



Project information

Project name

FVE Černý Most Praha

Company

OK Photo Energy

Project location

**41, Kpt. Stránského 958, 198 00 Praha 14-
Černý Most, Tsjechië**

Project reference

DC Power

98,6 kWp

Module quantity

232 pcs

Brand/type of solar panel

CSI Solar 425Wp

Dimensions/weight solar panel

1 722 x 1 134 x 30 mm / 23 kg

Creation date

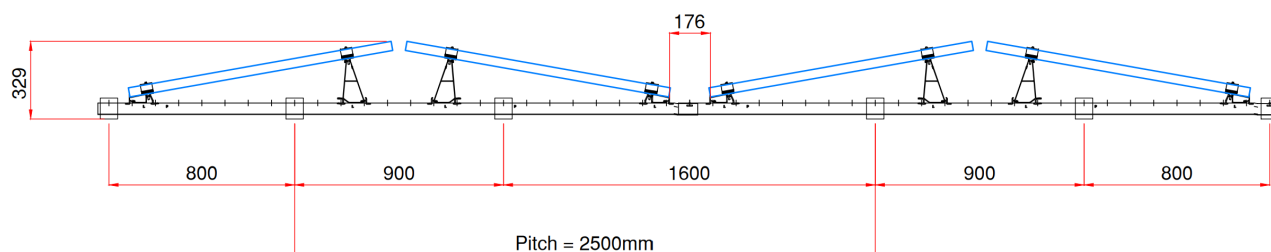
25 September 2024 at 11:56



System specification

ValkPro+ L10 East-West

System type	ValkPro+	Foundation	Tile carriers
Orientation	Landscape	Colour	Grey
Module tilt	10°	Side plates	No
Row pitch	2 500 mm		





Wind and snow load

Country

Eurocode Default

Standard - Wind actions

EN 1991-1-4:2005

EN 1991-1-4/AC:2010

EN 1991-1-4/A1:2010

Basic Wind Speed $V_{b,0}$

22,5 m/s

Standard - Snow loads

EN 1991-1-3:2003

EN 1991-1-3/AC:2009

EN 1991-1-3/A1:2015

Snow load zone

0.7 kN/m²

Height above sea level

234,16 m

Design lifetime

25 years

Consequence Class

CC1 (EN 1990)

Orography factor

$C_o = 1,000$





Terrain category



Terrain category 2

Area with low vegetation such as grass and isolated obstacles (trees, buildings) with separations of at least 20 obstacle heights



Highest building (m)

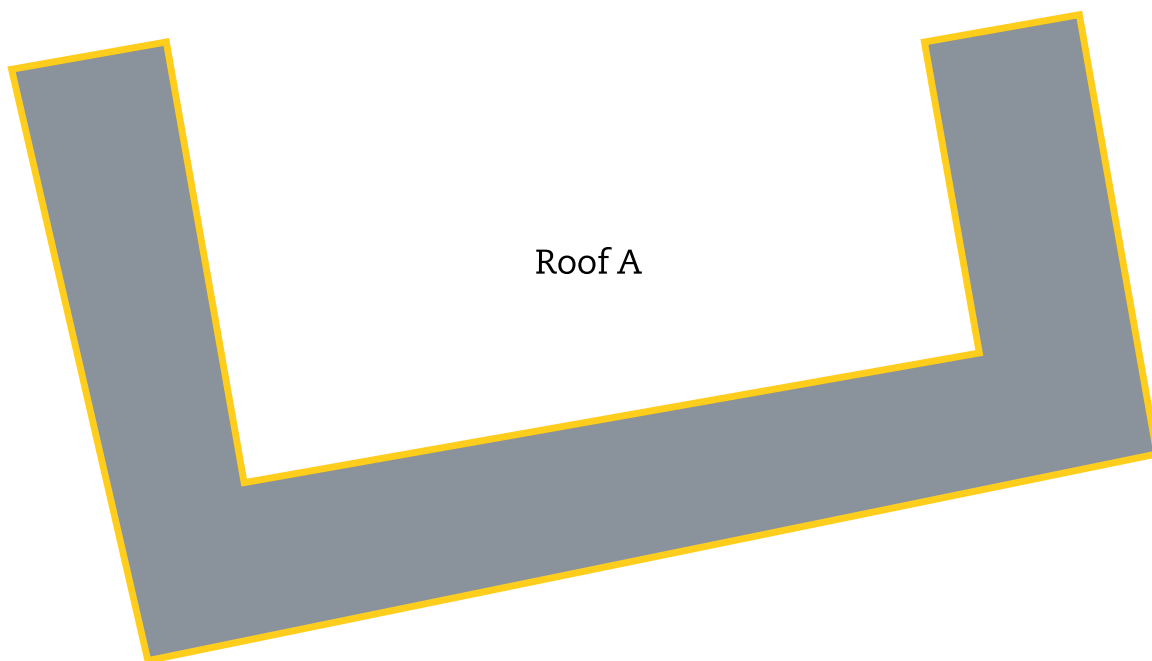
27,00 m

Perimeter radius (m)

500



Project overview





Roof A | Summary

Roof properties

Height	27,00 m	Roof area	2 650,7 m ²
Slope	0°	PV-system area	502,3 m ²
Roof type	Flat	Cladding	Membrane roof
Parapet height	0,30 m	Roof membrane type	BITUMINOUS
Parapet width	0,30 m	Number of panels	232 pcs
Friction coefficient	0,6	Power	98,60 kWp

Eurocode calculations

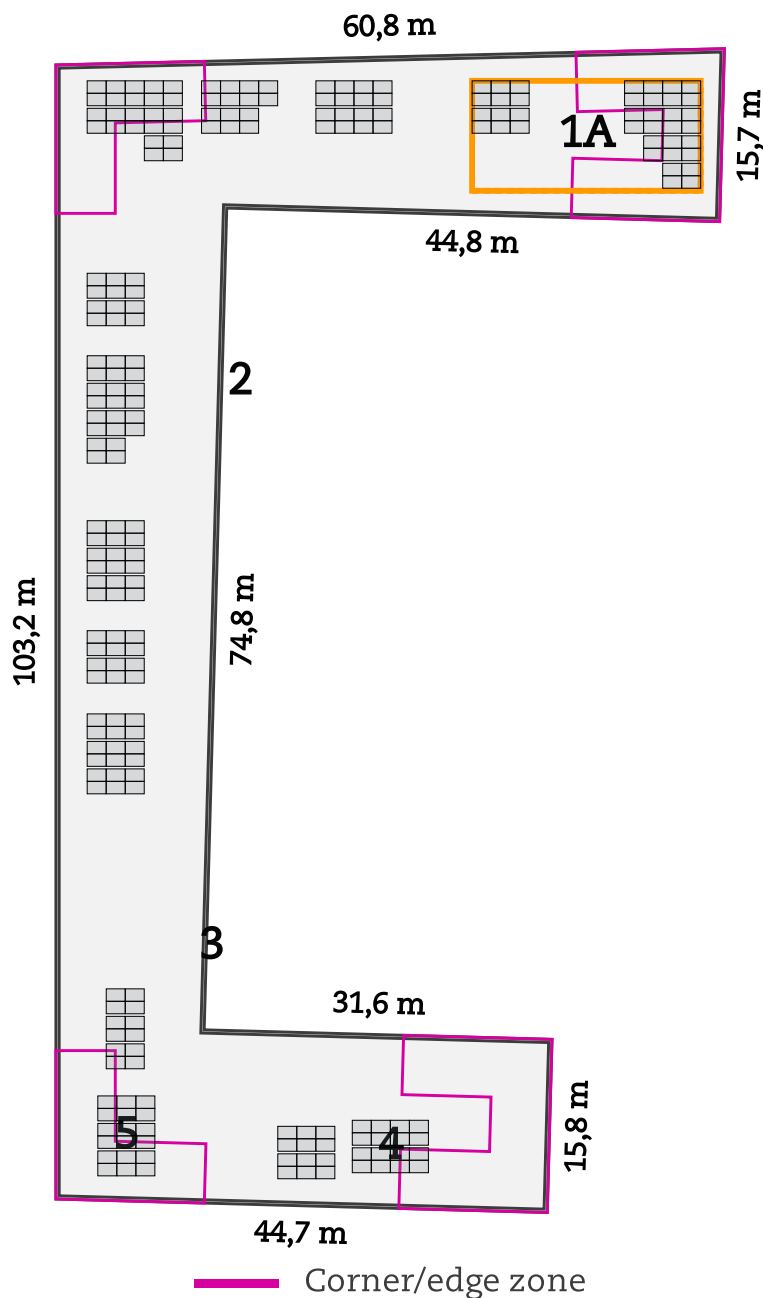
Peak wind velocity pressure	881,9 N/m ²	Combination factor for wind load	0.6
Characteristic snow load	625 N/m ²	Combination factor for snow load	0.5
Min. point load on roof	0 N/m ²		
Max. point load on roof	15 N/m ²		

Weight calculations

Weight of solar panels	5 336 kg	Average weight on roof area	5,2 kg/m ²
Weight of mounting system	2 243 kg	Average weight on PV-system area	27,5 kg/m ²
Ballast weight	6 238 kg		
Total weight	13 817 kg		



Roof A | Field 1 | Solar panels

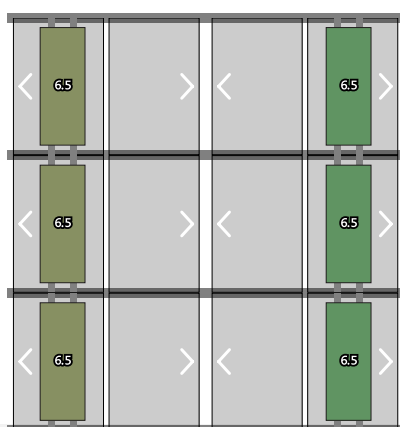
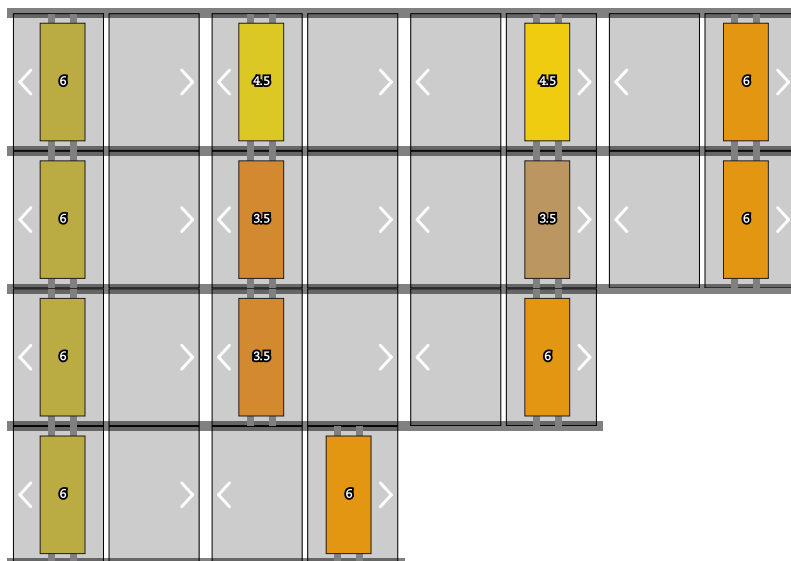


Components

Module	38 Pcs	Galv. ballast carrier ValkPro+ L=1979mm	38 Pcs
Alu rear foot ValkPro+ L10° middle	26 Pcs	Galv roof carrier L=2500x1,5mm	25 Pcs
Galv back plate ValkPro+ L10° L=1980mm	38 Pcs	Galv side plate ValkPro+ L10° universal	24 Pcs
Alu rear foot ValkPro+ L10° side	24 Pcs	SS thread-forming bolt M6x20mm - T30	72 Pcs
SS hammerhead bolt M8x20mm + lock nut	16 Pcs	Rubber tile carrier - click - ValkPro+	68 Pcs
Alu front foot ValkPro+ P/L10° middle	26 Pcs	Ballast full tiles	101 Pcs
Alu front foot ValkPro+ P/L10° side	24 Pcs	Ballast half tiles	11 Pcs

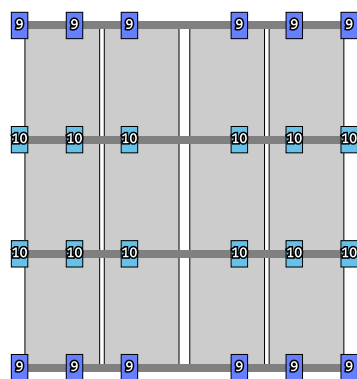
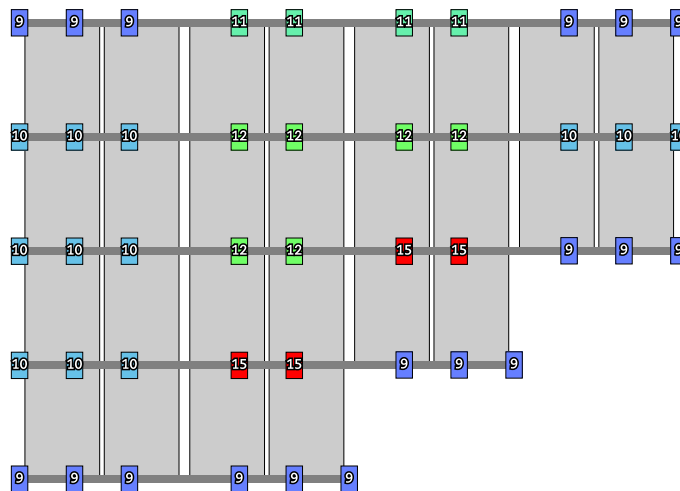


Roof A | Field 1 - part 1A | Solar panels





Roof A | Field 1 - part 1A | Point load



Legend

Point load of individual feet (system-weight)

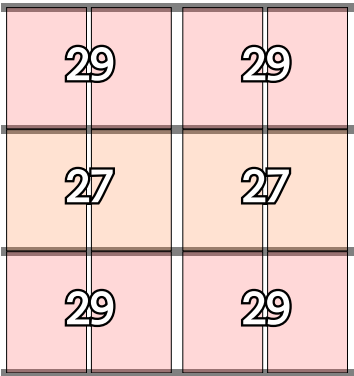
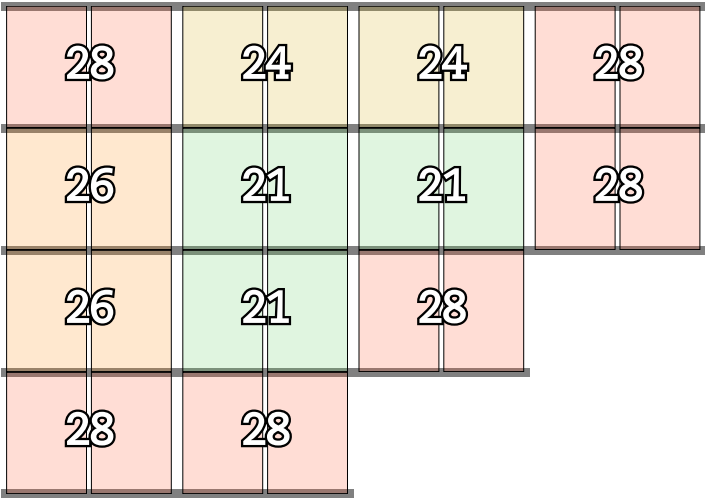
Standard feet (kPa)

Load distributor (kPa)

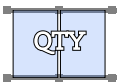
1A



Roof A | Field 1 - part 1A | Load



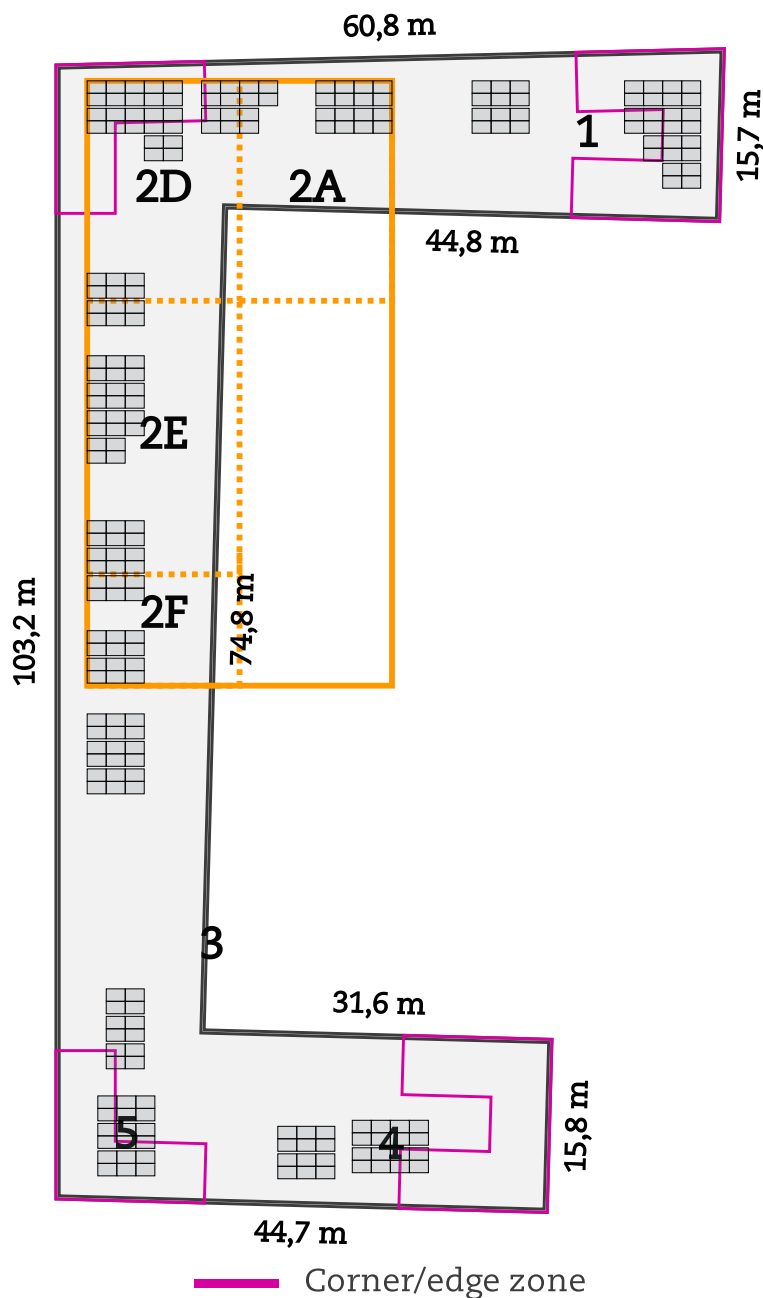
Legend



QTY = quantity of kg/m²

Max. Pressure 29 kg/m²
Avg. Pressure 26,7 kg/m²

Roof A | Field 2 | Solar panels

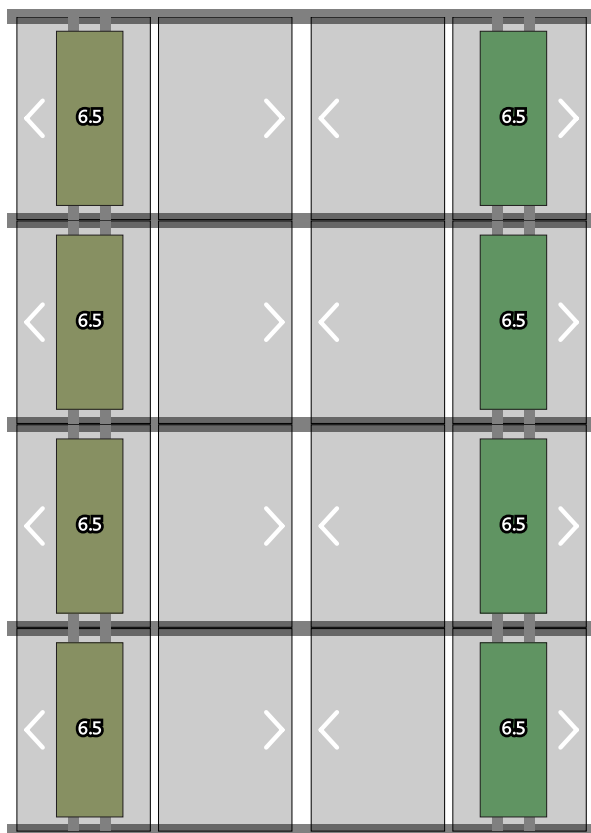


Components

Module	118 Pcs	Galv. ballast carrier ValkPro+ L=1979mm	118 Pcs
Alu rear foot ValkPro+ L10° middle	82 Pcs	Galv roof carrier L=2500x1,5mm	77 Pcs
Galv back plate ValkPro+ L10° L=1980mm	118 Pcs	Galv side plate ValkPro+ L10° universal	72 Pcs
Alu rear foot ValkPro+ L10° side	72 Pcs	SS thread-forming bolt M6x20mm - T30	216 Pcs
SS hammerhead bolt M8x20mm + lock nut	45 Pcs	Rubber tile carrier - click - ValkPro+	218 Pcs
Alu front foot ValkPro+ P/L10° middle	82 Pcs	Ballast full tiles	335 Pcs
Alu front foot ValkPro+ P/L10° side	72 Pcs	Ballast half tiles	38 Pcs

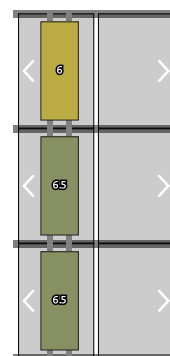
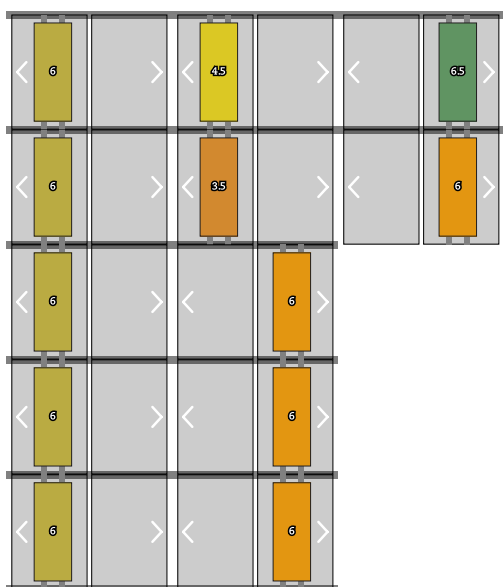
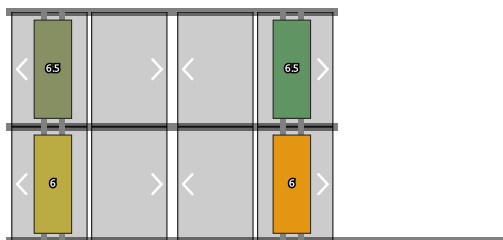


Roof A | Field 2 - part 2A | Solar panels



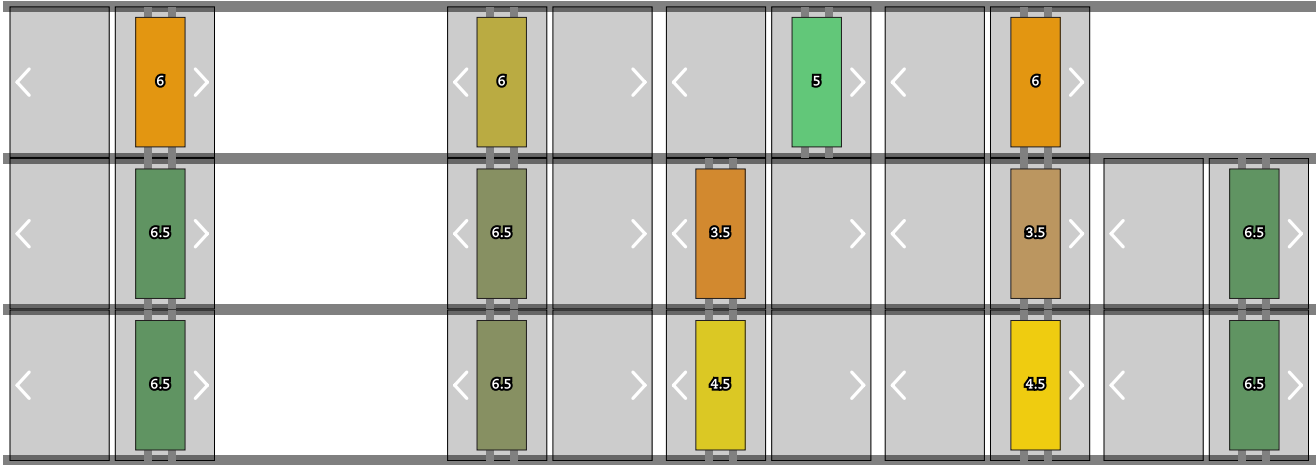


Roof A | Field 2 - part 2D | Solar panels



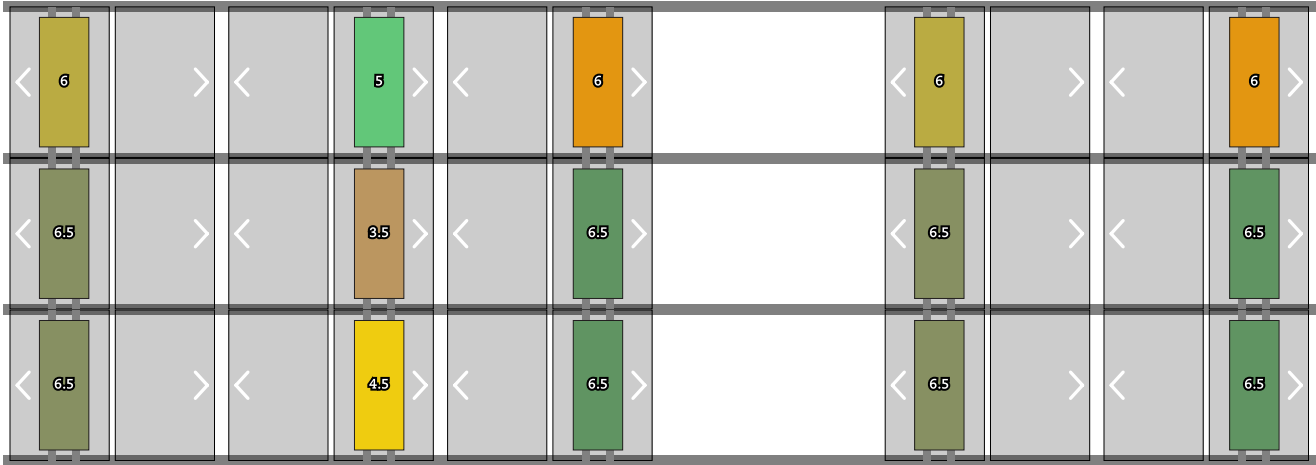


Roof A | Field 2 - part 2E | Solar panels



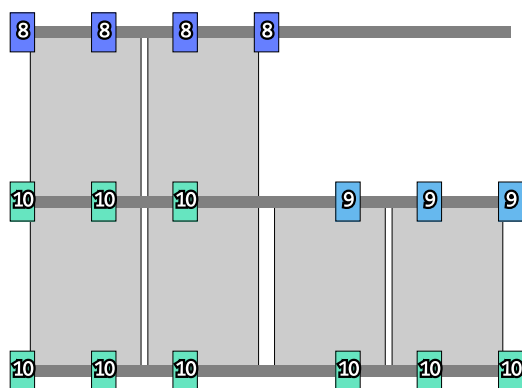
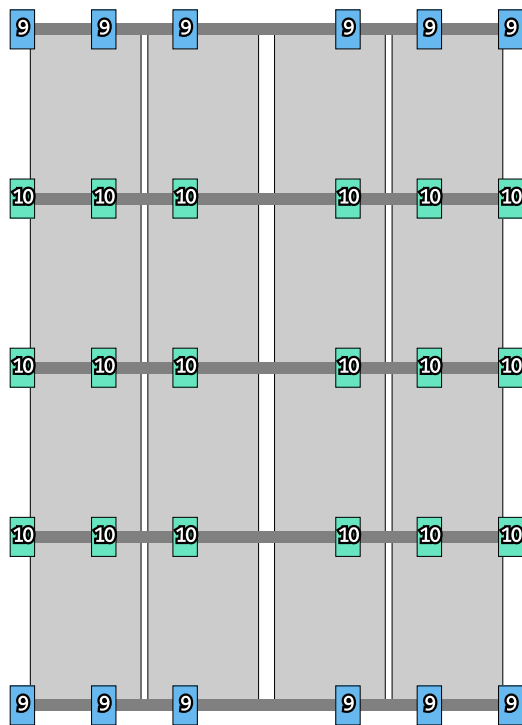


Roof A | Field 2 - part 2F | Solar panels





Roof A | Field 2 - part 2A | Point load



Legend

Point load of individual feet (system-weight)



Standard feet (kPa)



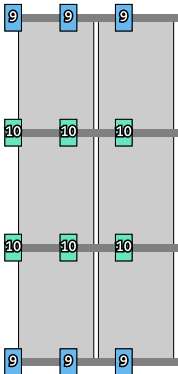
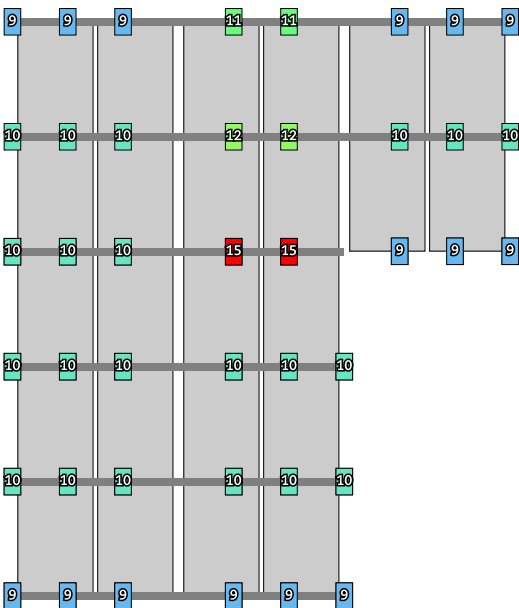
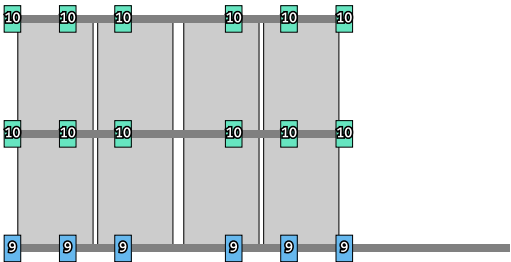
Load distributor (kPa)

8 15





Roof A | Field 2 - part 2D | Point load



Legend Point load of individual feet (system-weight)



Standard feet (kPa)



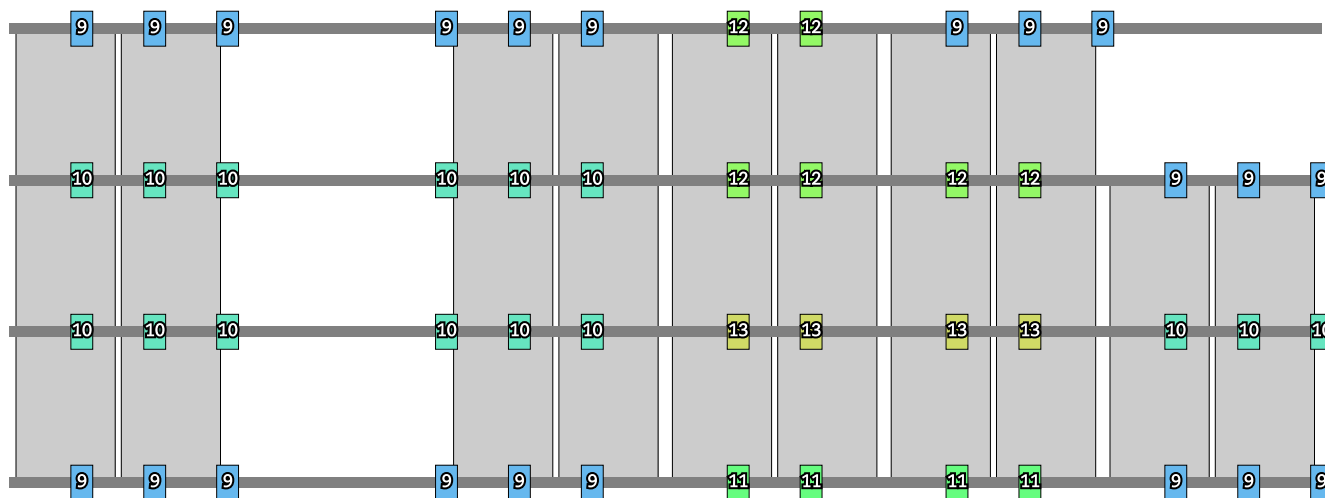
Load distributor (kPa)



2D



Roof A | Field 2 - part 2E | Point load



Legend

Point load of individual feet (system-weight)



Standard feet (kPa)



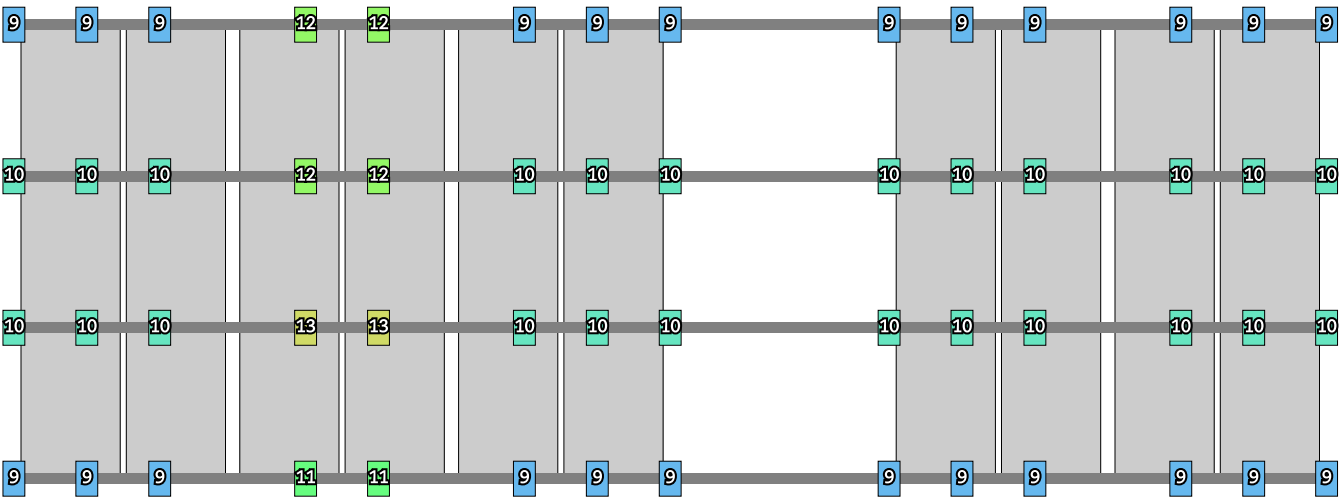
Load distributor (kPa)

8 15





Roof A | Field 2 - part 2F | Point load



Legend

Point load of individual feet (system-weight)

Standard feet (kPa)

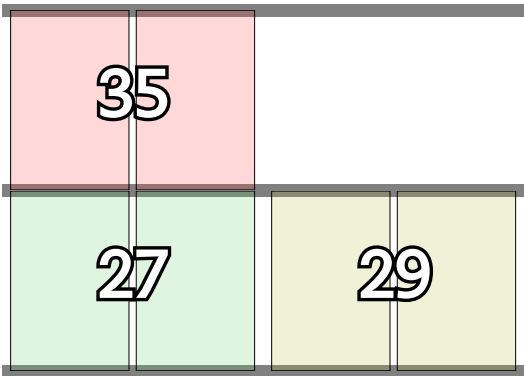
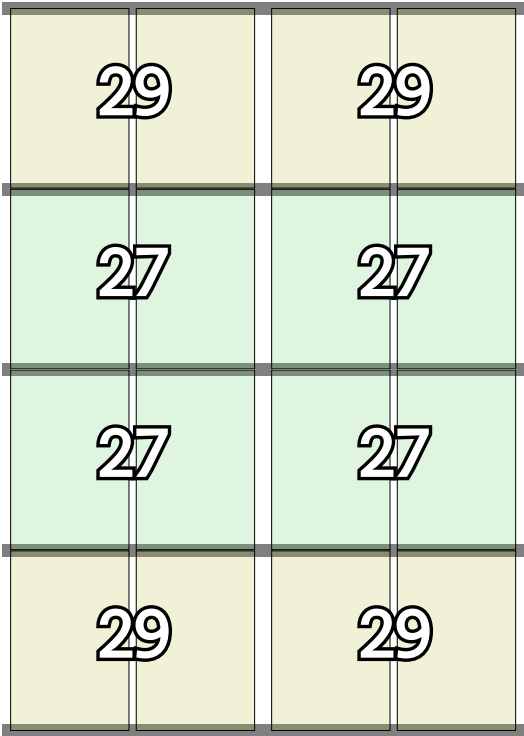
Load distributor (kPa)

8 15

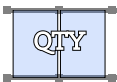




Roof A | Field 2 - part 2A | Load



Legend

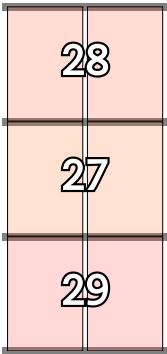
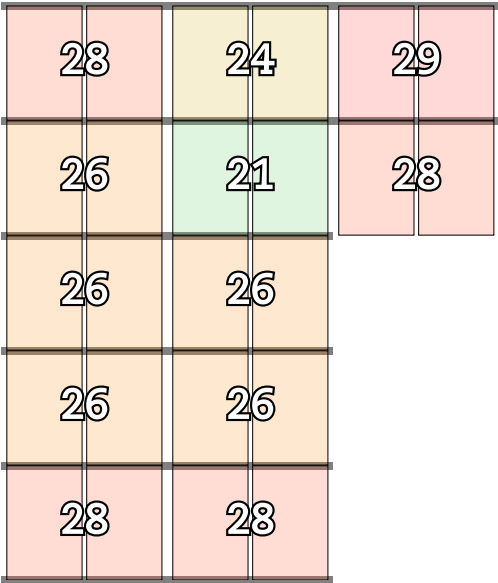
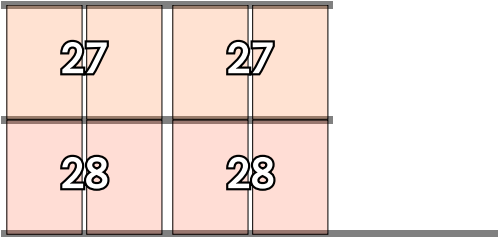


QTY = quantity of kg/m²

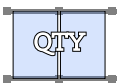
Max. Pressure 35 kg/m²
Avg. Pressure 27,5 kg/m²



Roof A | Field 2 - part 2D | Load



Legend



QTY = quantity of kg/m²

Max. Pressure 35 kg/m²
Avg. Pressure 27,5 kg/m²

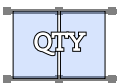


Roof A | Field 2 - part 2E | Load



28		28	25	28	
27		27	21	21	29
29		29	24	24	29

Legend



QTY = quantity of kg/m²

Max. Pressure 35 kg/m²
Avg. Pressure 27,5 kg/m²

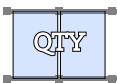


Roof A | Field 2 - part 2F | Load



28	25	28		28	28
27	21	27		27	27
29	24	29		29	29

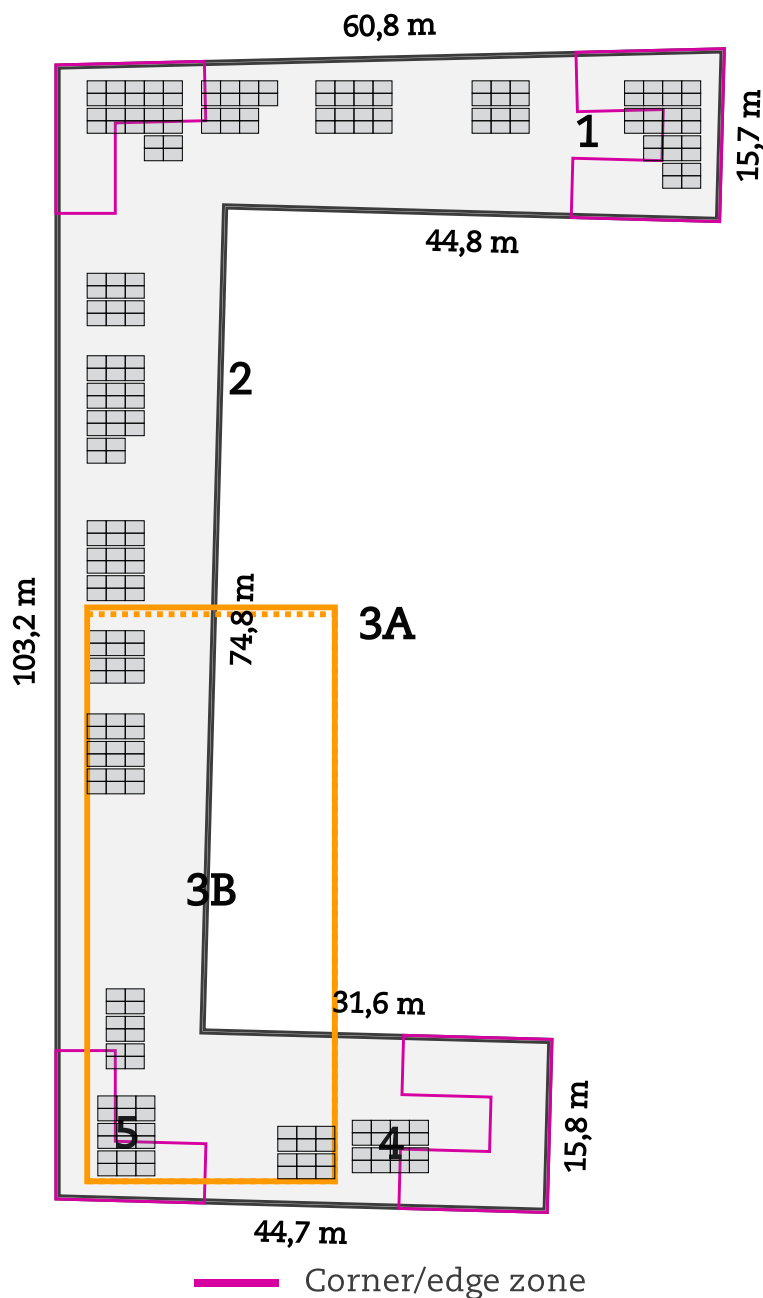
Legend



QTY = quantity of kg/m²

Max. Pressure 35 kg/m²
Avg. Pressure 27,5 kg/m²

Roof A | Field 3 | Solar panels

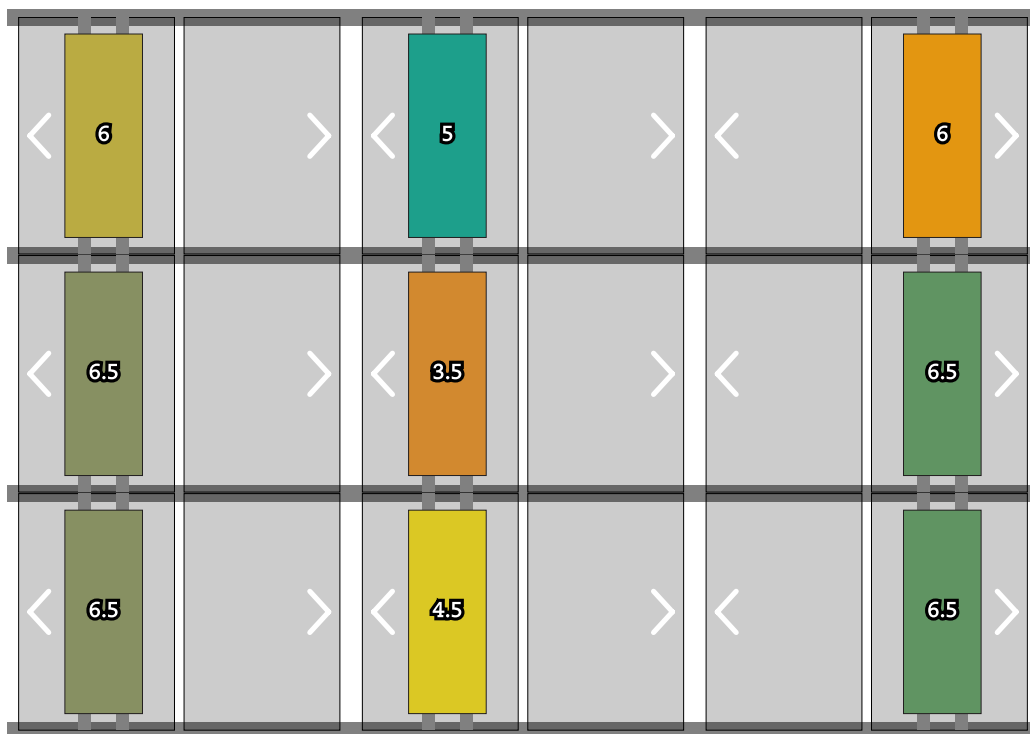


Components

Module	42 Pcs	Galv. ballast carrier ValkPro+ L=1979mm	42 Pcs
Alu rear foot ValkPro+ L10° middle	26 Pcs	Galv roof carrier L=2500x1,5mm	29 Pcs
Galv back plate ValkPro+ L10° L=1980mm	42 Pcs	Galv side plate ValkPro+ L10° universal	32 Pcs
Alu rear foot ValkPro+ L10° side	32 Pcs	SS thread-forming bolt M6x20mm - T30	96 Pcs
SS hammerhead bolt M8x20mm + lock nut	18 Pcs	Rubber tile carrier - click - ValkPro+	80 Pcs
Alu front foot ValkPro+ P/L10° middle	26 Pcs	Ballast full tiles	120 Pcs
Alu front foot ValkPro+ P/L10° side	32 Pcs	Ballast half tiles	15 Pcs

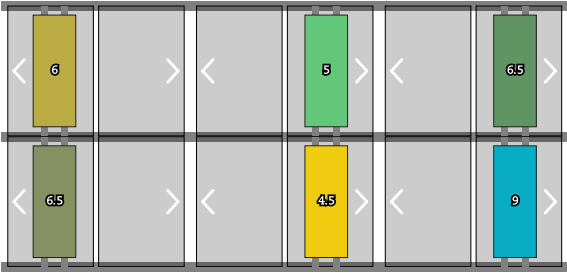
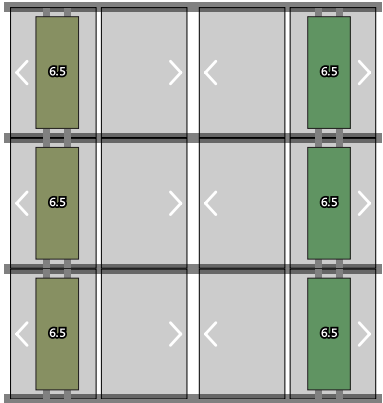


Roof A | Field 3 - part 3A | Solar panels



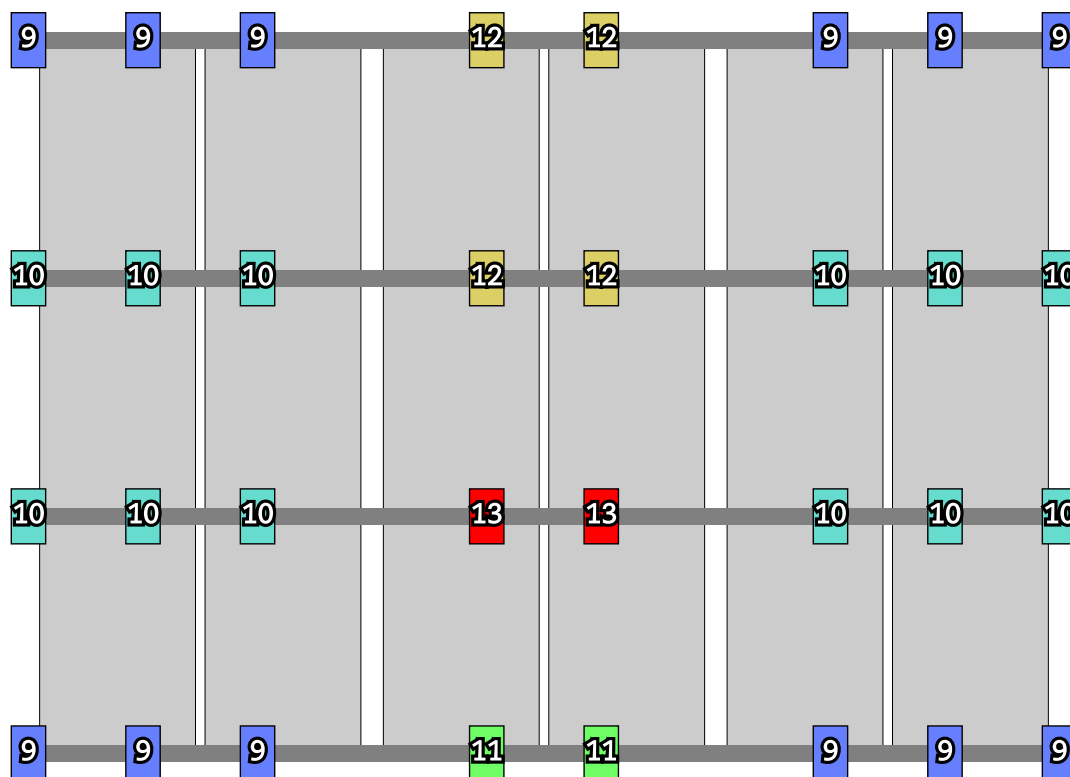


Roof A | Field 3 - part 3B | Solar panels





Roof A | Field 3 - part 3A | Point load



Legend

Point load of individual feet (system-weight)



Standard feet (kPa)



Load distributor (kPa)

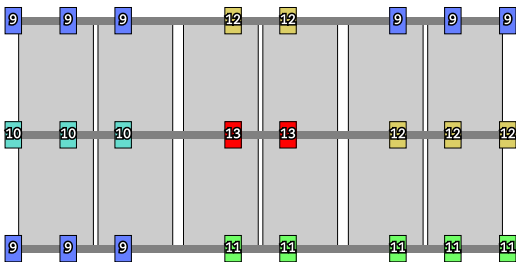
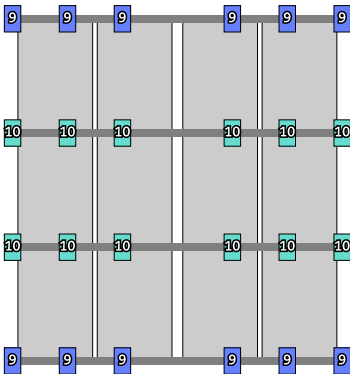
9 13

3A





Roof A | Field 3 - part 3B | Point load



Legend

Point load of individual feet (system-weight)

 Standard feet (kPa)

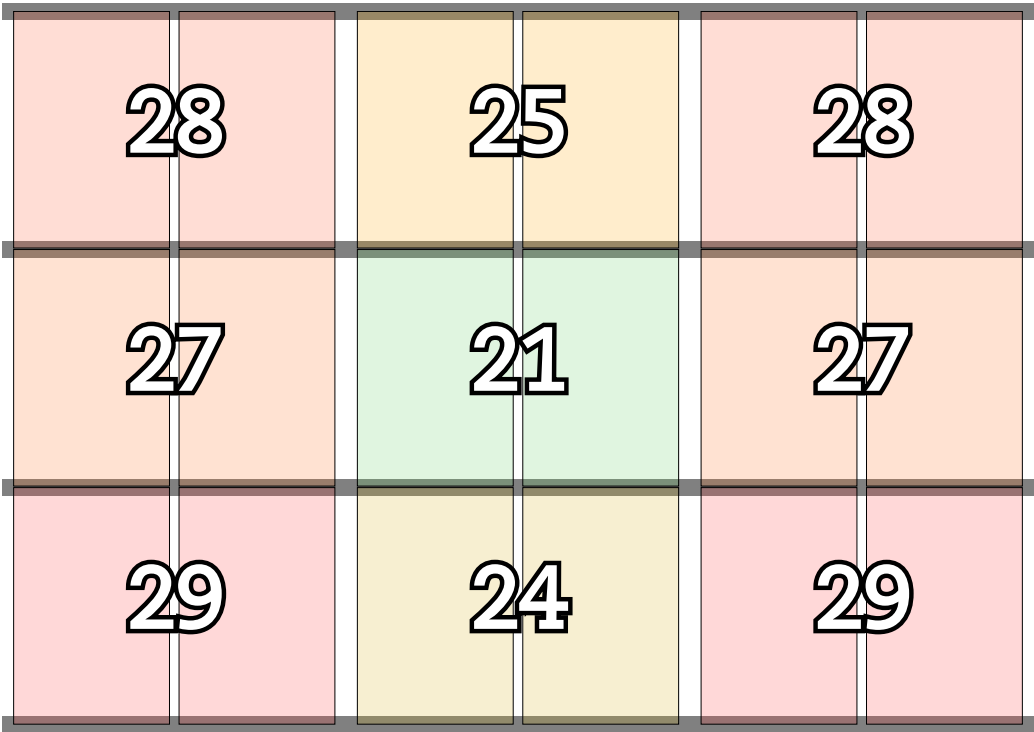
 Load distributor (kPa)

9 13

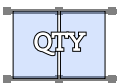
3B



Roof A | Field 3 - part 3A | Load



Legend

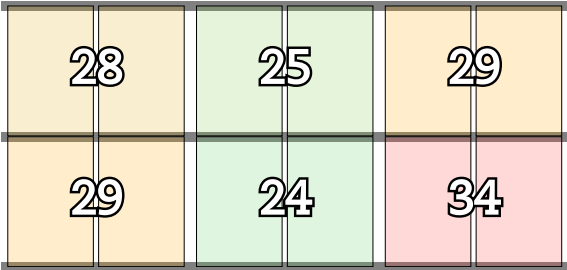
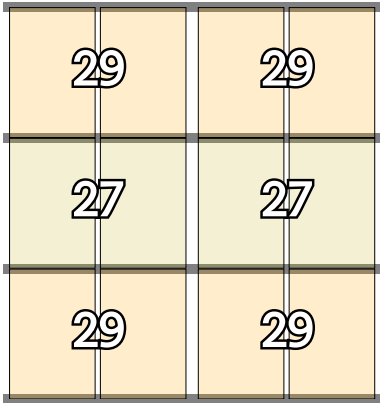


QTY = quantity of kg/m²

Max. Pressure 34 kg/m²
Avg. Pressure 27,9 kg/m²



Roof A | Field 3 - part 3B | Load

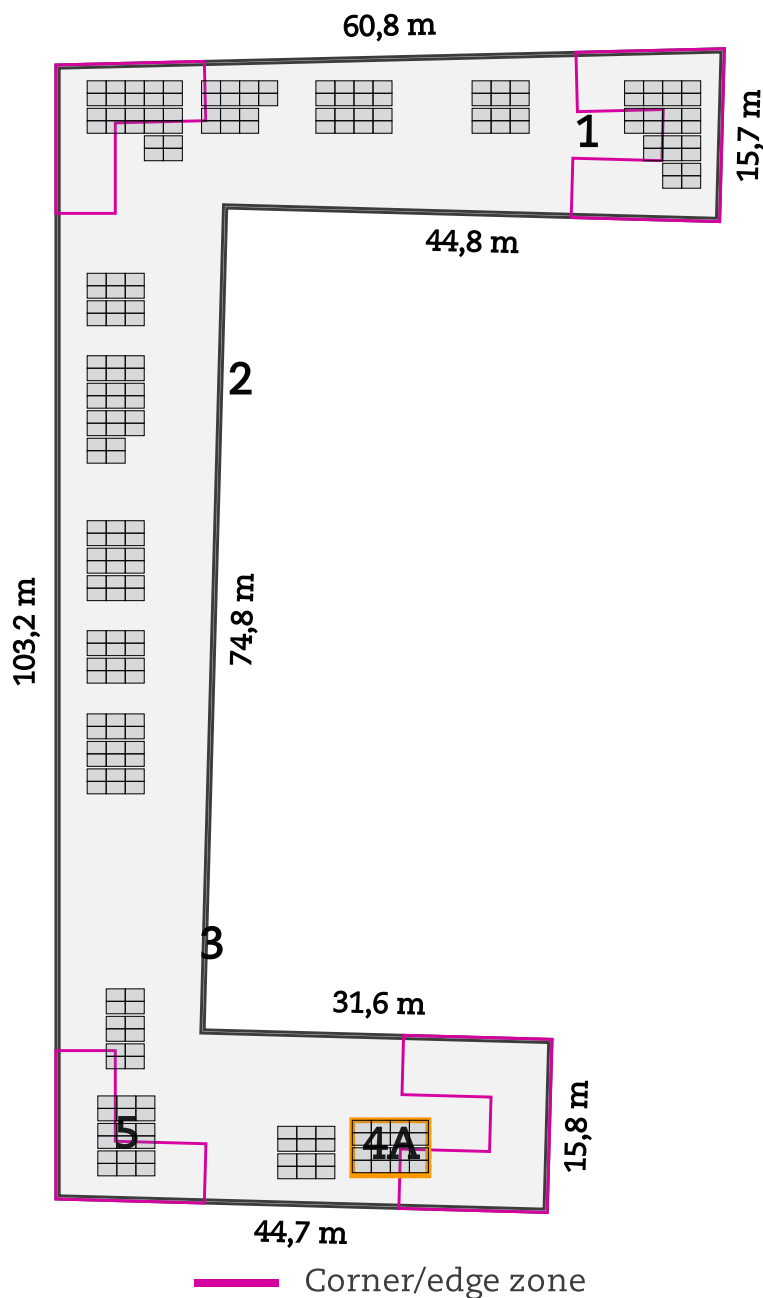


Legend

QTY = quantity of kg/m²

VAN DER VALK

Roof A | Field 4 | Solar panels

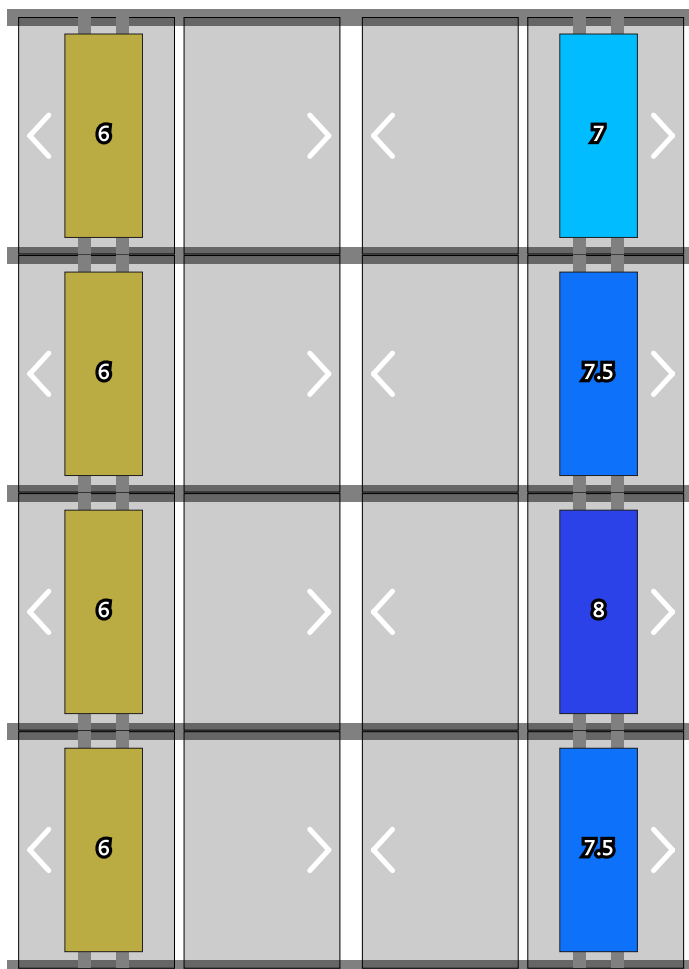


Components

Module	16 Pcs	Galv. ballast carrier ValkPro+ L=1979mm	16 Pcs
Alu rear foot ValkPro+ L10° middle	12 Pcs	Galv roof carrier L=2500x1,5mm	10 Pcs
Galv back plate ValkPro+ L10° L=1980mm	16 Pcs	Galv side plate ValkPro+ L10° universal	8 Pcs
Alu rear foot ValkPro+ L10° side	8 Pcs	SS thread-forming bolt M6x20mm - T30	24 Pcs
SS hammerhead bolt M8x20mm + lock nut	5 Pcs	Rubber tile carrier - click - ValkPro+	30 Pcs
Alu front foot ValkPro+ P/L10° middle	12 Pcs	Ballast full tiles	53 Pcs
Alu front foot ValkPro+ P/L10° side	8 Pcs	Ballast half tiles	2 Pcs

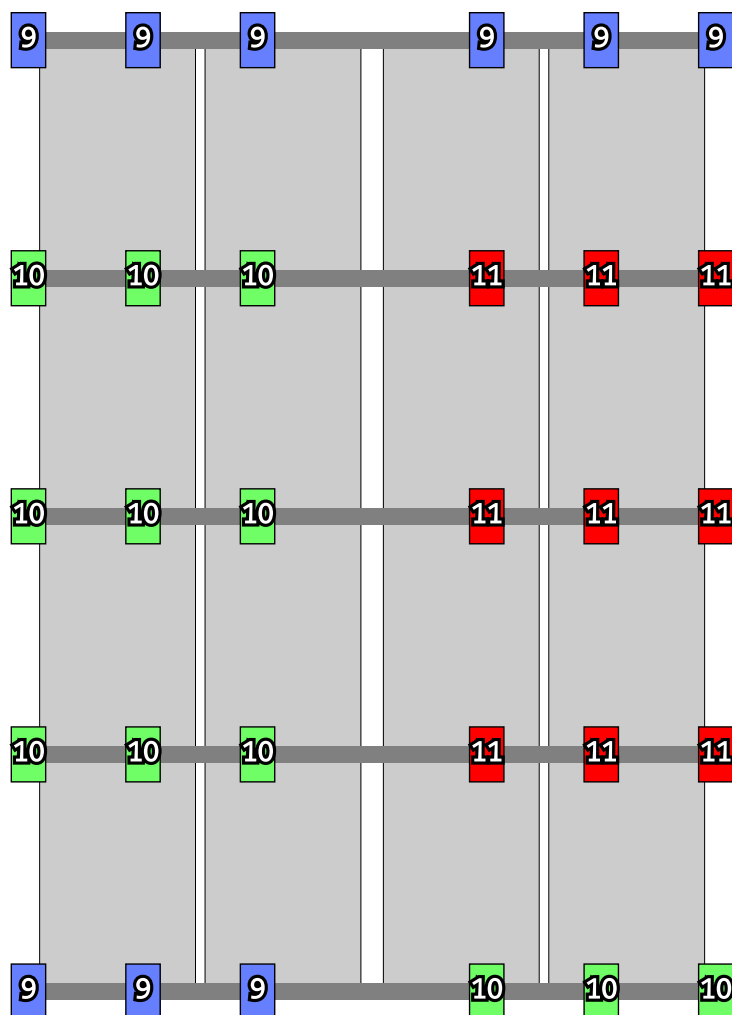


Roof A | Field 4 - part 4A | Solar panels





Roof A | Field 4 - part 4A | Point load



Legend

Point load of individual feet (system-weight)



Standard feet (kPa)



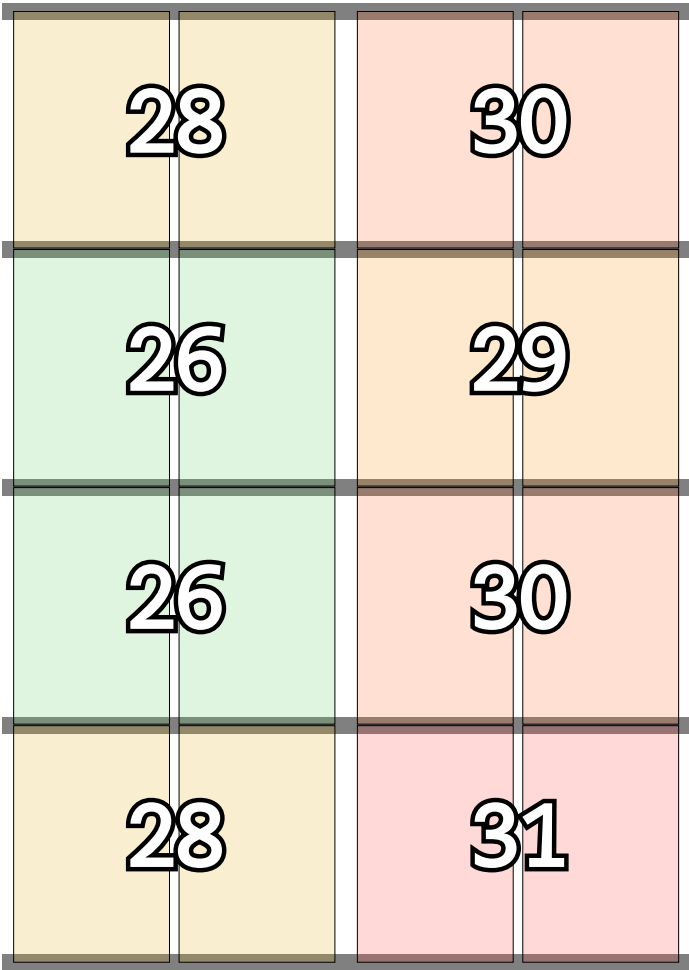
Load distributor (kPa)

9 11

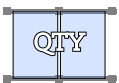
4A



Roof A | Field 4 - part 4A | Load



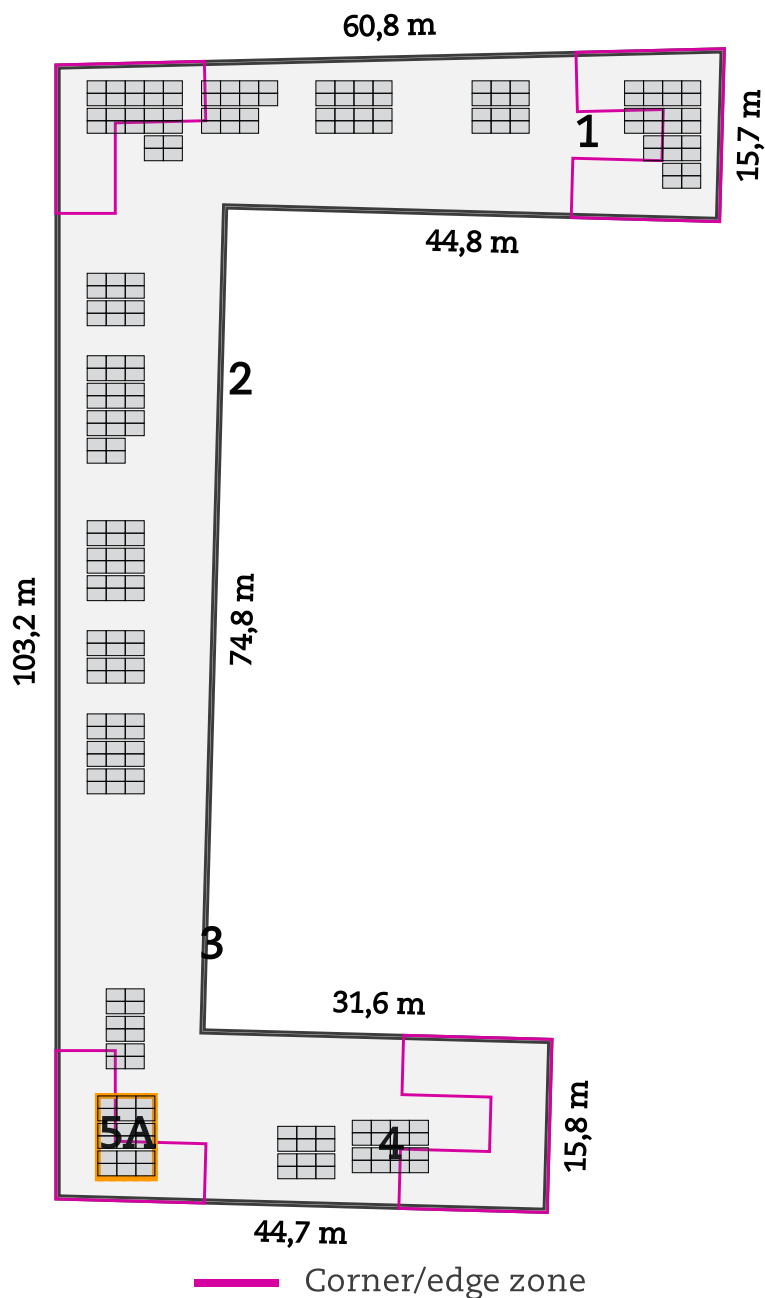
Legend



QTY = quantity of kg/m²

Max. Pressure 31 kg/m²
Avg. Pressure 29 kg/m²

Roof A | Field 5 | Solar panels

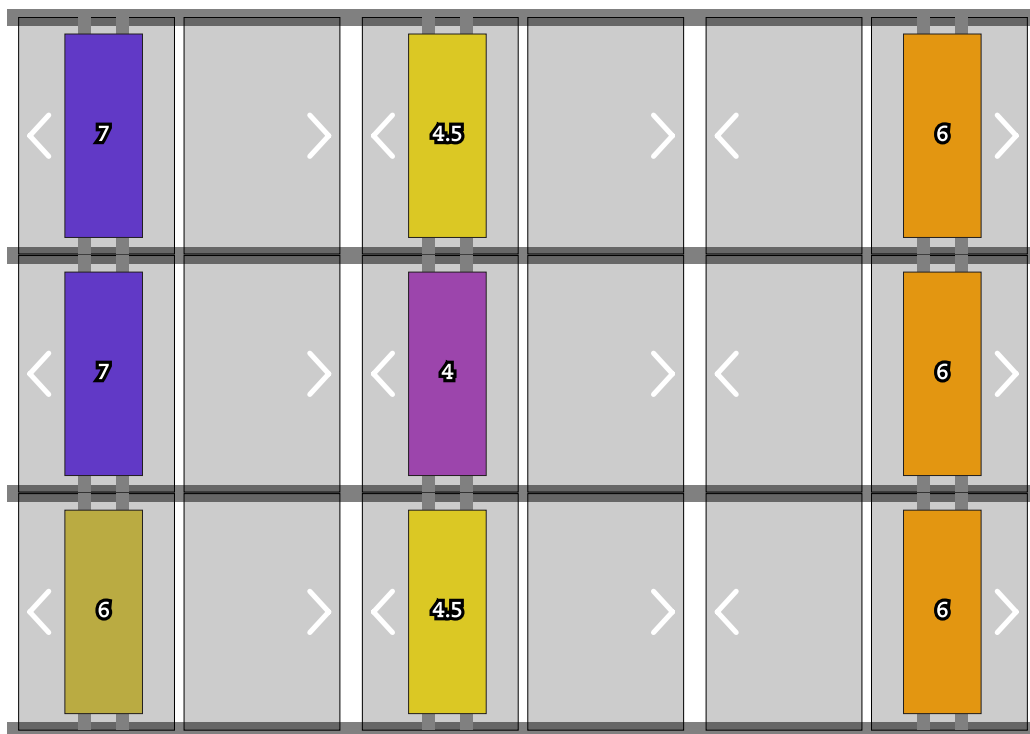


Components

Module	18 Pcs	Galv. ballast carrier ValkPro+ L=1979mm	18 Pcs
Alu rear foot ValkPro+ L10° middle	12 Pcs	Galv roof carrier L=2500x1,5mm	12 Pcs
Galv back plate ValkPro+ L10° L=1980mm	18 Pcs	Galv side plate ValkPro+ L10° universal	12 Pcs
Alu rear foot ValkPro+ L10° side	12 Pcs	SS thread-forming bolt M6x20mm - T30	36 Pcs
SS hammerhead bolt M8x20mm + lock nut	8 Pcs	Rubber tile carrier - click - ValkPro+	32 Pcs
Alu front foot ValkPro+ P/L10° middle	12 Pcs	Ballast full tiles	50 Pcs
Alu front foot ValkPro+ P/L10° side	12 Pcs	Ballast half tiles	2 Pcs

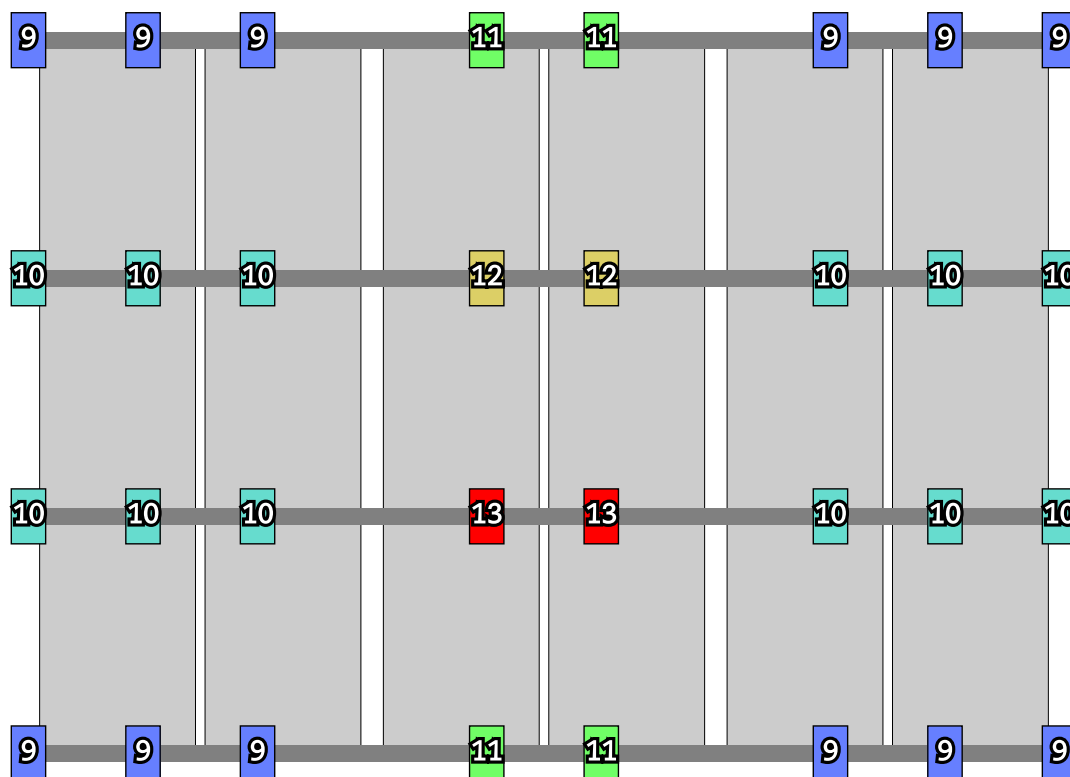


Roof A | Field 5 - part 5A | Solar panels





Roof A | Field 5 - part 5A | Point load



Legend

Point load of individual feet (system-weight)

 Standard feet (kPa)

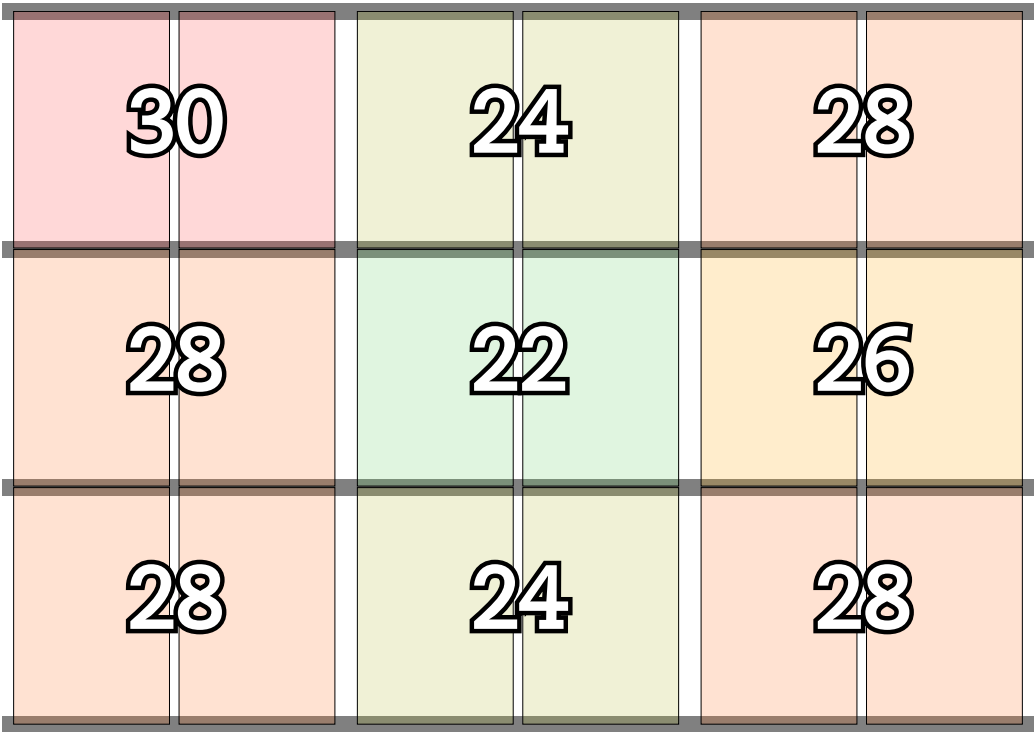
 Load distributor (kPa)

 9
  13

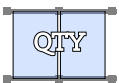
5A



Roof A | Field 5 - part 5A | Load



Legend



QTY = quantity of kg/m²

Max. Pressure 30 kg/m²
Avg. Pressure 26,9 kg/m²



Project total | Project summary

Field number	Panel Quantity (pcs)	DC power (kWp)	System Weight (kg/m ²)	Max. pressure/support (kPa)
1	38	16150	26.7	15
2	118	50150	27.5	15
3	42	17850	27.9	13
4	16	6800	29	11
5	18	7650	26.9	13





Roof A | Bill of materials

Item no.	Panel type	Qty
CS6R-425H-AG	CSI Solar	232 pcs
Item no.	Mounting system	Calc. Qty
724650	Alu rear foot ValkPro+ L10° middle	158 Pcs
742512	Galv back plate ValkPro+ L10° L=1980mm	232 Pcs
724651	Alu rear foot ValkPro+ L10° side	148 Pcs
774221	SS hammerhead bolt M8x20mm + lock nut	92 Pcs
724660	Alu front foot ValkPro+ P/L10° middle	158 Pcs
724661	Alu front foot ValkPro+ P/L10° side	148 Pcs
742564	Galv. ballast carrier ValkPro+ L=1979mm	232 Pcs
741802500	Galv roof carrier L=2500x1,5mm	153 Pcs
742540	Galv side plate ValkPro+ L10° universal	148 Pcs
773320	SS thread-forming bolt M6x20mm - T30	444 Pcs
729622	Rubber tile carrier - click - ValkPro+	428 Pcs
Item no.	Additional items	Calc. Qty
7506301545	Tile 30 x 15 x 4,5cm - 4,5kg - NL	68 pcs
7506303045	Tile 30 x 30 x 4,5cm - 9kg - NL	659 pcs



Project total | Bill of materials

Item no.	Panel type	Qty
CS6R-425H-AG	CSI Solar	232 pcs

Item no.	Mounting system	Calc. Qty
724650	Alu rear foot ValkPro+ L10° middle	158 Pcs
742512	Galv back plate ValkPro+ L10° L=1980mm	232 Pcs
724651	Alu rear foot ValkPro+ L10° side	148 Pcs
774221	SS hammerhead bolt M8x20mm + lock nut	92 Pcs
724660	Alu front foot ValkPro+ P/L10° middle	158 Pcs
724661	Alu front foot ValkPro+ P/L10° side	148 Pcs
742564	Galv. ballast carrier ValkPro+ L=1979mm	232 Pcs
741802500	Galv roof carrier L=2500x1,5mm	153 Pcs
742540	Galv side plate ValkPro+ L10° universal	148 Pcs
773320	SS thread-forming bolt M6x20mm - T30	444 Pcs
729622	Rubber tile carrier - click - ValkPro+	428 Pcs

Item no.	Additional items	Calc. Qty
7506301545	Tile 30 x 15 x 4,5cm - 4,5kg - NL	68 pcs
7506303045	Tile 30 x 30 x 4,5cm - 9kg - NL	659 pcs
732001	SS cable clamp small	464 pcs
732011	Plastic cable clamp for back foot ValkPro+	306 pcs
732012	Plastic multi-cable clip for roof carrier	232 pcs



Project total | Bill of materials

Item no.	Additional items	Calc. Qty
738201	Ss. Connector clamp	232 pcs



General Installation Guidelines

General

- This project report is based on the entered parameters and results of the calculator. The results of the calculations have been calculated with the greatest care. Always check carefully whether all values have been entered and displayed correctly in advance.
- During the installation of the mounting system, the instructions and safety regulations published in this project report and the installation manual of the chosen mounting system must be carefully followed. As shown in the general terms and conditions of sale and delivery of Van der Valk Solar Systems B.V., non-compliance with the regulations stated in this document means that the customer can no longer rely on any guarantees and Van der Valk Solar Systems is no longer liable for any form of damage.

Safety

- The installation of the mounting system must be carried out by qualified technical personnel.
- Omitting parts may negatively affect performance and is therefore not allowed.
- Avoid carrying out installation work during bad weather conditions, especially in case of strong winds and a wet (slippery) roof surface.
- During the planning and execution of the installation, always take into account possible changing weather conditions, in particular strong winds or storms. Take the right measures and make sure that no situation can arise where solar panels have already been placed on the system, but other essential parts (such as ballast tiles, side or back plates) are still missing.
- Always wear appropriate protective clothing and gloves when carrying out the installation work.
- During installation work on the roof, always use fall protection and, if necessary, work with safety nets and roof edge protection.
- Carefully follow the instructions for installation of the mounting system, as shown in the current installation manual and online installation videos.
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Environmental factors

- High neighbouring buildings or objects, such as windmills, can affect the wind pressure. In these cases, advice should always be obtained from Van der Valk Solar Systems before installation can take place.
- Indien voor, tijdens of na de installatie wordt vastgesteld, dat de gegevens en/of omgevingsfactoren niet volledig overeen komen met het projectrapport, moet het project eerst opnieuw worden gecalculeerd en eventueel worden aangepast.
- In kustgebieden, dient het systeem op minimaal 500 meter van open water te worden geplaatst, ter voorkoming van versnelde corrosie door inwerking van zout water. Wanneer er bebouwing aanwezig is tussen het open water en het dak mag een minimum afstand van 250 meter tot open water worden aangehouden.



General Installation Guidelines

Standards and regulations

- For correct and safe installation and use of the solar mounting system, always observe the applicable standards and regulations:
 - EN 1990: Basis of structural design
 - EN 1991-1-3: General actions - snow loads
 - EN 1991-1-4: General actions - wind loads
 - IEC 60364: Electrical Installations for Buildings
 - IEC 62305: Protection against lightnings
 - EN 50110: Operation of electrical installations
 - NEN 7250: Solar energy systems - Integration in roofs and facades - Construction aspects

Stability and condition of the roof and roof covering

- Placing a mounting system that uses ballast only, is only allowed in case the roof pitch is less than 5°. In case the roof pitch is 5° or more the mounting system always needs to be fixed mechanically to the roof.
- The condition of the roof must be checked upfront for sufficient strength to bear the weight of the mounting system including PV panels ballast and wind and snow loads. Make sure that the load reserve of the roof is not exceeded anywhere.
- Check the stability of the roof and adjust the roof/construction where necessary.
- Check prior to installation whether the roof covering and/or insulation is suitable for the pressure and thermal expansion of the solar mounting system. The maximum pressure is shown in this project report or can be requested at Van der Valk Solar Systems.
- Bulging of the roof membrane should be prevented. This can lift the solar mounting system and can cause displacement of the mounting system or ballast. It is the installer's responsibility to prevent the roof membrane from bulging.
- Factors such as overhead cranes inside the building, seismic activity and others that affect the stability of the roof and/or building can affect the installed solar mounting system. Van der Valk Solar Systems does not take these factors into account, unless confirmed in writing.
- The roof surface on which the solar mounting system is to be installed must be clean, dry and flat.
- The roof height must always correspond to the roof height in the project report. For installations on roofs higher than 25 meters, Van der Valk Solar Systems should always be contacted in advance.

Roof zones

- During the installation of the mounting system, always take the applicable roof zones according to EN1991-1-4 into account. Installation in the edge zone of the roof is only possible if this has been explicitly taken into account in the calculation. The edge zone is automatically calculated by the ValkPVplannerPro based on the roof height and building perimeter, according to the applicable standards. It is possible to draw panels in the edge zone of the roof, on the basis of which the required additional ballast, parts or mounting points are automatically calculated.
- In case solar panels on the ValkPro+ system are fully or partially placed in the edge zone of the roof, it is mandatory to use side plates.



General Installation Guidelines

Ballast

- After installation of the solar mounting system, it must be carefully checked whether the ballast has been placed in accordance with the ballast drawing. Ballast tiles must be neatly stacked, so that they are sufficiently supported by the tile carriers, mass carriers and/or ballast wings.

Dilatations

- The maximum allowed dimensions of a coupled mounting system is a 30 meters in the aluminium direction and 60 meters in the steel direction. The maximum dimensions are based on the thermal expansion in case of a maximum temperature difference (Delta T) of 70 degrees Celsius. Follow the recommendations in the installation manual for the required gap between the systems.
- The coupled mounting system must not be placed over a gutter or ridge. In the mounting system is place over a gutter or ridge, the system must be split (dilatation), even if the change in roof pitch is minimal.
- When using the extra wide panel support feet for ValkPro+ with ballast, different dilatation rules apply: in such installations the coupled system may be a maximum of 30 meters in the steel/roof carrier direction and 15 meters in the aluminium direction.

Solar panels

- It is the installer's responsibility to determine in advance whether the selected solar panel is compatible with the mounting system, in relation to the dimensions and allowable pressure loads. The calculated pressure loads on the solar panel are shown in this project report.

Cable management

- In order to create a sound and durable electrical connection between the solar panels, it must be ensured that the cables from the junction box have sufficient length and thus do not cause any mechanical stress on the cable glands. Take into account thermal expansion and contraction of cables and the mounting system.
- Cables and connectors must be kept away from sharp and/or abrasive parts and the roof surface by using sufficient and appropriate cable and connector clamps and cable baskets.
- Components of the Van der Valk solar Systems mounting systems can be easily and completely disassembled at the end of their service life and separated for recycling. The systems only have nut-bolt, screw and click connections. No parts are glued or welded. All materials are fully recyclable. Disposal of the components always in accordance with the locally applicable laws and regulations.