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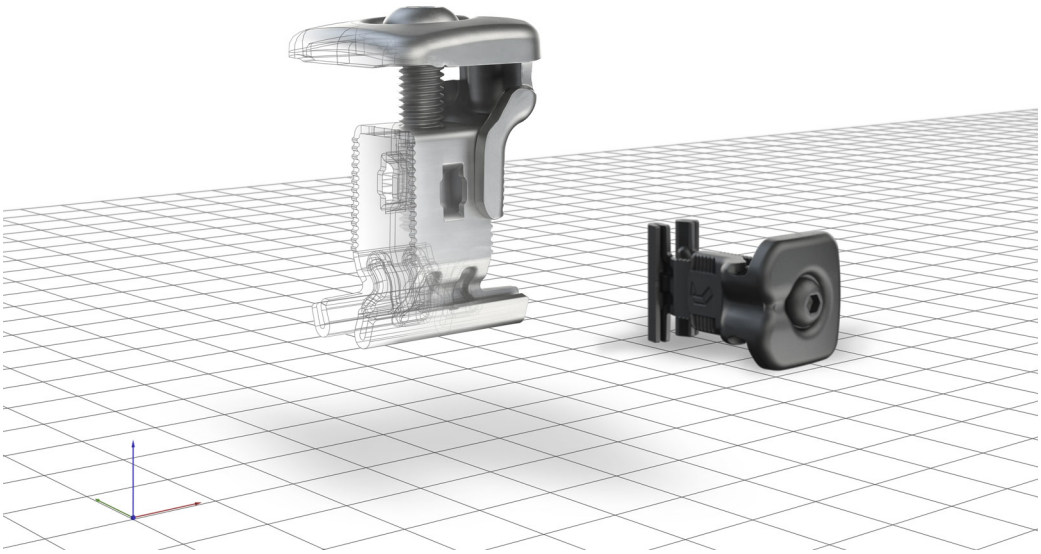
Technical project overview

51 Fitzroy Park, London N6 6JA, UK

Building project	51 Fitzroy Park, London N6 6JA, UK
Date	31.07.2024
In-house project no.	PA_240730_613104
Editor	Renusol Europe GmbH
Link to configurator	Open link
Number of modules	18
Rated output	8.1 kWp



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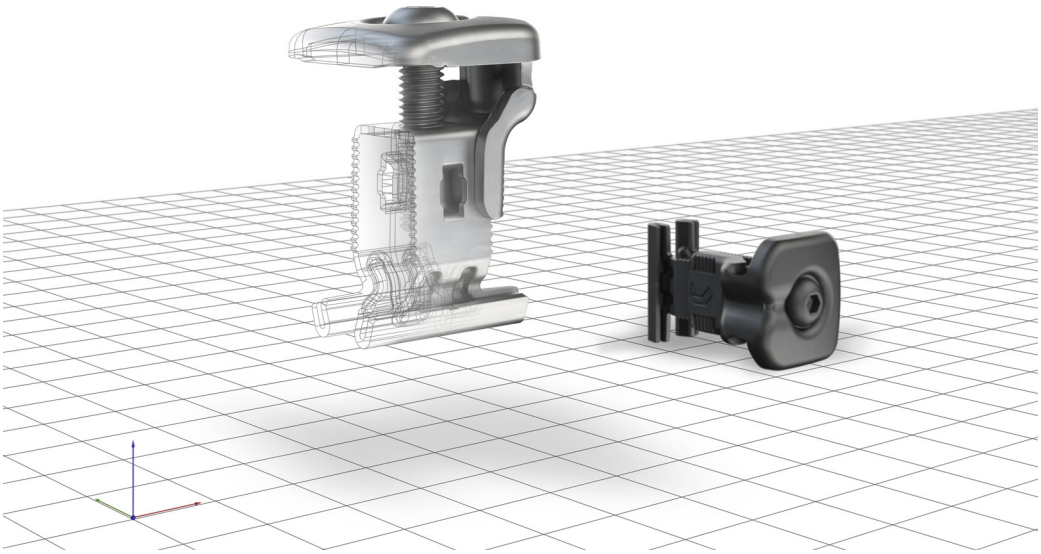
Technical project overview

51 Fitzroy Park, London N6 6JA, UK

Building project	51 Fitzroy Park, London N6 6JA, UK
Address	Fitzroy Park 55, N6 6JA
Country	United Kingdom
Module Type	Trina Solar Energy - TSM-450NEG9R.28 (Vertex S+)
Number of modules	18
Rated output	8.1 kWp
Mounting system	FSPro10S
Editor	Renusol Europe GmbH



LOCATION

Street	Fitzroy Park 55
City	N6 6JA
Country	United Kingdom

SURROUNDINGS

Code	Eurocode NA GB
Terrain height above sealevel	85,00 m
Snow load zone	Zone 3
Terrain category	Country
Distance to coast	50,00 km
Surroundings	normal
Service life of PV system	25 years
Failure consequence class	2

LOAD CALCULATION RESULT

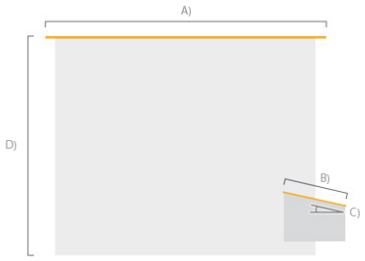
Peak velocity pressure	0,78 kN/m^2
Snow load	0,46 kN/m^2
Snow load on roof	0,37 kN/m^2
Base wind speed ($V_{b,0}$)	22,00 m/s

TOPOGRAPHY

Topography	Not exposed

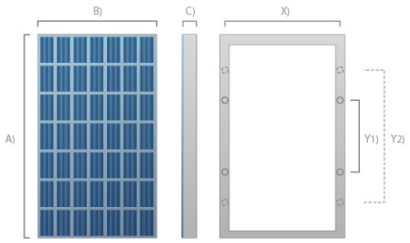
ROOF PROPERTIES

Roof type	Flat roof
Coverage type	Foil
A) Roof length	17,58 m
B) Roof segment width	5,10 m
C) Roof pitch	2,00 º
D) Building height	11,00 m
Parapet height	0,00 mm
Parapet width	0,00 mm
Rotation	0,00 º



MODULE PARAMETERS

Manufacturer	Trina Solar Energy
Name	TSM-450NEG9R.28 (Vertex S+)
Length	1762 mm
Width	1134 mm
Height	30 mm
Weight	21 kg
Rated output	450 W_{peak}
Color	black
Datasheet	Open datasheet

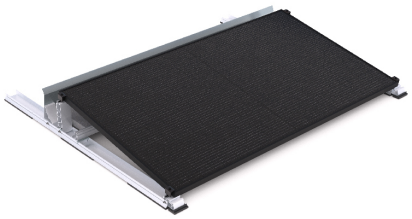


Please check the compatibility of clamping positions with module manufacturer advice.

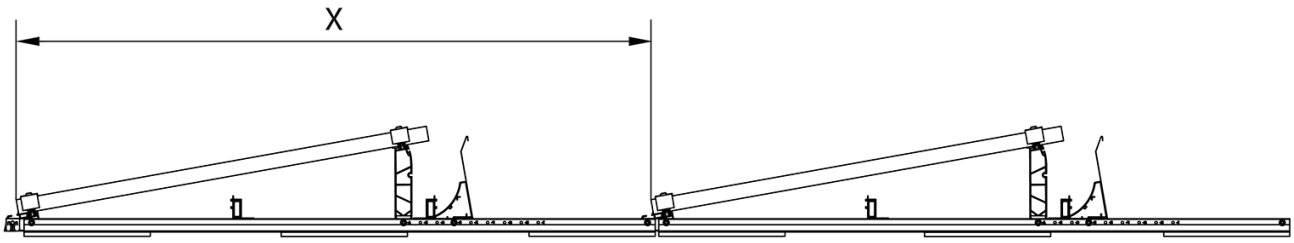
The module data was taken from a database. Please check whether this data corresponds to your actual module order. If necessary, please correct the data using the editing function.

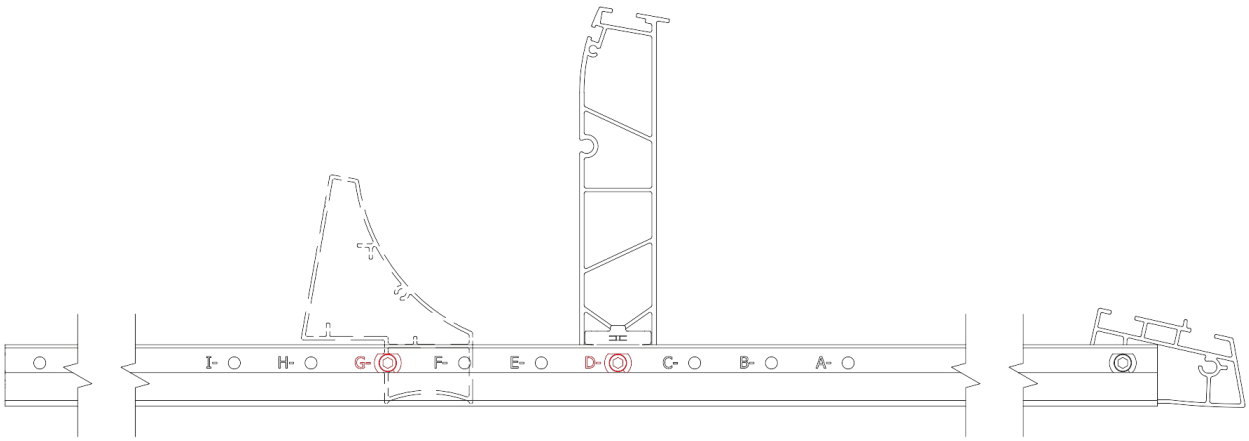
SYSTEM

System type	Ballasted
System	FSPro10S
Hole combination	D and G



Please check the entered row distance for an ideal yield calculation with a correct calculation including consideration of the shading.





FASTENER DETAILS

Mounting direction of modules	Landscape
Module clamping side	Short side
X) Row distance	1510mm
Streamliner	Optimized (recommended)
Sideplates	Never
Add third rail under the module	Automatic
Ballast block mass (optional)	10,00 kg
Friction coefficient	0,50
Partial safety factor dead load (ballast)	1

CLAMPS

Clamp type	Mid clamps+ / End clamps+
Clamp colour	black

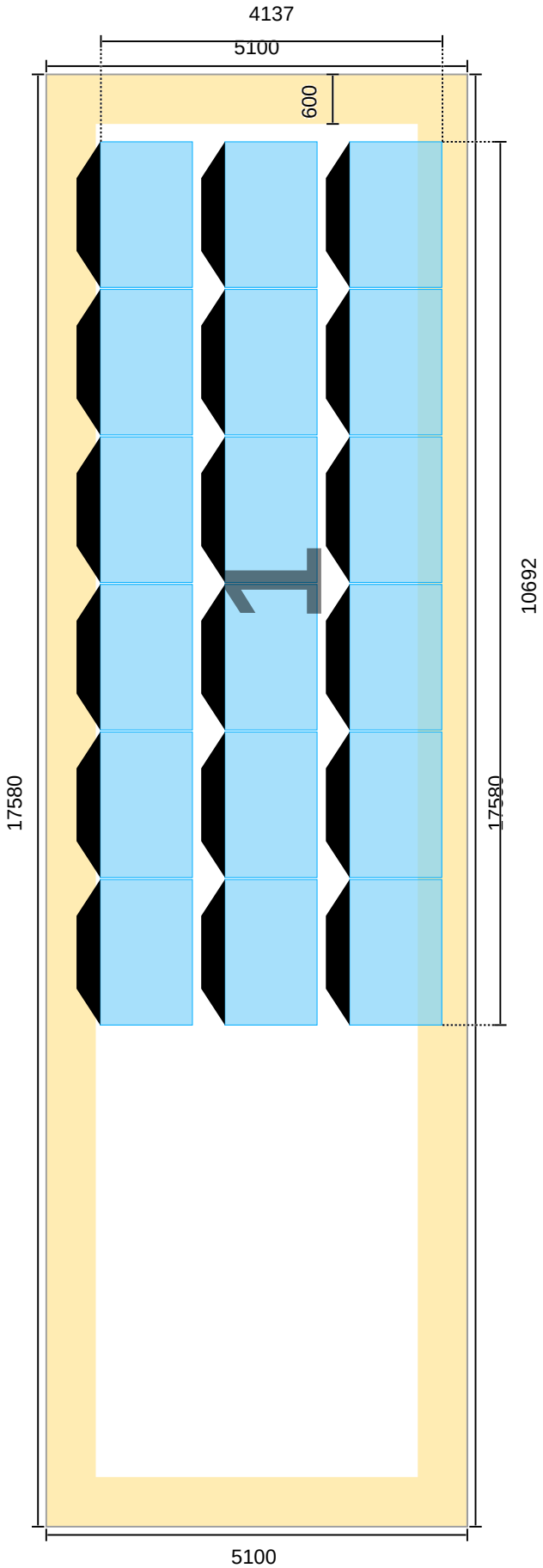
STATIC VALIDATION

Your project was validated by our statics check successfully.

Maximum ballast value: 146 kg

Ballast: 2621 kg
Modules: 378 kg
Partlist: 110 kg

The predefined default values for input fields have to be compared with the conditions of the project. Necessary changes to adapt to local conditions must be carried out. The following relevant input fields contain their default value:
• Service life of PV system: 25 years
• Failure consequence class: 2
• Partial safety factor dead load (ballast): 1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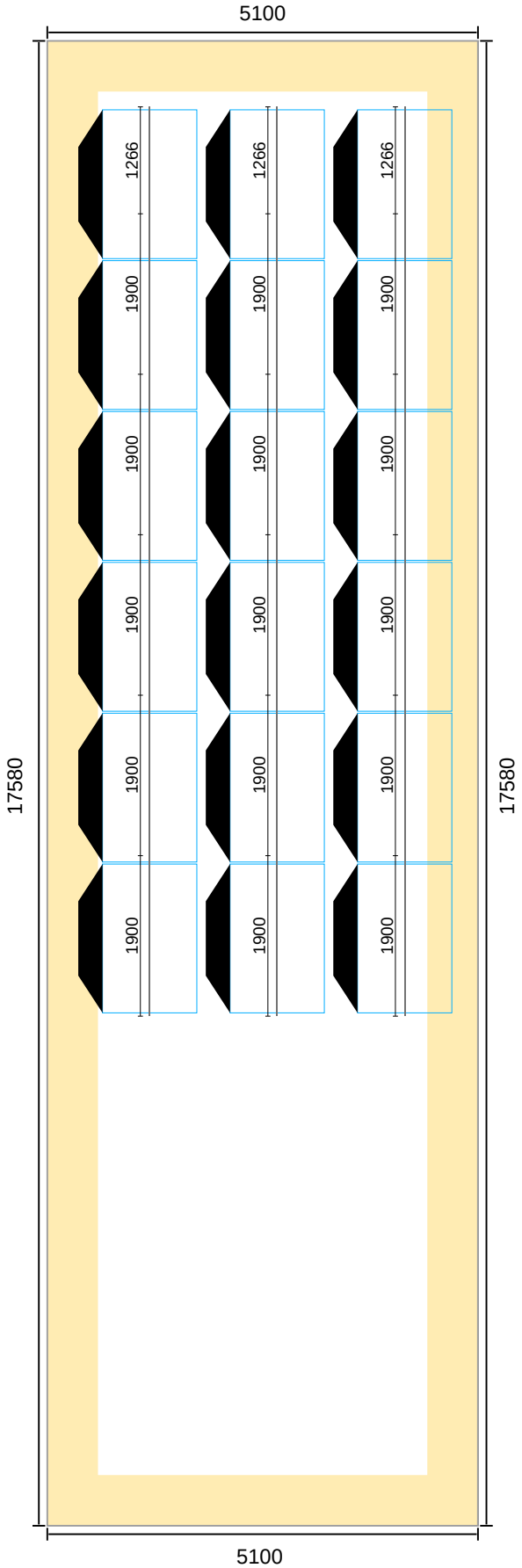
5100
600
10692
17580
17580
5100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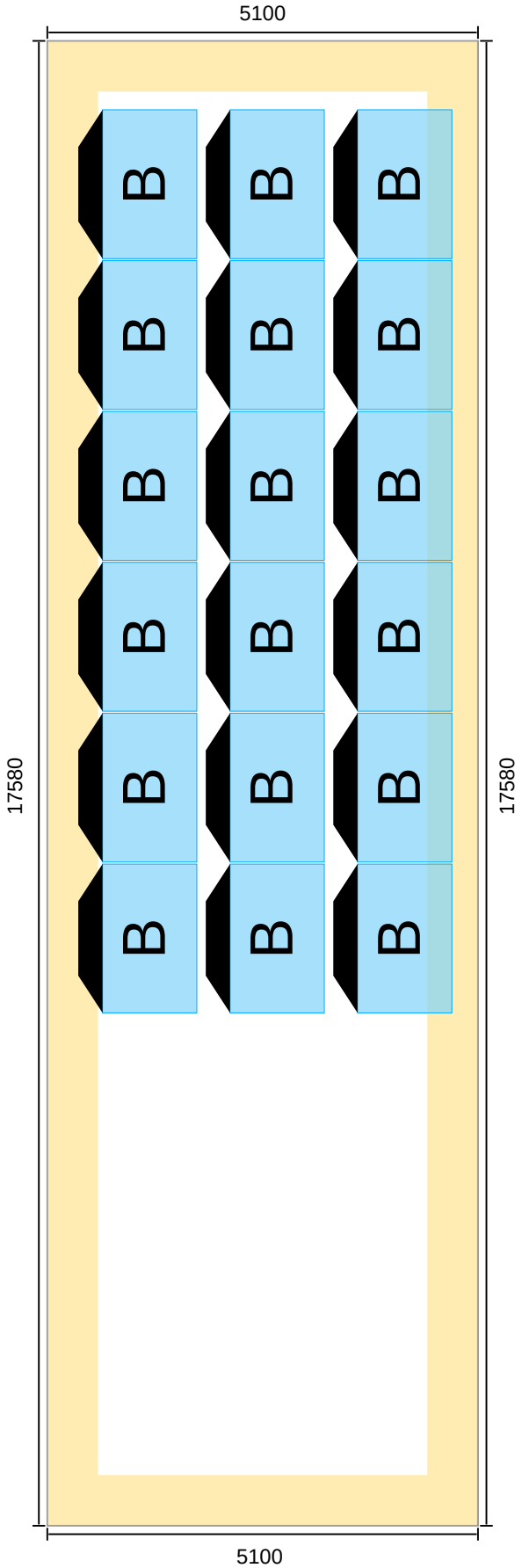
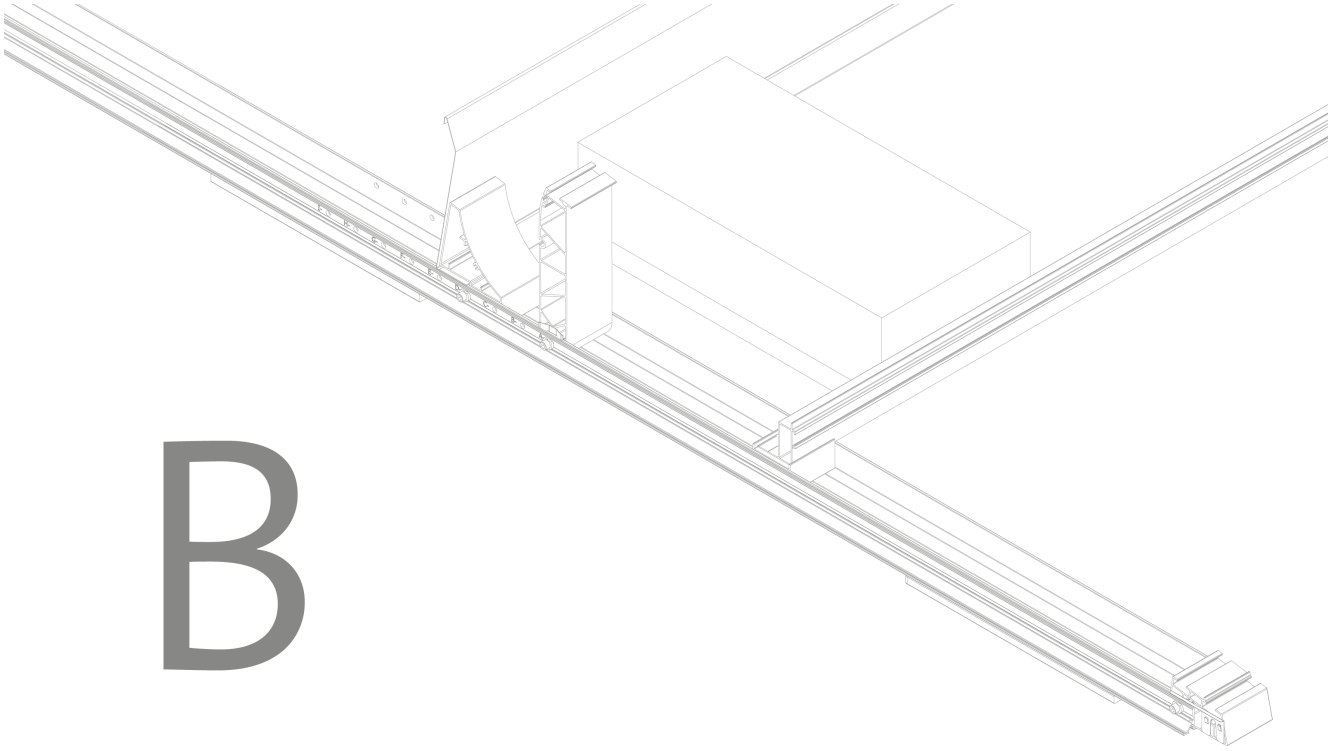
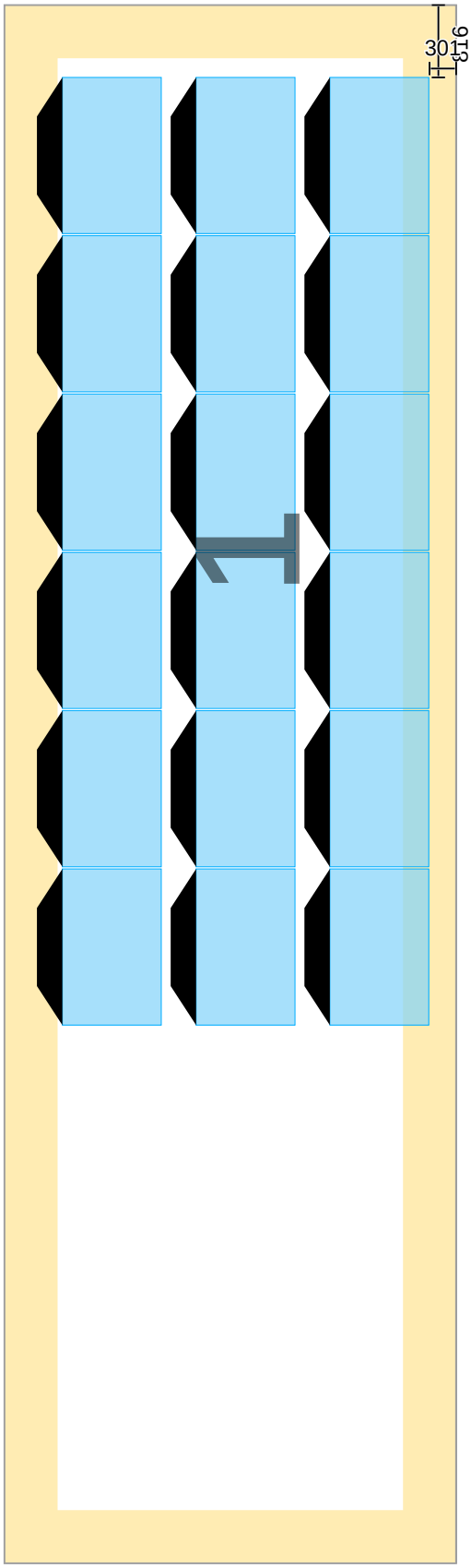
1266
1900
17580
5100


5100
17580
17580
5100
B



B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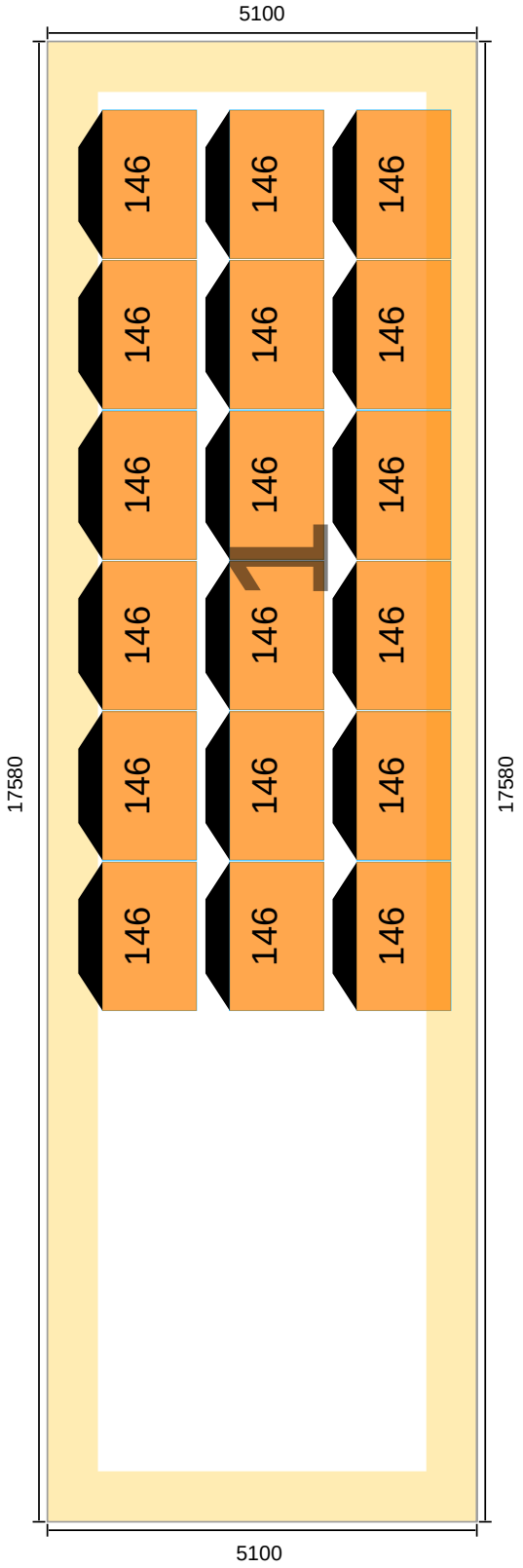
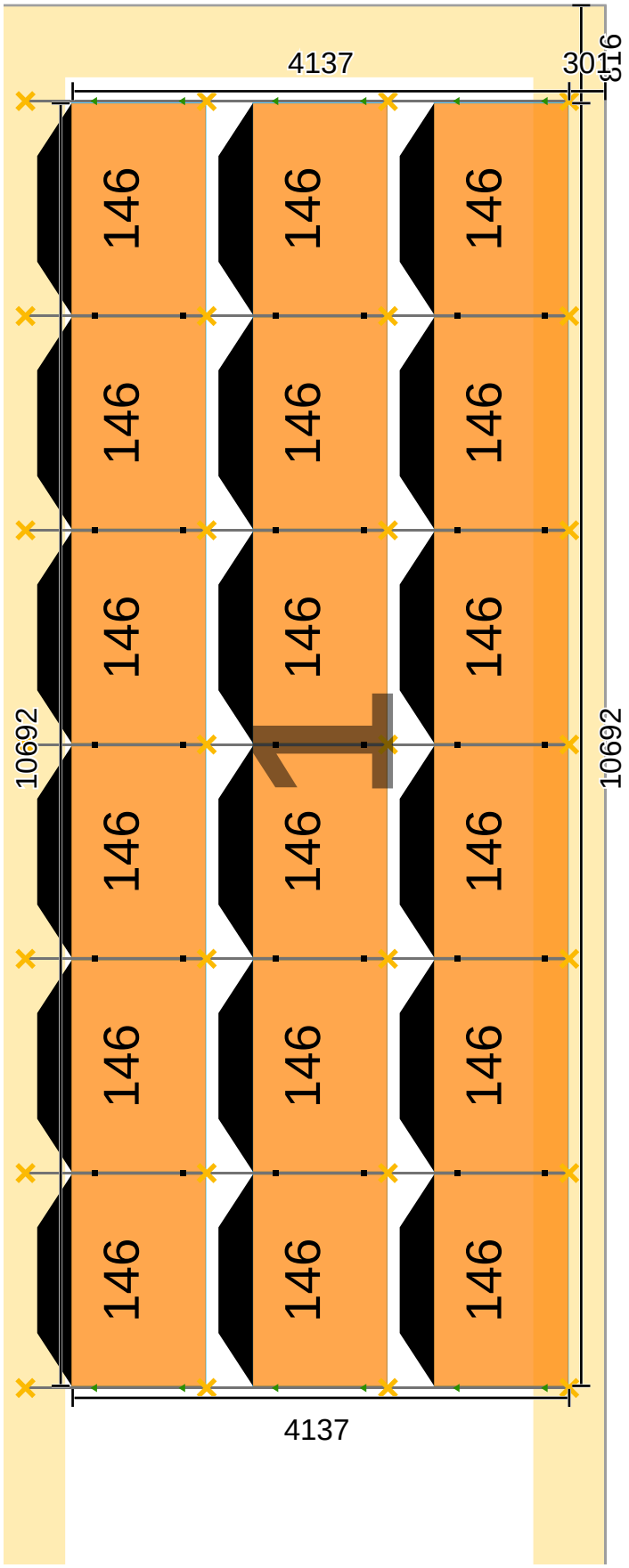
916



Ballast value[kg] (Blocks with 10 kg) / Sum of ballast stones: 270

146
(15)
(18 x 15)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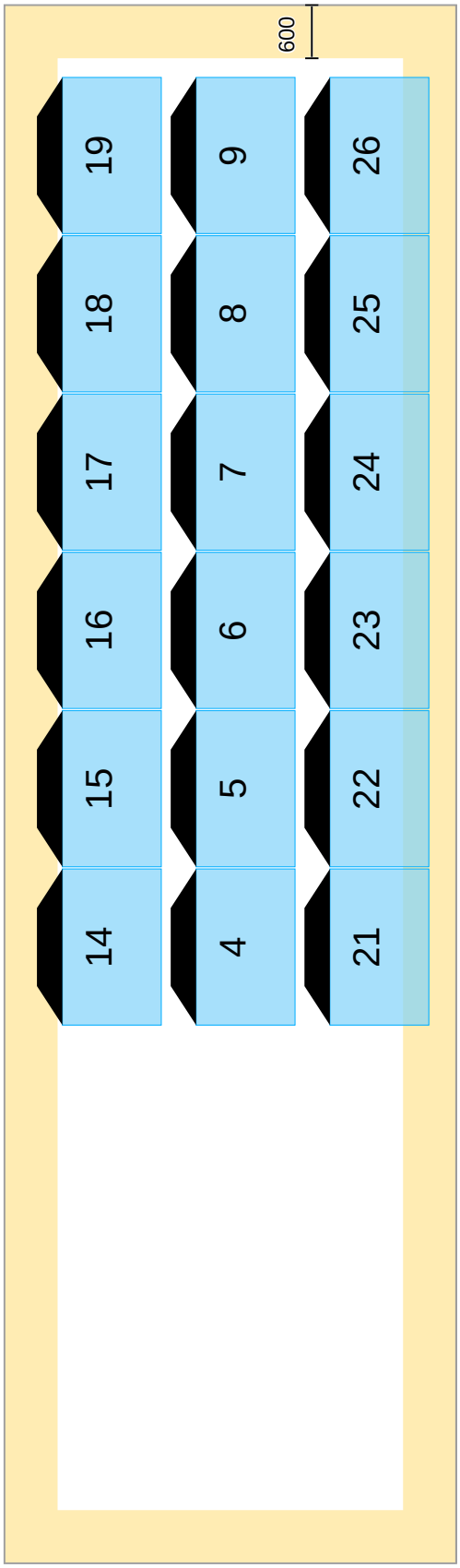
316
146
10692
4137


600
19
18
17
16
15
14
9
8
7
6
5
4
26
25
24
23
22
21

BILL OF MATERIAL

Article No.	Article	Quantity	Ordering Unit	Weight/Piece	Weight
R420081-BE	End clamp+ (black)	12	1	0,064 kg	0,768 kg
R420082-BE	Middle clamp+ (black)	30	1	0,063 kg	1,890 kg
R500227	FS Pro Securing bolt	35	1	0,007 kg	0,245 kg
R500240	FS Pro 10-S Streamliner 1900	18	1	2,195 kg	39,510 kg
R500241	FS Pro Streamliner bracket	21	1	0,147 kg	3,087 kg
R500250	FS Pro Ballast profile 1900	18	1	1,287 kg	23,166 kg
R500251	FS Pro Ballast profile connector	15	1	0,144 kg	2,160 kg
R500252	FS Pro Ballast profile support	21	1	0,053 kg	1,113 kg
R500253	FS Pro Securing clip ballast support	21	1	0,007 kg	0,147 kg
R500260	FS Pro Potential equalisation clip S	14	1	0,007 kg	0,098 kg
R500270	FS Pro Roof protection pad 300	2	1	0,016 kg	0,032 kg
R520220	FS Pro 10-S Base rail 1500 (Set)	21	1	1,776 kg	37,296 kg
R900229	Self Drilling Screw 4,8x19 A2	1	100	0,005 kg	0,500 kg
				Total Weight:	110,012 kg

ROOF STATICS

ROOF STATICS

Total weight	3109 kg
Module weight	378 kg
Ballast	2621 kg
Max ballast	146 kg
Roof size	89,66 m^2
Weight per total roof area	34,67 kg/m^2
Mounting system weight	110,01 kg

MODULE FIELD STATICS

FIELD1

Total weight	3109 kg
Module weight	378 kg
Ballast	2621 kg
Max ballast	146 kg
Field area	44,23 m^2
Weight per field area	70,29 kg/m^2
Mounting system weight	110,01 kg

LOAD ASSUMPTIONS

Dead load

Solar modules type TSM-450NEG9R.28 (Vertex S+) are used.

Dimensions:	1762 mm x 1134 mm
Weight:	G = 21.0 kg

Snow load

The determination of the snow load is carried out according to BS EN 1991-1-3:2003/NA:2010-06.
Snow-trap formation or snow-load accumulations are not considered in the calculation. Please contact Renusol if necessary.

Height above sea level:	85 m
Snow load zone:	3
Roof pitch:	α = 2°
Module elevation:	β = 9°
total pitch:	2.0°
Period of use:	25 Year
Snow load:	$s_k = s_{k,50} * f_s$ = 0.50 kN/m² * 0.93 = 0.46 kN/m² μ_1 = 0.800 $s_1 = \mu_1 * s_k$ = 0.8 * 0.46 kN/m² = 0.371 kN/m² $s_{1,2°}$ = 0.371 kN/m² * cos(2.0°) = 0.371 kN/m²

Wind load

The determination of the wind load is carried out according to BS EN 1991-1-4:2005/NA:2011-01.

Building height roof ridge:	11 m
Terrain category:	Country terrain
Basic wind velocity:	22.00 m/s
Distance to shoreline:	50.000 km
Period of use:	25 Year
Pressure of the gusts velocity:	q(z) = 0.780 kN/m²

MODULSTATIK

Systemkonstanten

$\gamma_G = 1$	Teilsicherheitsbeiwert Eigengewicht
$\gamma_Q = 1.5$	Teilsicherheitsbeiwert Wind
$A_M = 2.00\ m^2$	Modulfläche
$\beta_M = 8.9°$	Module elevation
$A_D = 0.34\ m^2$	Fläche des Streamliners
$\beta_D = 85.9°$	Neigung des Streamliners
$m = 25\ kg$	Masse eines Modultisches mit Streamliner incl. Unterkonstruktion
$\alpha = 2°$	Roof pitch
$\mu = 0.5$	Reibbeiwert
$q_p = 0.780\ kN/m^2$	Pressure of the gusts velocity
$g = 9.81\ m/s^2$	Erdbeschleunigung

Koeffizienten und Beiwerte

n	Effektive Anzahl Module
$61\ m^2 \le A_{eff} = n * A_M \le 465\ m^2$	Effektive Modulfläche
$k_A = 1 - 0.53 * lg(A_{eff}/61m^2) / lg(465/61)$	Koeffizient für effektive Modulfläche
$k_R = 1.6$	Koeffizient nur für Module mit geringem Abstand zum Dachrand
k_p	Koeffizient für Attikahöhe
$k_\alpha = \mu / (\mu * \cos(\alpha) - \sin(\alpha)) = 1.08$	Koeffizient für Dachneigung im Lastfall Verschieben
cp_M, cp_D	Druckbeiwerte auf Modul bzw. Streamliner

Gesamtdruckbeiwerte

$c_M = cp_M * k_p * k_A * k_R$

$c_D = cp_D * k_p * k_A * k_R$

Einwirkende Kräfte

$F_z = -q_p * (A_M * \cos(\beta_M) * c_M + A_D * \cos(\beta_D) * c_D)$	Vertikale Last - System mit Streamliner
$F_x = q_p * \lvert A_M * \sin(\beta_M) * c_M + A_D * \sin(\beta_D) * c_D \rvert$	Horizontale Last - System mit Streamliner

Ballastermittlung (pro Modultisch)

$G_W = k_\alpha * \gamma_Q * (F_x/\mu + F_z) / \gamma_G$	Erforderliches Gesamtgewicht im Lastfall Verschieben
$G_A = \cos^{-1}(\alpha) * \gamma_Q * F_z / \gamma_G$	Erforderliches Gesamtgewicht im Lastfall Abheben
$B = MAX(G_W, G_A) / g - m$	Erforderlicher Ballast

MODULSTATIK

Modul	Ballast [kg]	Lastfall	k_R	n	k_p	cp_M	cp_D
4	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
5	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
6	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
7	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
8	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
9	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
14	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
15	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
16	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
17	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
18	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
19	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
21	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
22	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
23	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
24	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
25	145.6	Verschieben	1.6	18	1.000	-0.240	0.318
26	145.6	Verschieben	1.6	18	1.000	-0.240	0.318

IMPORTANT NOTES

The Project Report is a result of information provided by the Customer ("Customer" means customer of Renusol ordering this Project Report from the technical service of Renusol or user of the PV Configurator creating this Project Report himself). Renusol has neither verified the accurateness nor the completeness of the information and data provided by the Customer, which form the basis of this Project Report. It is the responsibility of the Customer to check and verify all input variables (including but not limited to those input variables which had been pre-set with proposed values) and assumptions used in the Project for their accuracy and correctness.

These verifications shall include but not be limited to the following aspects: (a) Wind and snow loads are proposed by the PV Configurator using respective wind and snow load maps. It should be verified that the local conditions do not deviate from the values used in the Configuration (e.g. location on mountain with higher snow load). (b) The Customer shall check and verify the Failure Consequence Class ("CC"). Typical residential and commercial buildings require CC 2. The Customer shall use higher CC in sensitive local environment (e.g. public building, high frequency of visitors, vicinity with potential for severe damages). (c) The service lifetime of the PV installation shall be verified by the Customer depending on the expectation of the ultimate user of the PV installation as well as the lifetime of the other components used in the installation. If the lifetime is expected beyond the service lifetime used for this Project Report, all relevant structural properties as well as input variables and assumptions shall be re-checked using the then expected service lifetime. (d) For flat roof systems: The Customer shall in any case measure and document the friction coefficient of the PV system on the location-specific roof cover it is placed on. The measurement shall be performed in various, at least three roof areas. (e) For flat roof systems: The PV Configurator proposes a ballast calculation. The ballast forms, together with the weight of the PV mounting system itself and the weight of the module, the total weight of the system. The actual ballast applied may in no case be lower than the values proposed by the PV Configurator. The ballast applied shall furthermore be documented. If the ballast applied cannot be precisely determined, a safety factor increasing the ballast is to be applied.

To the extent values of input variables measured or observed by the Customer differ from values used in this Project Report, the configuration of the PV installation shall be re-iterated using the respective correct values.

To the extent this Project Report includes a data concerning structural properties, it is the responsibility of the Customer to professionally verify (have verified) the structural data with regards to its compliance with the applicable local laws and properties of the location for which the Project Report has been prepared.

Furthermore the Terms of Use of the Renusol PV Configurator ({https://www.pv-configurator.com/pages/terms}) and the General Terms and Conditions (https://www.renusol.com/files/content/Downloads/Rechtliche%20Dokumente/Renusol_AGB_EN_110406.pdf) apply. The General Installation Guidelines of Renusol as well as the Installation Manuals and Data Sheets of the respective Renusol products, have likewise to be complied to.

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