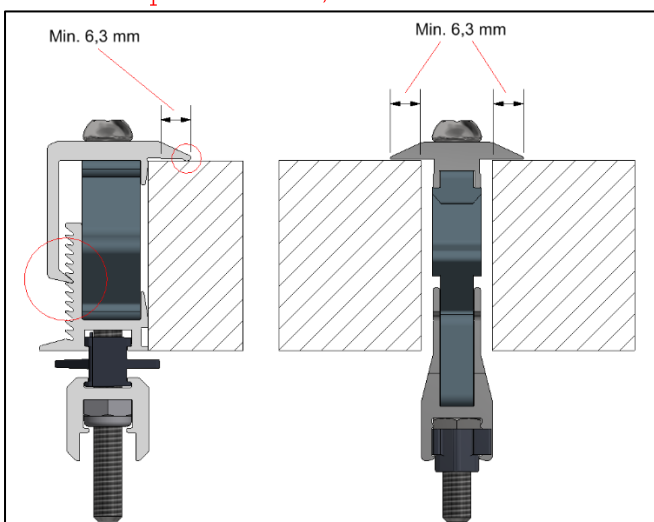


## Placing panels

Place the PV-panels under the clamps and make sure ALL the panel clamps are securely fastened.



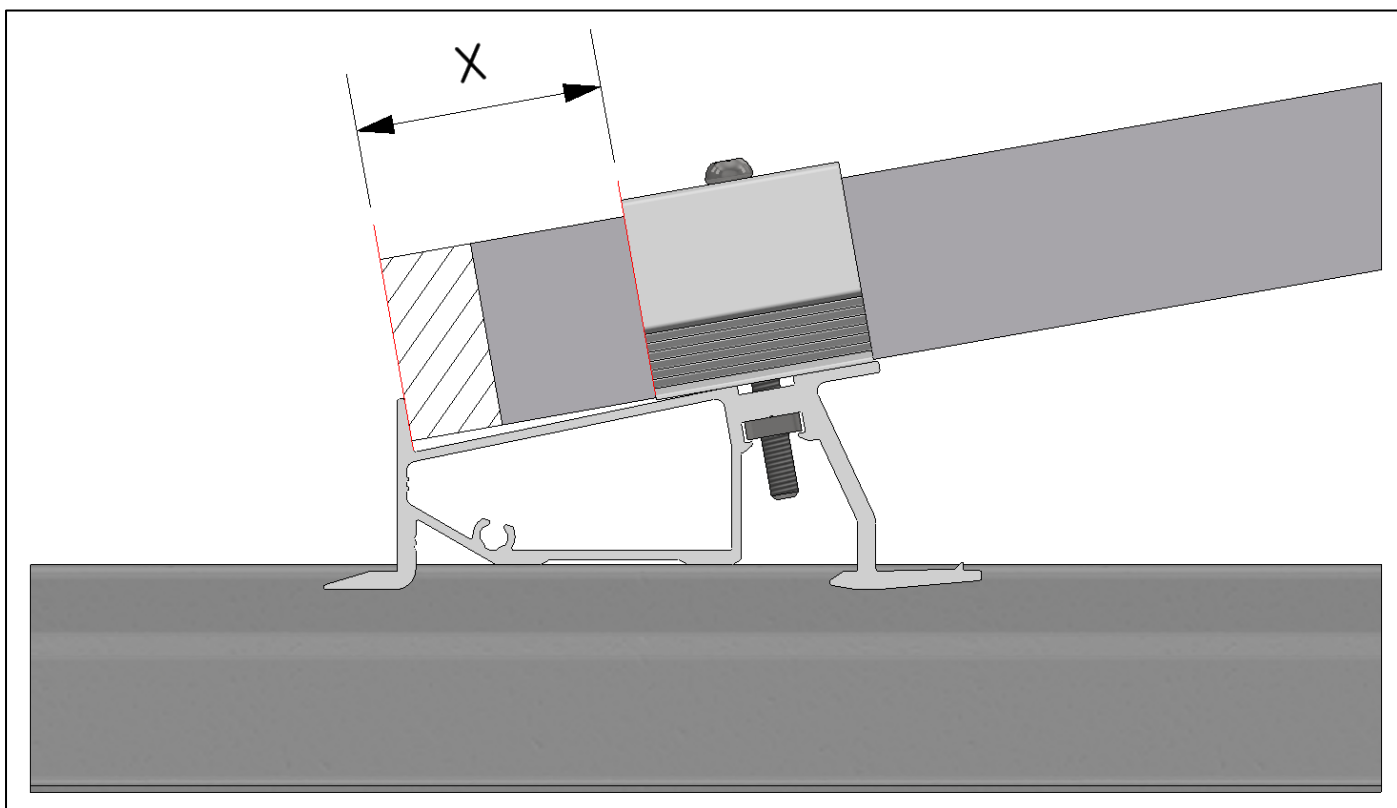
Make sure the end clamps are placed in the correct height slot, corresponding with the panel frame thickness, before they are fastened. The clamps must have an overlap of at least 6,3mm with each panel frame, in order to ensure full clamping force.



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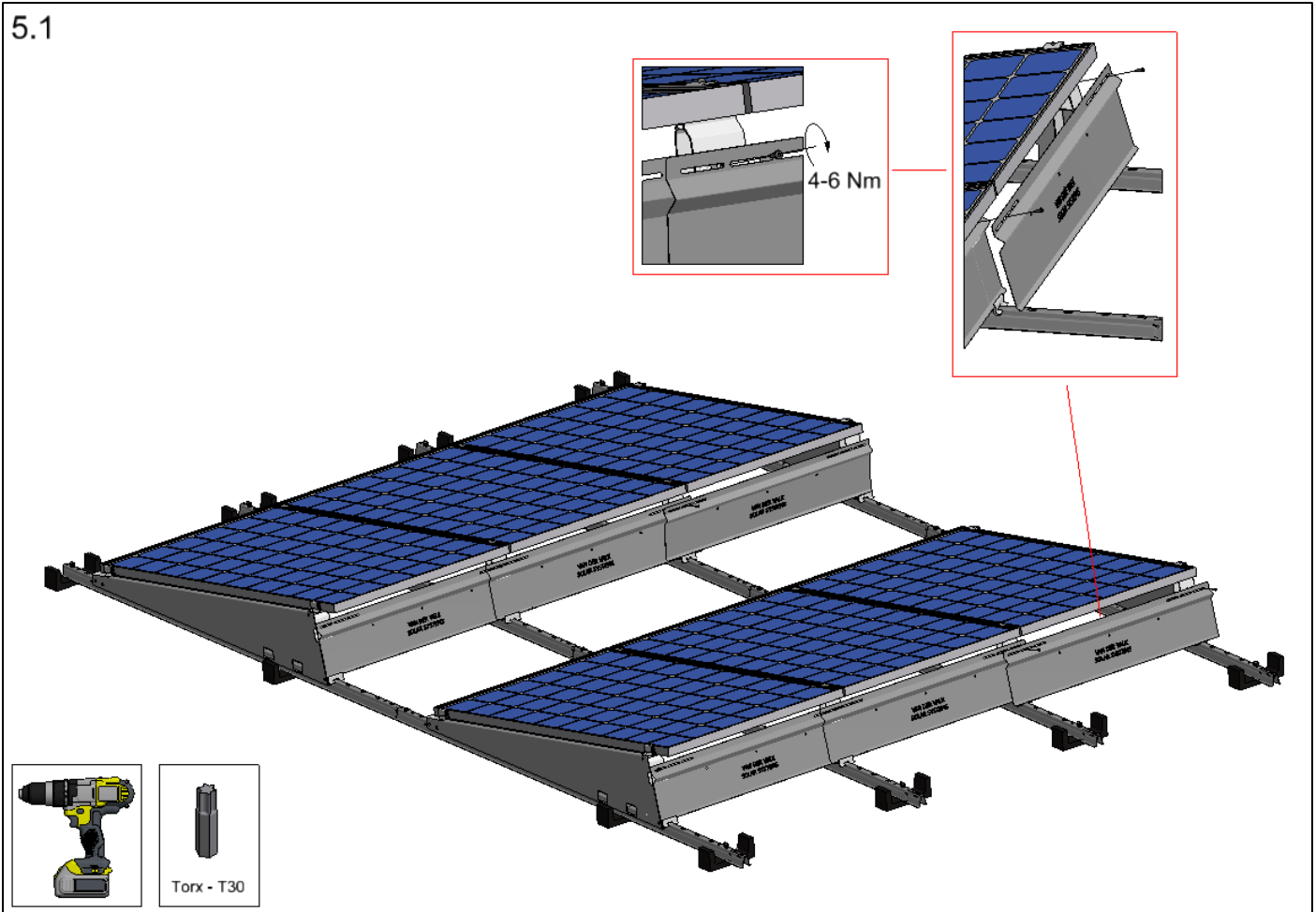
The front foot is designed with an upstanding edge, which makes it easy to align the PV-panels, when the frames are placed against this edge. This is not mandatory however. In case it is not possible to place the panels against the edge, it is ok as long as the side of the frame is still positioned in range X. The ValkPro+ system will then still apply enough clamping force on the panels.



## Mounting back panels

Each panel is provided with a back panel. The back panels are placed in the back feet and are fastened with the thread forming bolts. Also the back panels that overlay each other are fastened with 1 thread forming bolt.

5.1

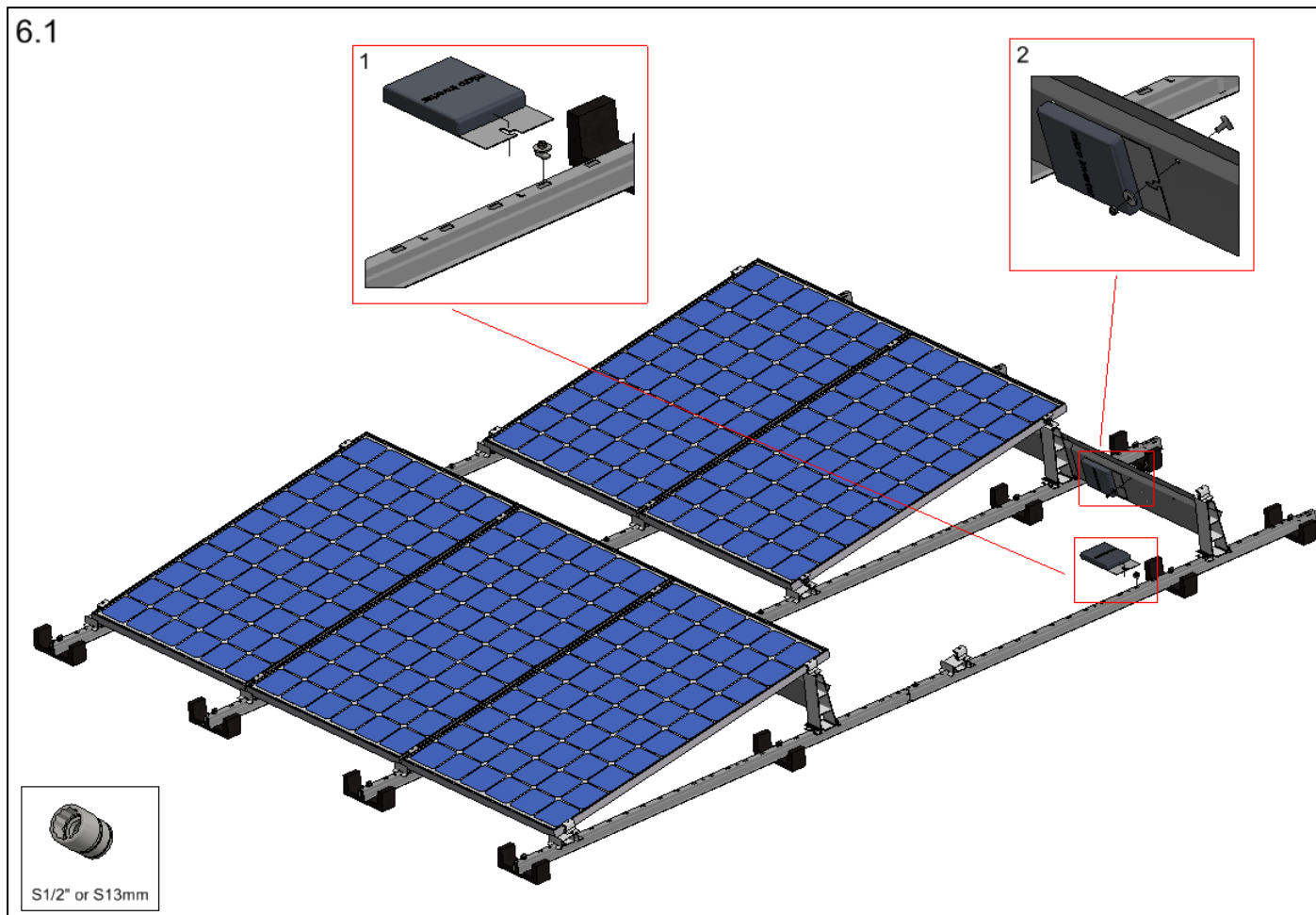


## Mounting micro inverter clamps

The micro inverters will be fastened with the coupling pieces that are used to couple the roof carriers (774221). There are 2 locations where the micro inverter can be mounted.

First location: the micro inverter is mounted to the back panel. (see image 6.1, detail 1)

Second location: The micro inverter is mounted on the roof carrier. (see image 6.1, detail 2)

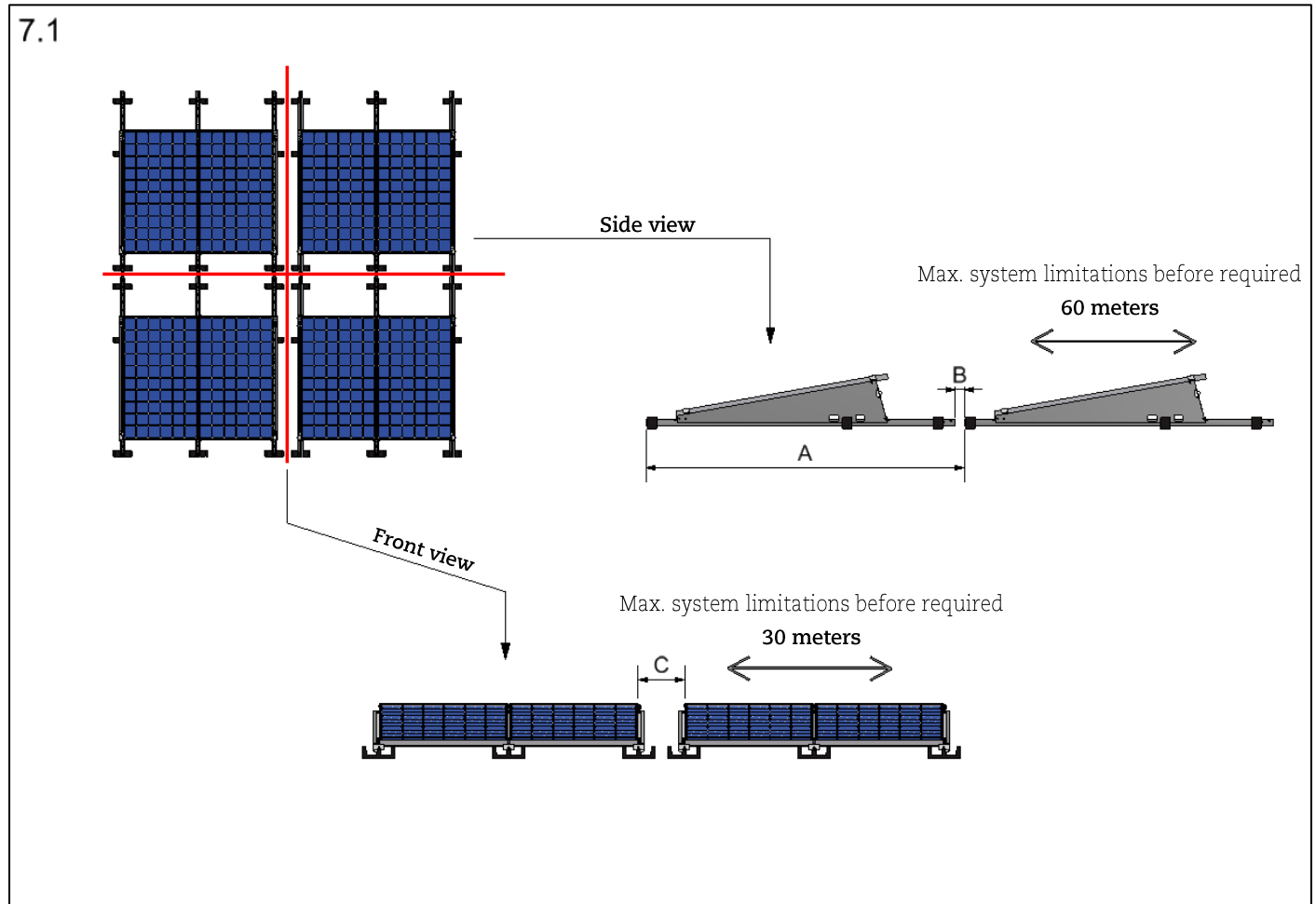




## Dilatations

The ValkPro+ system has certain measurements that may not be exceeded due to thermal expansion/contraction. If these measurements are bigger than allowed the system must be dilated. The required distance for the dilatations is shown in image 7.1.

Once the system has a dilation the system is now seen as 2 separate systems. If the dilatations are not too big some parts of the system can still be calculated as 'shielded panels'. (shielded panels have less ballast than the exposed panels)



The dimensions below refer to the distance limitations of the dilatation for the outer panels of the system to be 'shielded'. In case these distances are longer, the outer panels of the system, need to be seen as 'exposed', which means more ballast needs to be placed, compared to 'shielded' panels.

### **Dimension A:**

For pitch 2100mm - [min. 2220 mm and max. 2500 mm]

For pitch 2200mm - [min. 2320 mm and max. 2500 mm]

For pitch 2300mm - [min. 2420 mm and max. 2500 mm]

For pitch 2400mm or larger, the outer PV-panels are automatically 'exposed'.

### **Dimension B:**

For pitch 2100mm - [min. 37 mm and max. 317 mm]

For pitch 2200mm - [min. 37 mm and max. 217 mm]

For pitch 2300mm - [min. 37 mm and max. 117 mm]

For pitch 2400mm or larger, the outer PV-panels are automatically 'exposed'.

### **Dimension C (distance between the frames of the PV-panels):**

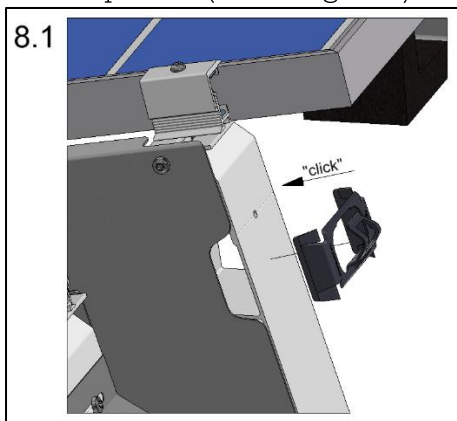
Min. 350 mm and max. 500 mm

**VAN DER VALK**



## Cable management

The ValkPro+ system offers various options to handle the electrical cables and connectors in a safe and neat way. The first option is to use plastic cable clamps that are mounted on the aluminium back feet. The cable clamps are simply “clicked” on the aluminium feet and the cable can be placed (see image 7.1)



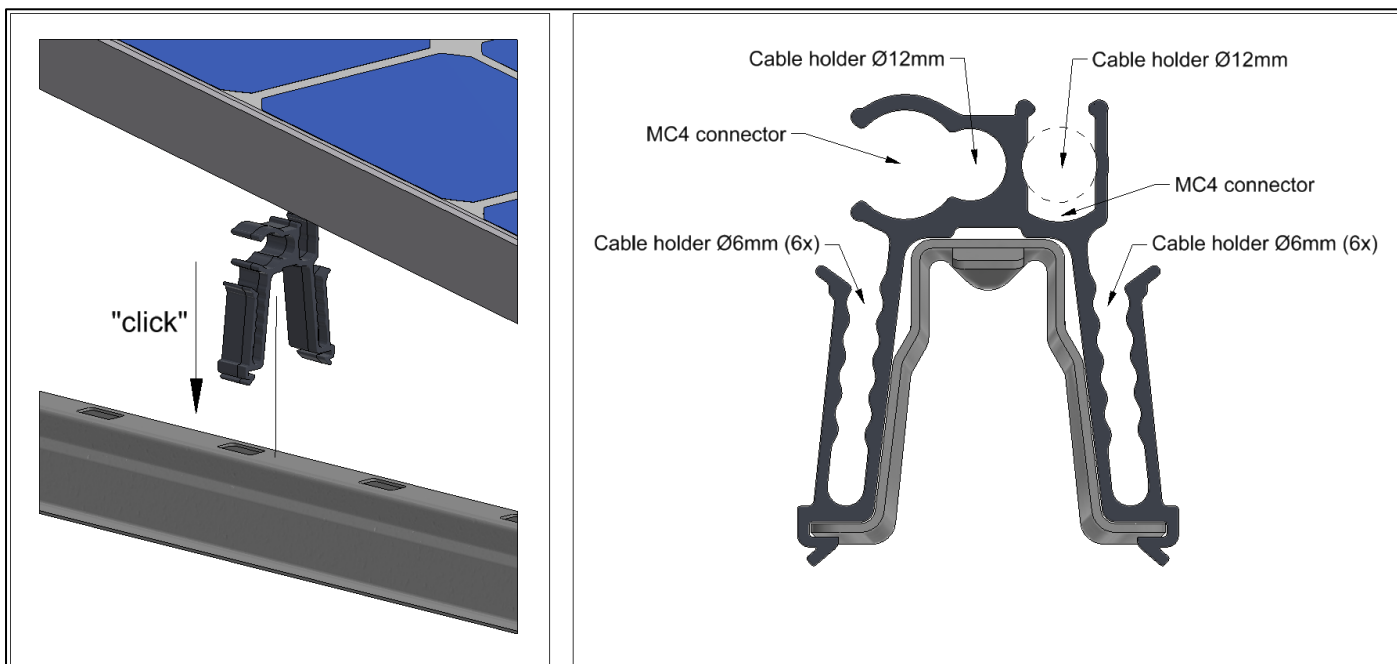
The cable clamp provides space for:

- 5 cables - Ø6mm
- 4 cables - Ø7mm
- 3 cables - Ø9mm

### Multi-cable and connector clip

This clip can be placed over the roof carrier in any desired location. It has multiple options to hold various MC4 connectors and cables:

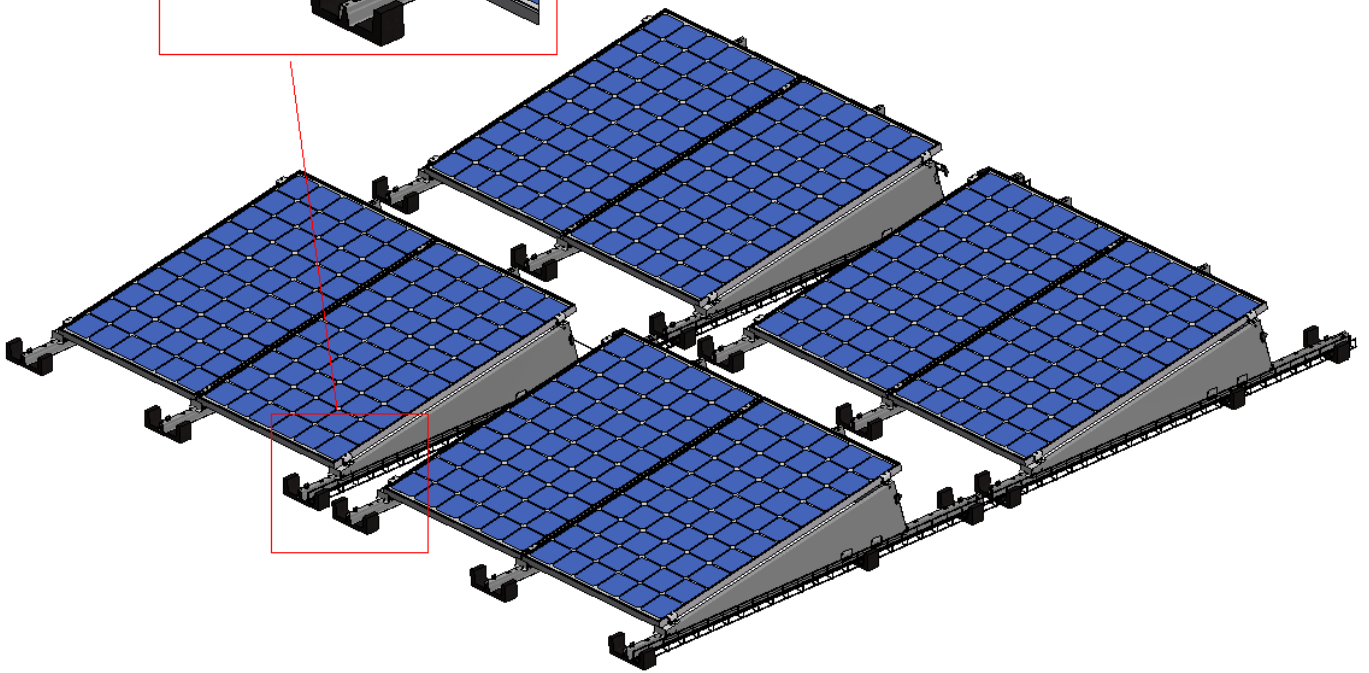
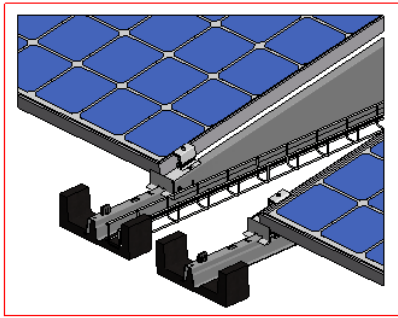
- 2x MC4 connector holder
- 2x Cable holder Ø12 mm (DC/AC)
- 12x Cable holder Ø6 mm



Cable baskets can be nicely integrated in the ValkPro+ system. ValkCableCare cable baskets with dimensions 50x60mm fit on both sides of the roof carrier and can be placed in the spaces of the tile carriers (see image 7.2).

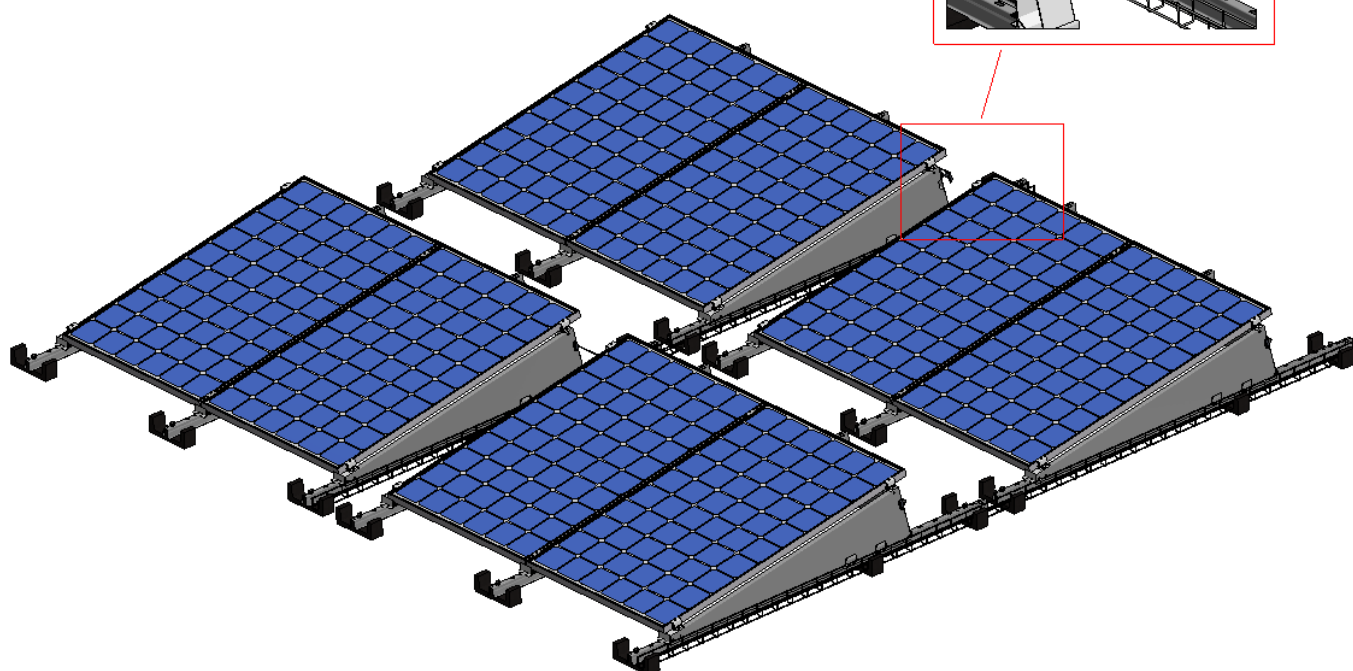
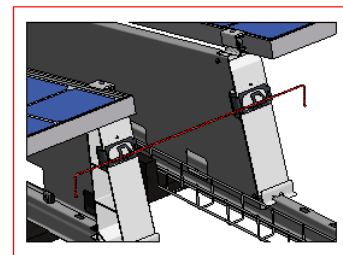
Please note: in case mass carriers are used, it is not possible to place the 50x60mm cable baskets in the inside position (under the PV-panel) next to the roof carrier.

8.2



In positions where there is a dilatation in the system, a metal dilatation wire (732020) can be used. This wire can be placed in the cable clamps and the length can absorb the thermal expansion of the coupled system. The electrical cables can be fixed to the wire using tie-wraps. This keeps the cables free from the roof surface.

### 8.3



## Special surfaces

The ValkPro+ system can be placed on a range of different surfaces, besides the “normal” roof coverings. Each surface requires a different foundation method. In this section of the manual the foundation methods for each surface are shown.

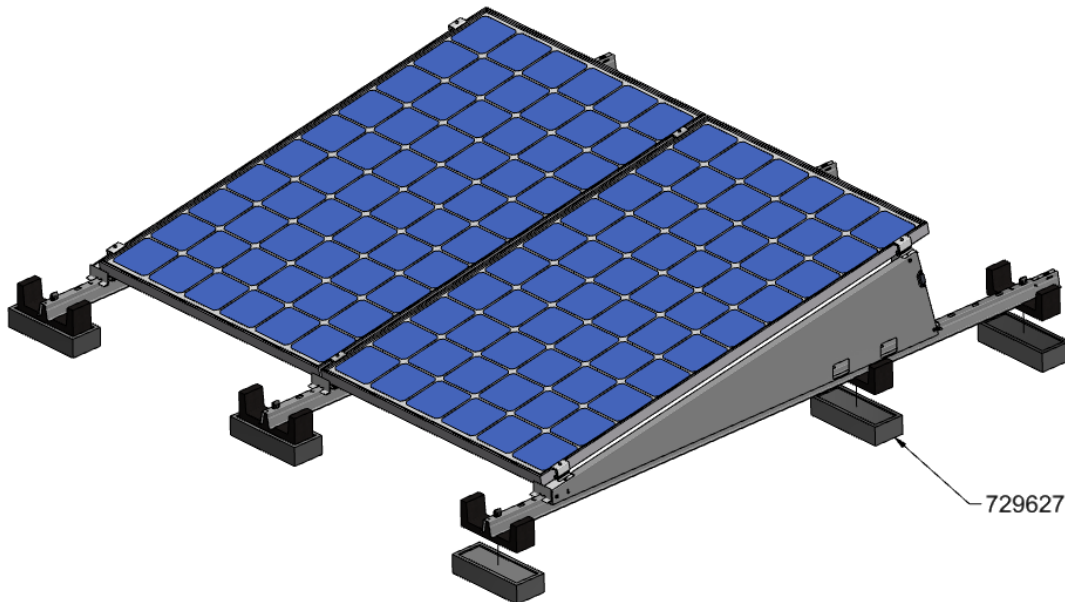
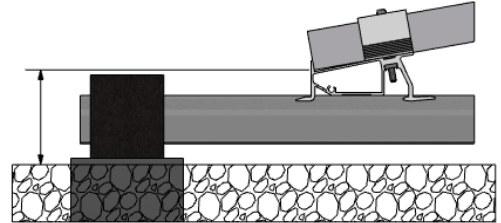
### Gravel roofs:

In case the roof is covered with gravel the system can be elevated using rubber elevation blocks (729627). It is important to ensure the distance between the gravel and the lowest part of the PV-panel is always between 95,5 - 115,5 mm.

9.1

Min. 95,5mm - Max. 115,5mm

Gravel roof



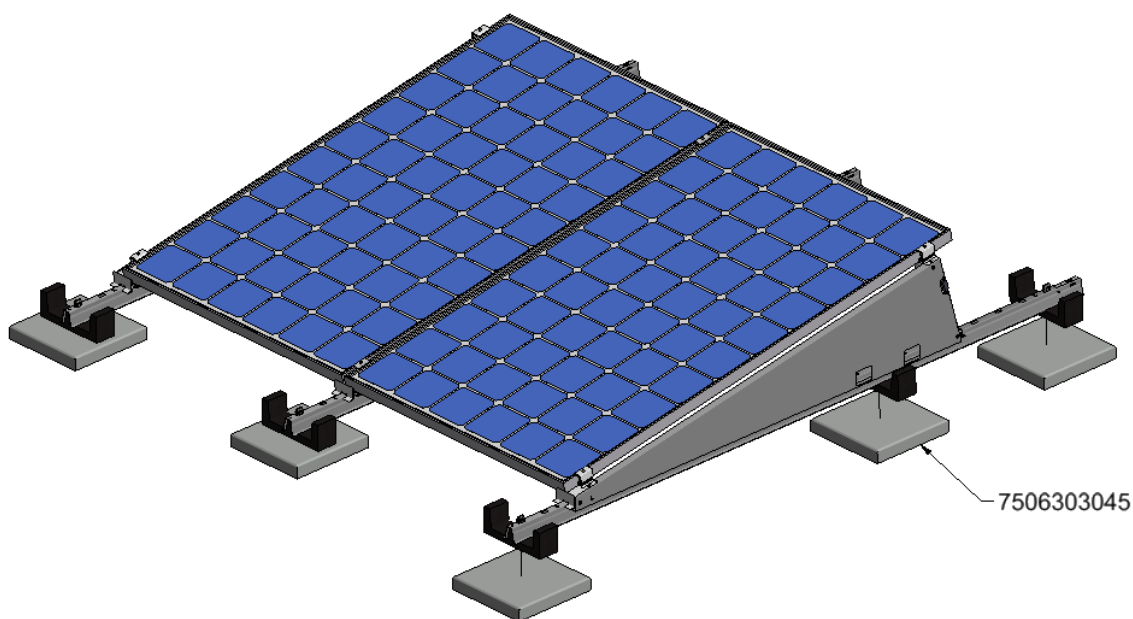
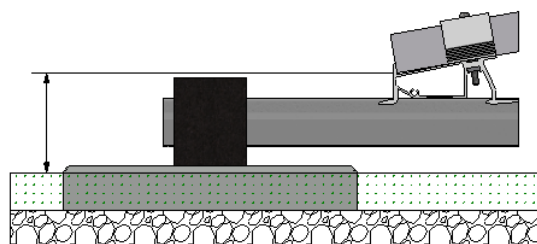
## Sedum / green roofs:

For sedum / green roofs the advice is to first place tiles (7506303045) in the sedum, to support the tile carriers of the ValkPro+ system. The tiles will better distribute the point loads and prevent the system from sinking into the vegetation. It is important to ensure the distance between the sedum and the lowest part of the PV-panel is always between 95,5 - 115,5 mm.

9.2

Min. 95,5mm - Max. 115,5mm

Sedum / green roof



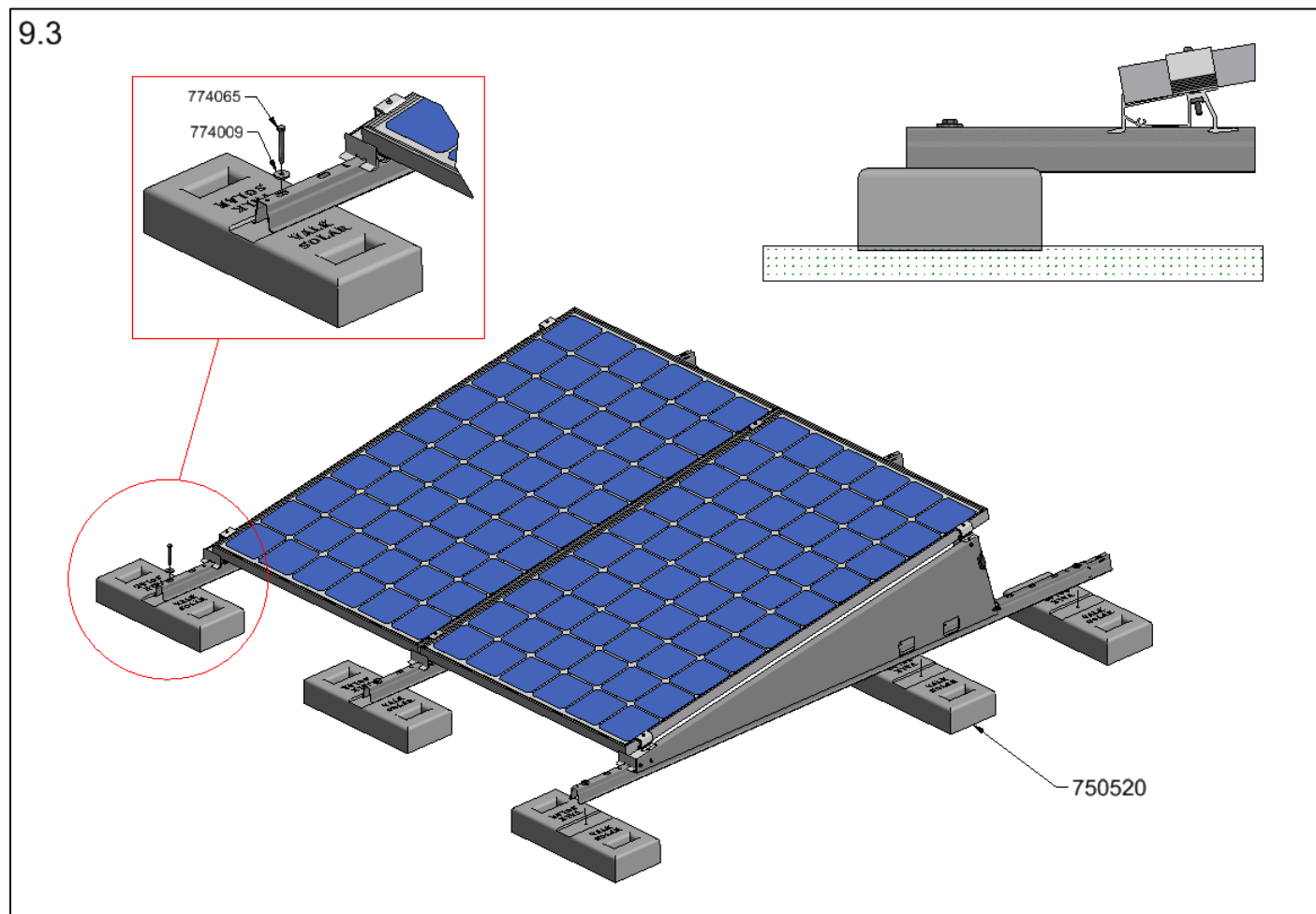


### ValkPro+ as a field system:

The ValkPro+ system can be placed on the ground as a field system. For this method the system is mounted on top of concrete mass blocks (750520). These mass blocks are fixed to the roof carriers with a stainless steel M8x65 bolt and washer (774065 + 774009).

A demand for the ValkPro+ system as ground mount is that the surface should be levelled. This can be done with the following options:

- To place the system on a hard surface, such as pavement or concrete slabs (Stelcon)
- To place the system in a field we advise the ground to be levelled and quaked to a flat surface. Also a high quality rooting membrane should be placed which is covered with gravel, this prevent the spread of weeds. The gravel protects the rooting membrane against UV radiation which expands the life span of the rooting membrane. Keep in mind that the foundation point must be placed between the gravel and not on top of it.



ValkPro+ as a field system can not be calculated with the ValkPVplanner software. Please contact Van der Valk Solar Systems to calculate your project.

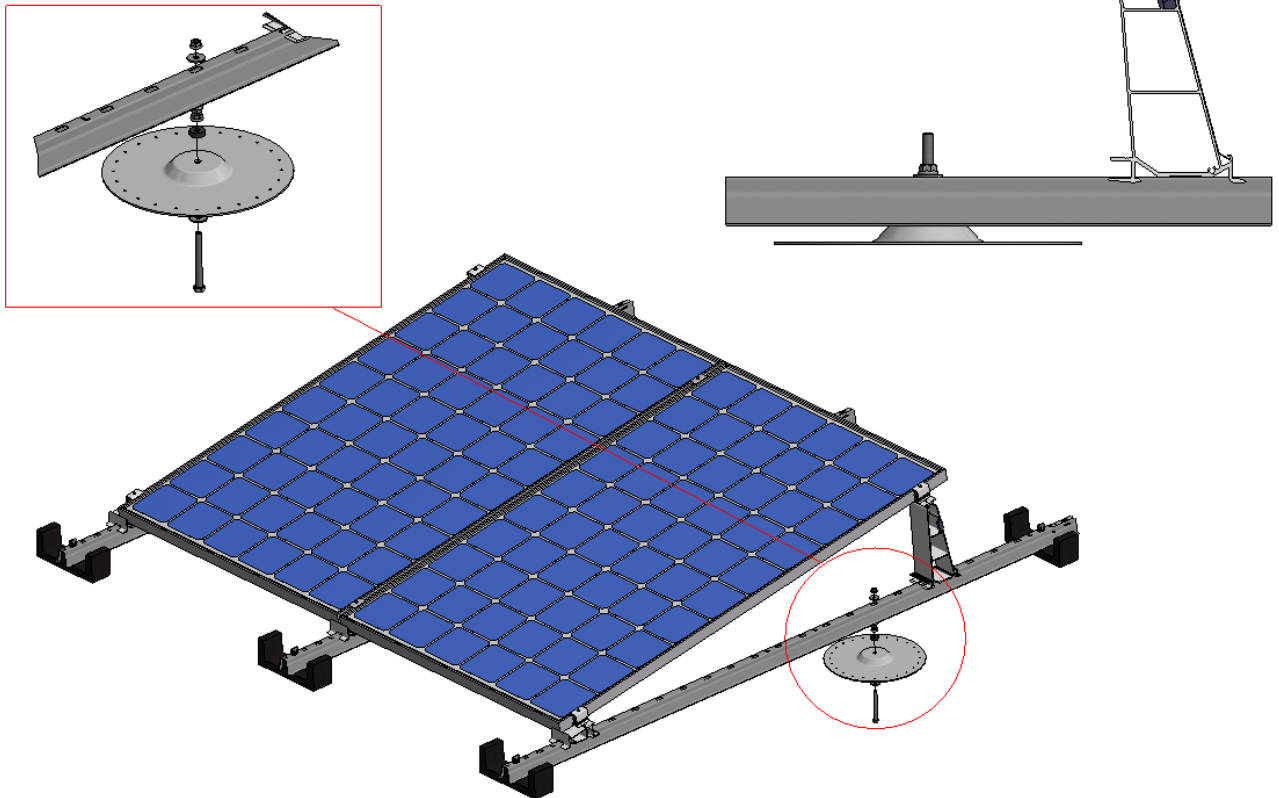
## ValkSolarFix:

The ValkPro+ system can be mechanical fixed to the roof. This can be done with the ValkSolarFix consoles. The consoles with special height of 20mm can be fixed to the roof with:

- Toggle anchor
- Concrete anchor
- Roof screw for fixation in wood
- Roof screw for fixation in steel
- Roof screw for fixation in aerated concrete

For the detailed mounting of a specific ValkSolarFix anchor, please refer to the manuals that can be downloaded from our website: <http://www.valksolarsystems.com>.

9.4

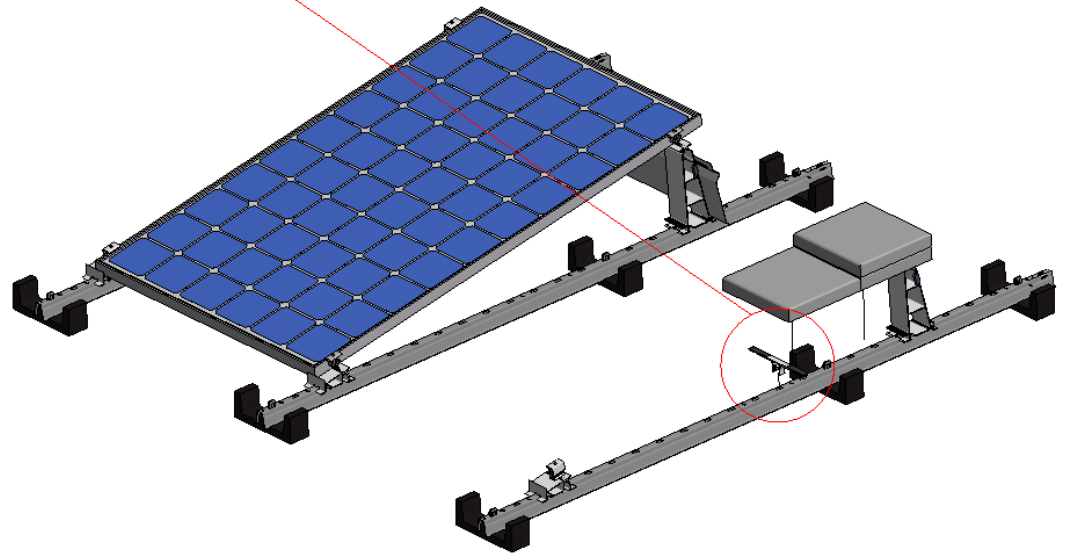
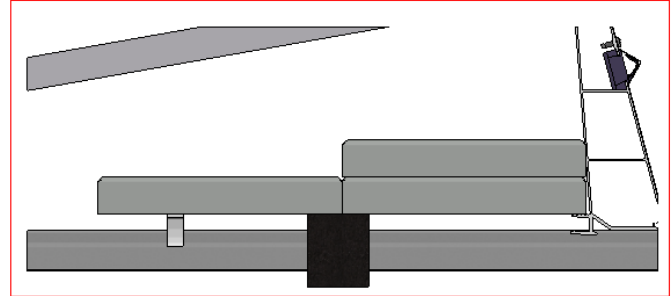
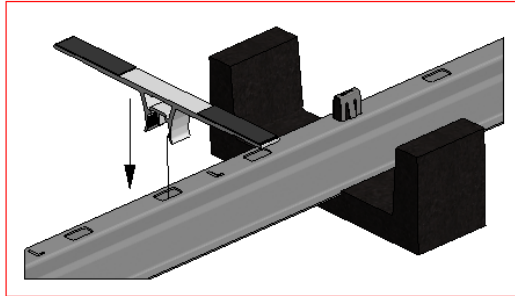


### Ballast wings:

When non-standard or larger tile sizes are used for ballast and mass carriers are not ideal, ballast wings can offer a solution. In combination with the rubber tile carriers the ballast wings can provide additional support for the tiles.

The ballast wing is mounted by placing it over the roof carrier above a free hole and push it downwards.

9.5





# Van der Valk Solar Systems

Van der Valk Solar Systems is since 2009 one of the fastest growing companies in the solar industry and focuses entirely on the development and production of solar mounting systems for pitched roofs, flat roofs and open fields. Van der Valk Solar Systems also has an office and warehouse in the UK, offices in Sweden and Spain and is currently active in 13 countries.

Our mounting systems are developed and produced in our own factory in the Netherlands and stand out thanks to their broad area of application, the very short time in which they can be installed, and the high quality. They are developed according to the latest Eurocodes and therefore comply with the requirements defined for solar systems by banks and insurance companies.

Van der Valk Solar Systems is part of family-owned company Van der Valk Systemen, which has been a household name in the field of moving systems and mounting components since 1963.

Our shared industrial complex consists of 20,000m<sup>2</sup> of offices and factory spaces. Here we use modern machinery and the latest technologies to quickly and accurately develop, manufacture, and test products and systems.



## Solar mounting systems & cable management



Flat roofs



Pitched roofs



Cable management

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