ENSTALL

Project plan

Openshaw,

Roof 1



Location: Manchester M11 2WH, UK

Calculation date: 07-07-2026

ClickFit Evo

METAL ROOF

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Disclaimer **42**

Scan the code for the product manual.

Overview

General

Generated by	Christian Dallimore (chris.dallimore@ukgreentech.co.uk)*
Address	Manchester M11 2WH, UK
Basic wind speed ($v_{b,map}$)	22.5 m/s**
Fundamental value of basic wind speed	23.78 m/s
Terrain category	Town**
Distance to coast	50.0 km**
Distance to city boundary	2.0 km (calculated with 2.0 km)**
Wind pressure	604.09 N/m²
Snow zone	3**
Characteristic value of snow on the ground	0.42 kN/m²
Snow load on the roof	334.48 N/m²
Altitude above sea level	57.0 m**
Consequence class	CC1
Reference period	50 years

* This person can open this project in the calculator via https://calculator.eu.enstall.com/3502406/4584207.

** Automatically determined based on the address.

Roof specification

Roof height	8.8 m
Roof pitch	6.0°
Roofing material	Steel
Building type	Stand-alone
Steel type	Trapezoidal
Steel thickness	0.5 - 1.0 mm

System specification

Panel model	JA JAM60D42-540
Panel dimensions	2063 mm x 1134 mm x 30 mm
Panel weight	28.8 kg
Panel count	51
Orientation	Portrait
Segment count	12

Panel power	540 Wp
Total power	27.540 kWp

Complete list of materials

Total roof bill of materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	126
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	126
1008065-B	ClickFit EVO End clamp support black	48
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	504

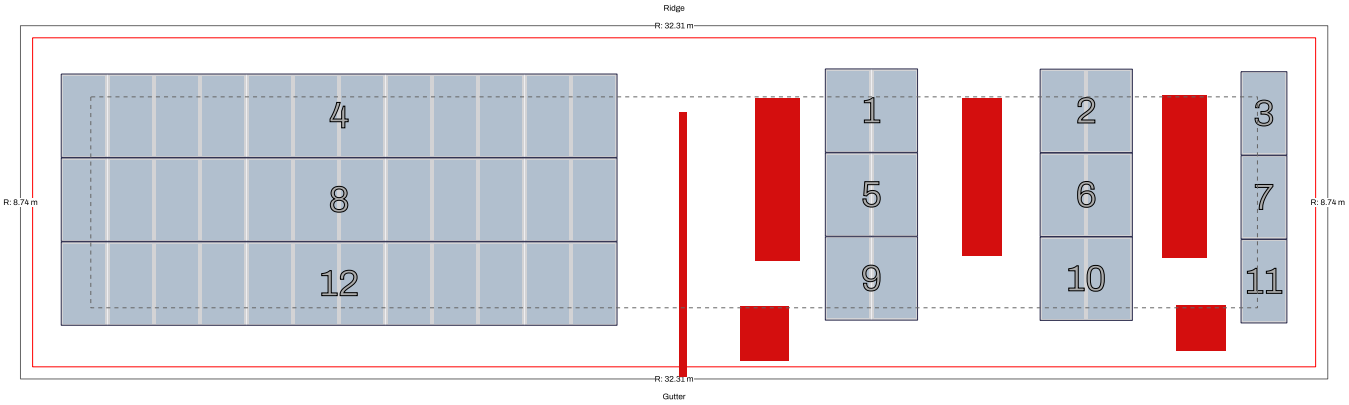
Assembly

General installation conditions

Warning!

⚠ To ensure the safe and efficient installation of PV systems, the work should be carried out by qualified personnel trained to do installations for the chosen roof material. The installation should be conform the general instructions in the user manual and the roof-specific instructions in this project plan.

Roof overview

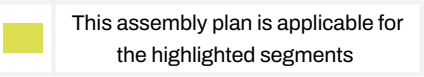


R: XXm	Length of outer roof side
	No-Go zone width (30cm)

Edge depth ridge and gutter	1.76 m
Edge depth side gable	1.74 m

Segment 1

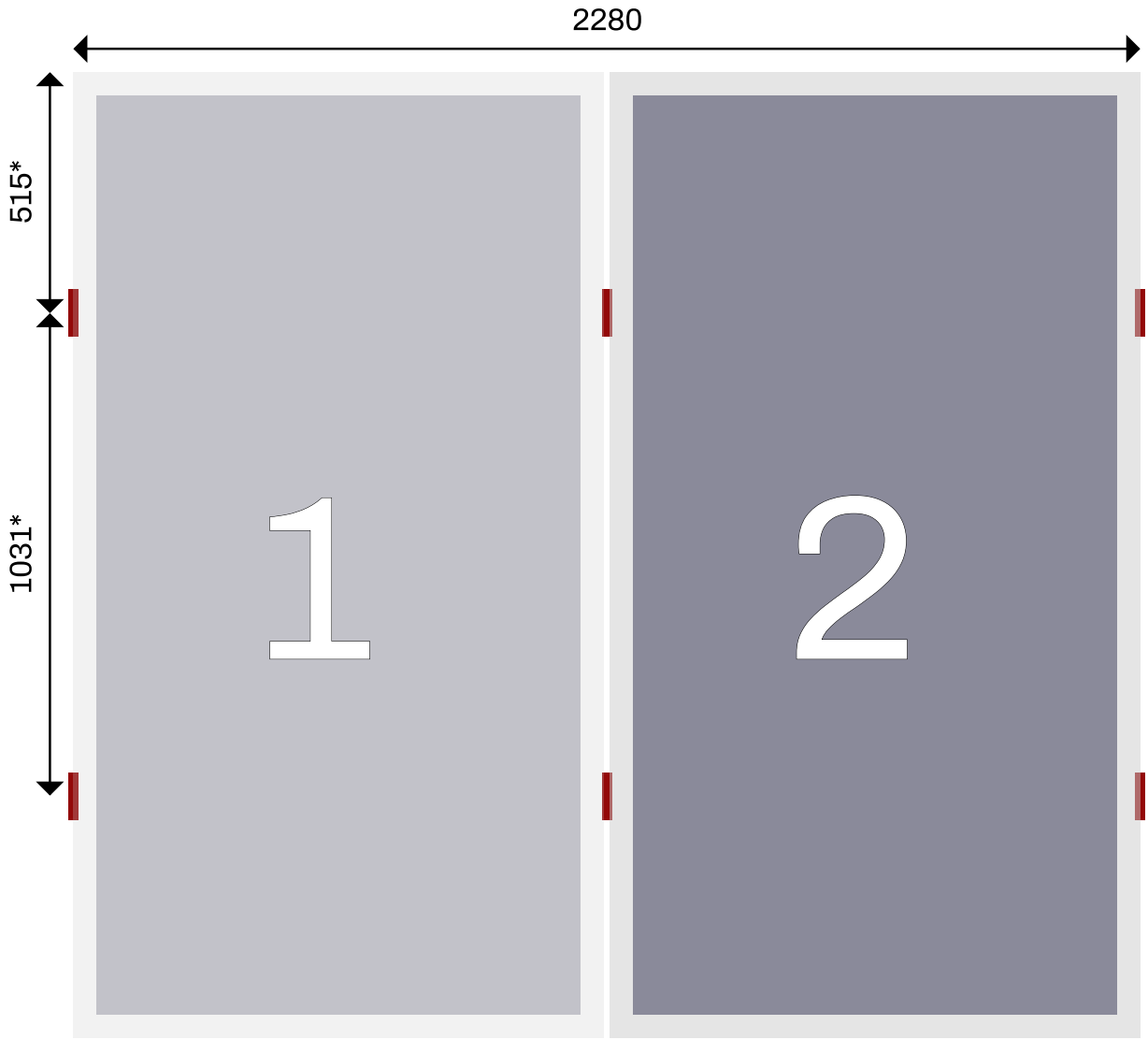




Panel count	2
Total power	1.080 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

* When needed, rail spacing can be extended to the previous or next tile, crest or seam, up to 400mm beyond the recommended distance. Enstall recommends to always respect the module manufacturers rail spacing and clamping specifications.

Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	6
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	6
1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	24

Segment 2, 9

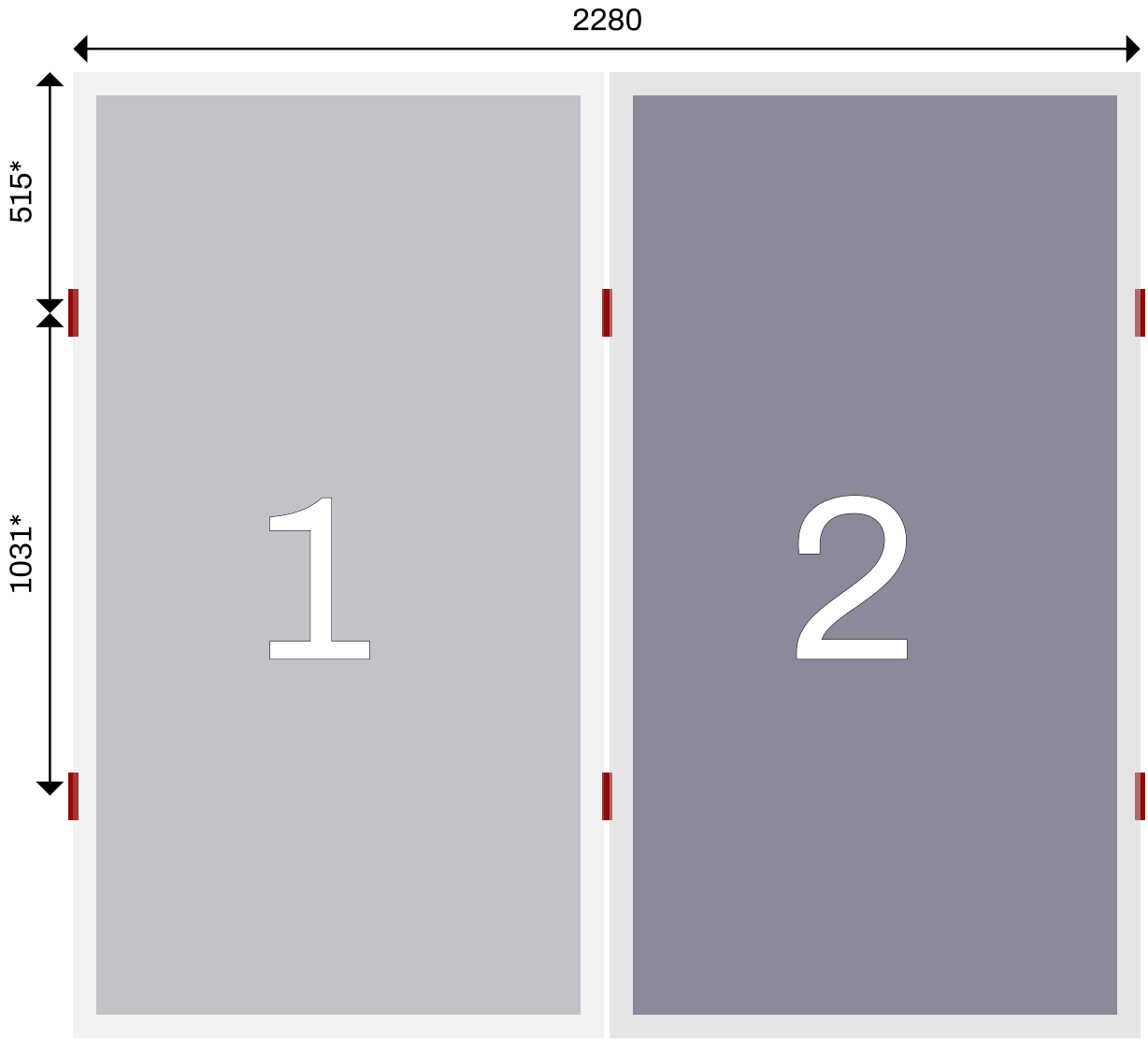


This assembly plan is applicable for the highlighted segments

Panel count	2
Total power	1.080 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

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Number of profiles on side of the panel	2
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Article number	Description	Amount
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Segment 3, 7

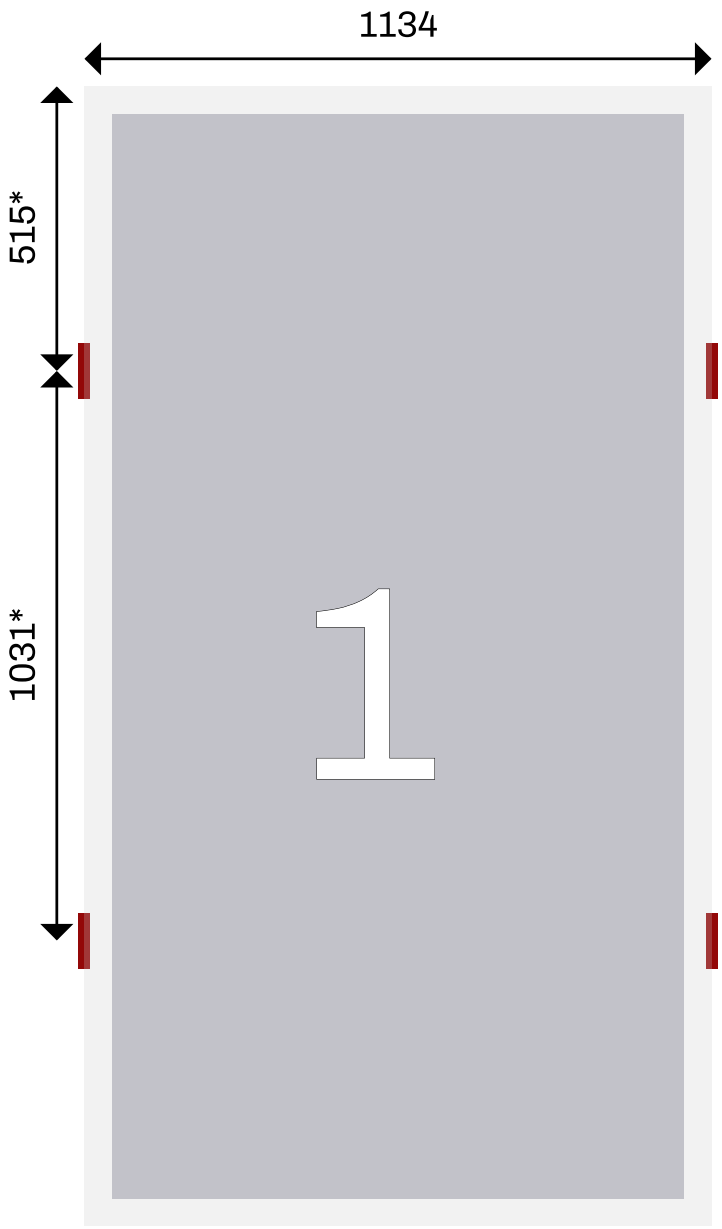
Panel count	1
Total power	0.540 kWp
Orientation	Portrait
Rail system	Horizontal



This assembly plan is applicable for the highlighted segments

Assembly plan

Fixation plan



Units are in mm

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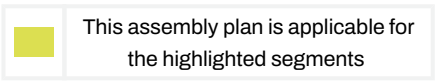
Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	4
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	4
1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	16

Segment 4, 8

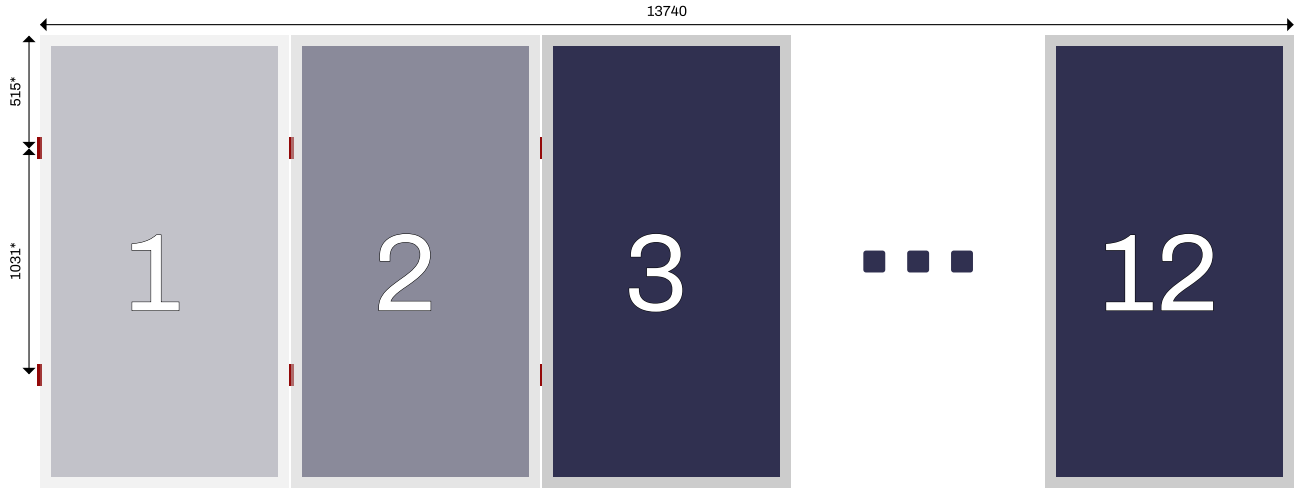




Panel count	12
Total power	6.480 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

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Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	26
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	26
1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	104

Segment 5, 6

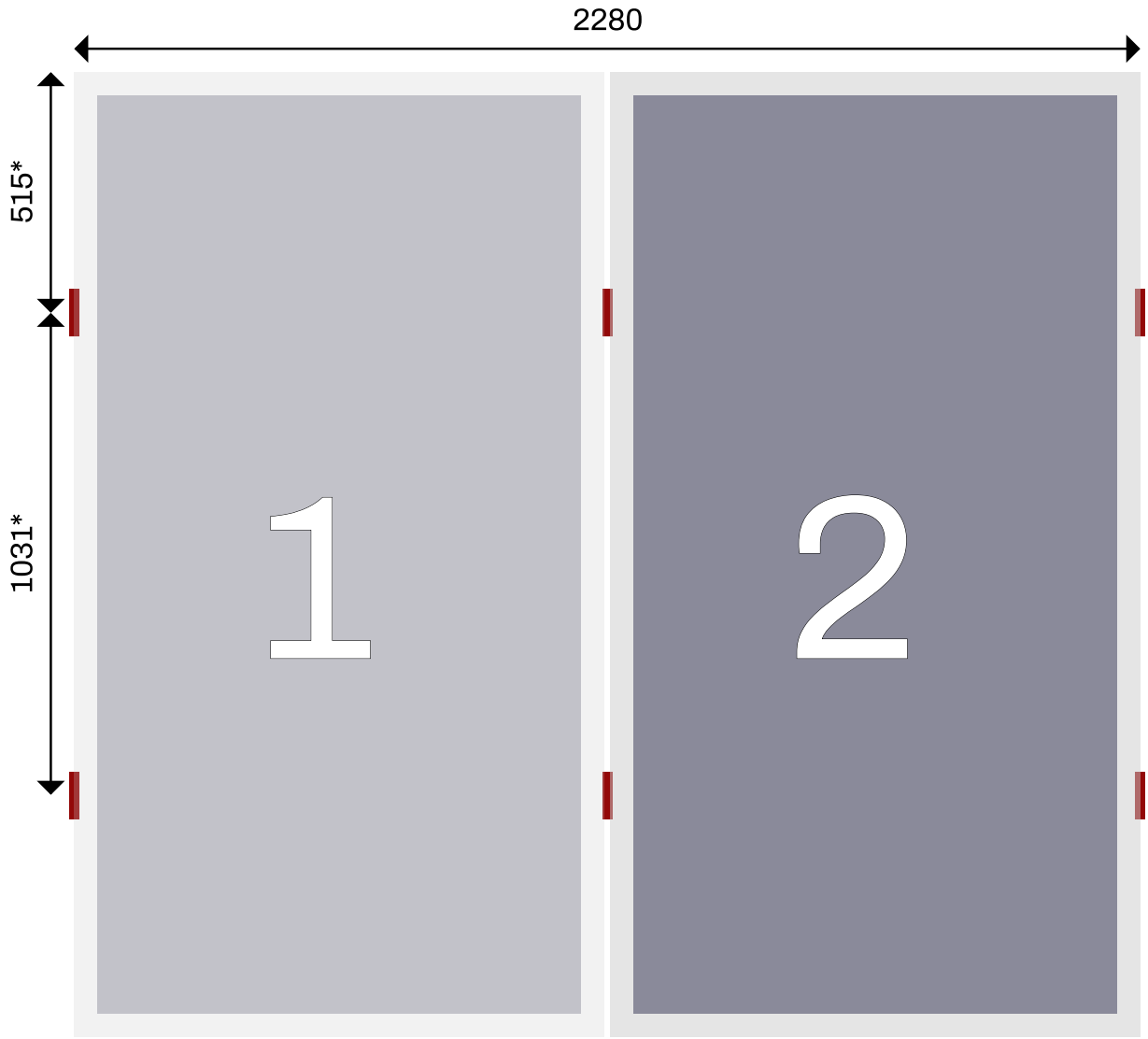


This assembly plan is applicable for the highlighted segments

Panel count	2
Total power	1.080 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

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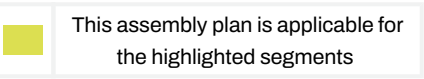
Number of profiles on side of the panel	2
Number of screws per profile	4

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Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	6
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1008065-B	ClickFit EVO End clamp support black	4
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Segment 10

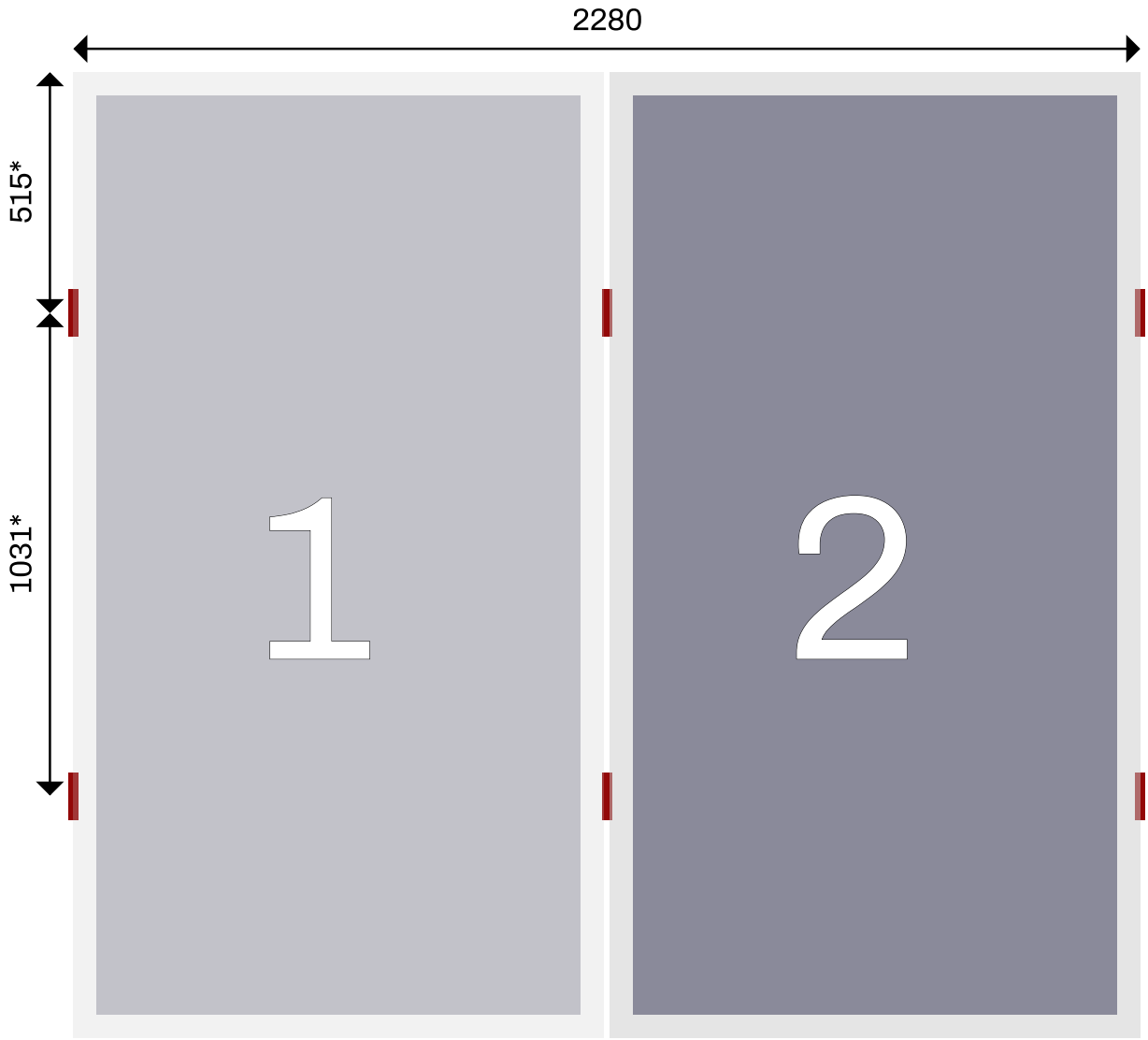




Panel count	2
Total power	1.080 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

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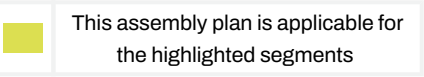
Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	6
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	6
1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	24

Segment 11

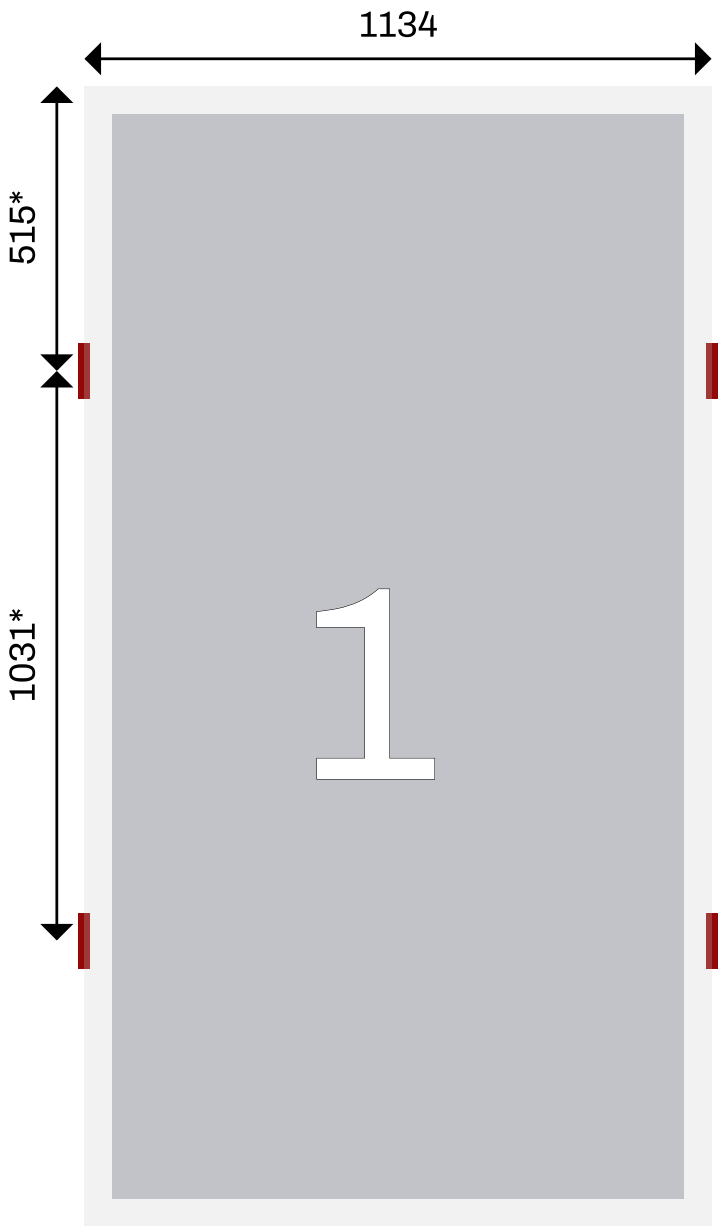




Panel count	1
Total power	0.540 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

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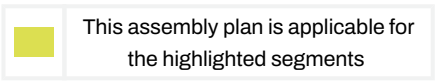
Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
1008020-B	ClickFit EVO Module clamp universal black	4
1008052	ClickFit EVO Mounting Profile Trapezoidal Metal Roof Portrait	4
1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	16

Segment 12

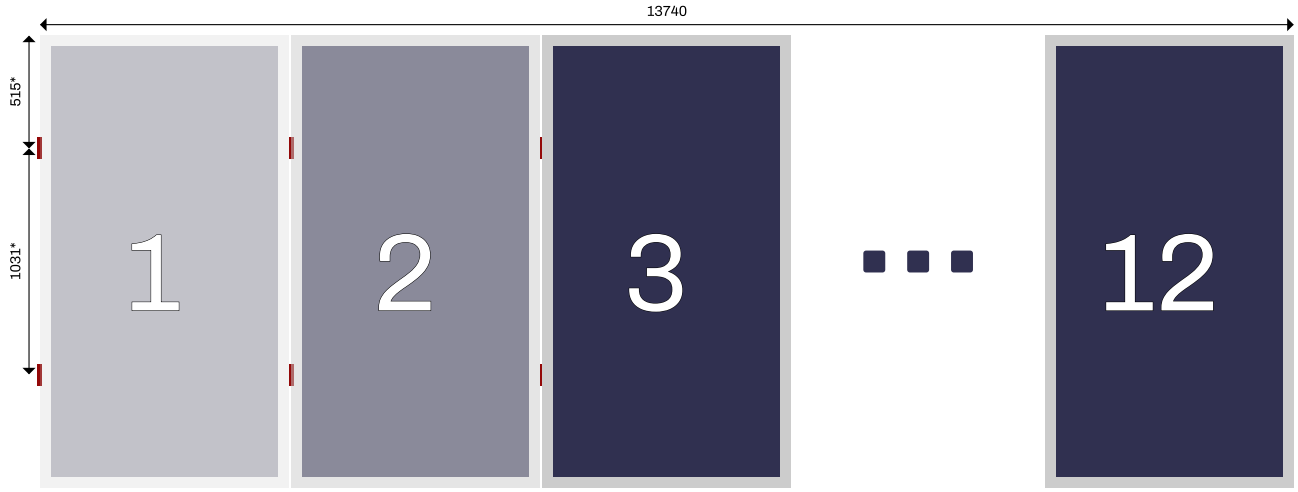




Panel count	12
Total power	6.480 kWp
Orientation	Portrait
Rail system	Horizontal

Assembly plan

Fixation plan



Units are in mm

* When needed, rail spacing can be extended to the previous or next tile, crest or seam, up to 400mm beyond the recommended distance. Enstall recommends to always respect the module manufacturers rail spacing and clamping specifications.

Number of profiles on side of the panel	2
Number of screws per profile	4

Materials

Article number	Description	Amount
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1008065-B	ClickFit EVO End clamp support black	4
1008085	Self-tapping sheet metal screw 6,0x25 mm SW10 HEX/T30	104

Calculations

Input

Altitude factor (c_{alt})	1.06
Town terrain exposure correction factor ($c_{e,T}$)	0.85
Displacement height (h_{dis})	3.0 m
Snow fences	No

Snow load

Reference period	n	50	years	
Snow zone		3		
Characteristic ground snow load for 50 years	s_k	0.42	kN/m²	BS EN 1991-1-3
Annual variation coefficient	V	0.0*		BS EN 1991-1-3
Annual probability	P_n	0.02		BS EN 1991-1-3
Snow load form coefficient	μ	0.8		BS EN 1991-1-3
Exposure coefficient	C_e	1.0		BS EN 1991-1-3
Thermal coefficient	C_t	1.0		BS EN 1991-1-3
Characteristic ground snow load for n years	S_n	0.42	kN/m²	$s_k \left(\frac{1 - V \frac{\sqrt{6}}{\pi} (\ln(-\ln(1-P_n)) + 0.57722)}{(1 + 2.5923\ V)} \right)$
Snow load on the roof	s	334.48	N/m²	$\mu \cdot S_n \cdot C_e \cdot C_t$

* No variation coefficient given, we assume a value of 0

Peak velocity pressure

Reference period	n	50	years	
Basic wind velocity	v_b	23.78	m/s	
Air density	ρ	1.23	kg/m³	BS EN 1991-1-4
Building height incl. parapet	h	8.8	m	
Terrain category		Town		
Orography factor	c_o	1.0		
Peak velocity pressure over 50 years	$q_{p,50}$	604.09	N/m²	BS EN 1991-1-4
Probability factor	c_{prob}	1.0		BS EN 1991-1-4
Altitude above sea level	A	57.0	m	
Basic wind pressure	q_b	346.72	N/m²	$0.5 \cdot \rho \cdot {v_b}^2$
Peak velocity pressure over reference period	q_p	604.09	N/m²	$q_{p,50} \cdot {c_{prob}}^2$

Load equations - General

Consequence class		CC1		
Reliability factor	K_{FI}	0.9		BS EN 1990
Reduction factor	ξ	1.0		BS EN 1990
Partial factor for unfavorable permanent actions	$\gamma_{G,sup}$	1.35		BS EN 1990
Partial factor for favorable permanent actions	$\gamma_{G,inf}$	1.0		BS EN 1990
Snow combination factor	$\psi_{0,snow}$	0.5		BS EN 1990
Wind combination factor	$\psi_{0,wind}$	0.5		BS EN 1990

Ultimate limit state (ULS) equations

Primary wind, secondary snow (6.10):
$$K_{FI} \cdot \gamma_{G,sup} \cdot G_k + K_{FI} \cdot \gamma_Q \cdot Q_{k,wind,ec} + K_{FI} \cdot \psi_{0,snow} \cdot \gamma_Q \cdot Q_{k,snow}$$

Primary snow, secondary wind (6.10):
$$K_{FI} \cdot \gamma_{G,sup} \cdot G_k + K_{FI} \cdot \gamma_Q \cdot Q_{k,snow} + K_{FI} \cdot \psi_{0,wind} \cdot \gamma_Q \cdot Q_{k,wind,ec}$$

Wind pressure as primary action (6.10):
$$K_{FI} \cdot \gamma_{G,sup} \cdot G_k + \gamma_Q \cdot K_{FI} \cdot Q_{k,wind,wt}$$

Wind uplift as primary action (6.10):
$$\gamma_{G,inf} \cdot G_k + \gamma_Q \cdot K_{FI} \cdot Q_{k,wind,lift}$$

Serviceability limit state (SLS) equations

Primary wind, secondary snow (6.14):
$$G_k + Q_{k,wind,ec} + \psi_{0,snow} \cdot Q_{k,snow}$$

Primary snow, secondary wind (6.14):
$$G_k + Q_{k,snow} + \psi_{0,wind} \cdot Q_{k,wind,ec}$$

Wind pressure as primary action (6.14):
$$G_k + Q_{k,wind,wt}$$

Wind uplift as primary action (6.14):
$$G_k + Q_{k,wind,lift}$$

Roof loads

Total system weight	61.91 kg
Total panel weight	1,468.8 kg
Total weight	1,530.71 kg
Roof area (gross)	282.3 m²
Average load over roof area	5.42 kg/m²
System area (projected area)	120.28 m²
Average load over system area	12.73 kg/m²

Roof loads for segment 1

Total system weight	2.97 kg
Total panel weight	57.6 kg
Total weight	60.57 kg
System area (projected area)	4.7 m²
Average roof load over system area	12.88 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 2, 9

Total system weight	2.97 kg
Total panel weight	57.6 kg
Total weight	60.57 kg
System area (projected area)	4.7 m²
Average roof load over system area	12.88 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 3, 7

Total system weight	2.0 kg
Total panel weight	28.8 kg
Total weight	30.8 kg
System area (projected area)	2.34 m²
Average roof load over system area	13.17 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 4, 8

Total system weight	12.69 kg
Total panel weight	345.6 kg
Total weight	358.29 kg
System area (projected area)	28.35 m²
Average roof load over system area	12.64 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 5, 6

Total system weight	2.97 kg
Total panel weight	57.6 kg
Total weight	60.57 kg
System area (projected area)	4.7 m²
Average roof load over system area	12.88 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 10

Total system weight	2.97 kg
Total panel weight	57.6 kg
Total weight	60.57 kg
System area (projected area)	4.7 m²
Average roof load over system area	12.88 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 11

Total system weight	2.0 kg
Total panel weight	28.8 kg
Total weight	30.8 kg
System area (projected area)	2.34 m²
Average roof load over system area	13.17 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Roof loads for segment 12

Total system weight	12.69 kg
Total panel weight	345.6 kg
Total weight	358.29 kg
System area (projected area)	28.35 m²
Average roof load over system area	12.64 kg/m²
Maximum downwards force per attachment	542 N (SLS), 712 N (ULS)
Maximum upwards force per attachment	-276 N (SLS), -425 N (ULS)
Maximum upwards force per screw	-138 N (SLS), -212 N (ULS)

* Irregularities in the roof can cause deviating point pressures

Disclaimer

Please read this information carefully before starting with the design and installation of the PV system.

The output for the design of the PV system is generated by using the calculator tool made available through the website of Enstall Europe B.V. ("**Enstall**") at www.enstall.com (the "**Calculator**"). The responsibility for the correct application of the output derived from the Calculator lies with the user of the Calculator and/or the installer or any other person responsible for the installation of the PV system, which output may be subject to or impacted by many different variables and factors. The installation of a PV system onto an existing building can for example impact the existing building loads (e.g., as a result of snow and wind) or the building construction. To avoid personal injury and/or property damages, the installer or any other person responsible for the installation of a PV system should ensure that the static calculations applicable to the existing building are reviewed and confirmed beforehand by a qualified technician. Any applicable regulations, including (but not limited to) NEN 7250, EN 1990, EN 1991-1-3, EN 1991-1-4 and relevant national annexes, should be observed and adhered to. Failure to obtain such confirmation or observe and adhere to applicable regulations may, amongst others, lead to failure of the roof load-bearing structure of the building. It is advisable to consult with the insurer of the building in case of the intention to install a PV system or in case of any other intended changes to the building.

The installer or any other person responsible for the installation of a PV system should also consider, confirm or control applicable design elements which include (but are not limited to):

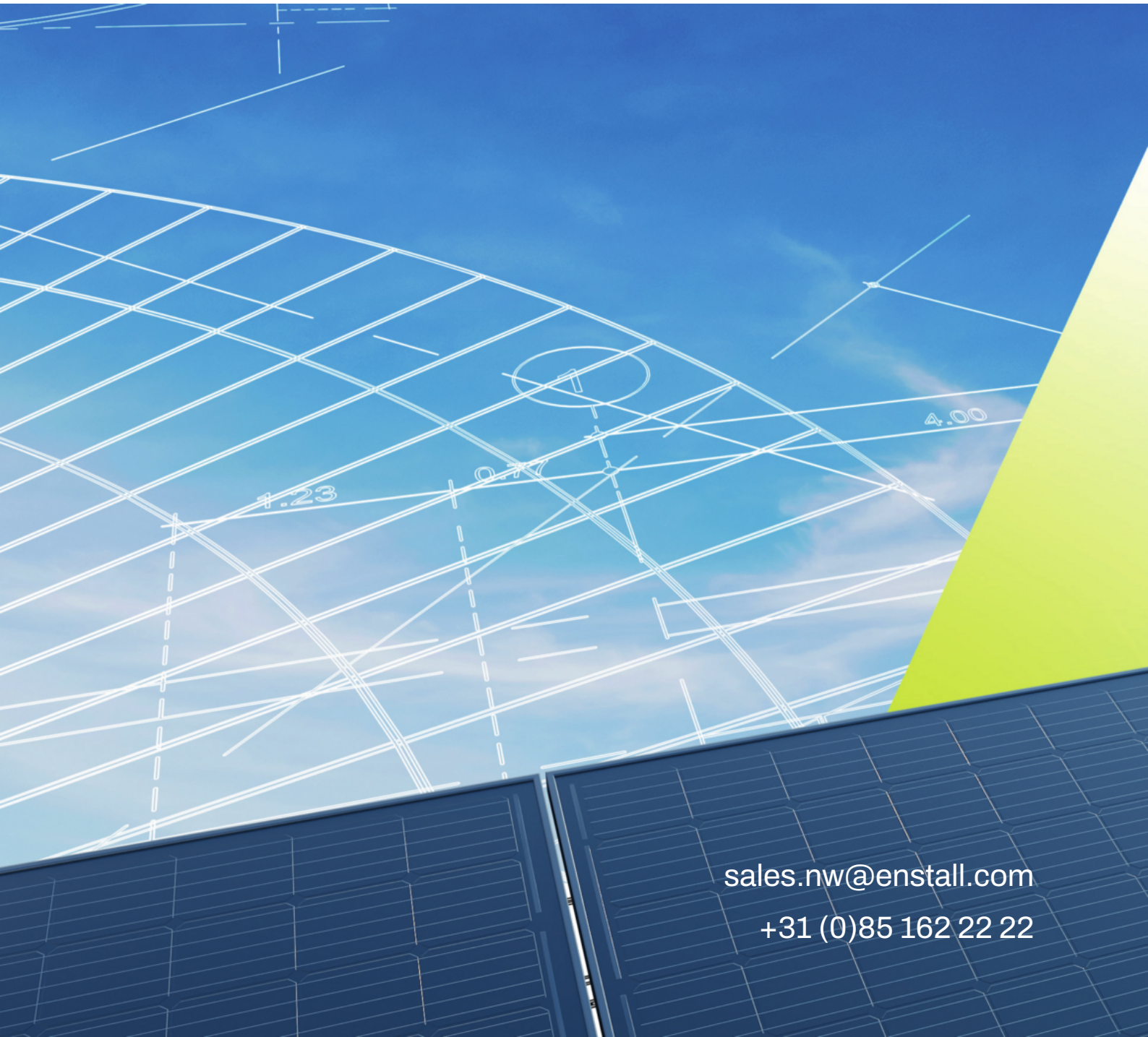
a. changes as a result of the additional weight of the complete PV system on the building;
b. changes as a result of the changed geometry of the building's roof;
c. changes as a result of the dynamic wind pressure and possible accumulation of rain or any other precipitation on the building;
d. the loads occurring during installation on the building, roofing material and insulation;
e. the compatibility of the insulation and roofing material at the location of the contact points of the long-term PV-system's support structure, as a result of the pressure point;
f. the compatibility of the roofing material in combination with the support structure at the location of the contact points;
g. the effect of thermal performance of the building on the PV system and vice versa; and/or
h. the effect of any movement and vibrations of the roof on the PV system and vice versa.

In addition, the installer or any other person responsible for the installation of a PV system should confirm the compatibility of any third party products, components or materials (including PV panels) used in conjunction with Enstall's products, if such third party products, components or materials have not been provided for such use by or on behalf of Enstall or the use of which has not been expressly authorized by Enstall. Reference to a third party product in the Calculator should not be deemed an express or implied authorization by Enstall. Enstall's products should always be used in accordance with instructions set out in the most recent version of the applicable manual, available via www.enstall.com.

Prices in the Calculator are indicative and are subject to change resulting from, amongst others, fluctuations in commodity prices.

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