

Structural Calculations

Customer Name

Report Author

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Contractor Name

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Address

2 De Quincey Road

System Data

System Size

3.600 kW (DC)

Number of roofs

1

Module Details

8 x DM450M10RT-B54HBT

Weight loading calculations

Roof 1

Weight of solar panels and mounting	239.0 kg
Area of solar array	15.98 m ²
Loading imposed by solar array	0.147 kN/m ²
Dead load from roof covering	0.020 kN/m ²
Total load of solar array, mounting and roof covering	0.167 kN/m²
Maximum permitted dead load	0.785 kN/m²

The system load is below the maximum permitted load



Weight loading calculations follow methodology outlined in The Solar PV Standard published by MCS.

Snow loading

Snow zone	3
Altitude	0.0
Roof pitch	31.0
Imposed load due to solar array and mounting	0.147 kN/m²
Imposed load due to snow	0.359 kN/m²
Maximum permitted imposed load	0.75 kN/m²

The total imposed load is below the maximum permitted load



Snow loading is calculating following Eurocode-1 (BS EN 1991-1) as advised by The Solar PV Standard published by MCS.

Wind loading calculations

Wind loading calculations follow the methodology described in MCS's Guide to the Installation of Photovoltaic Systems. The forces on the fixings are calculated using the equation above, and compared to the force which would cause the fixings to pullout.

$$F = Q_p \times C_{pnet} \times C_a \times C_t \times A_{ref}$$

Roof 1

Q_p	1066
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C_a	1
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C_t	1.0
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Area, A_{ref}	15.98 m
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	Forces acting at the roof center	Forces acting at the roof edge
Uplift, C_{pnet}	-1.3	-2.2
Uplift, F	22151.8 N	37487.7 N
Uplift per fixing	346.1 N	585.7 N
Pressure, C_{pnet}	1	1.1
Pressure, F	17039.9 N	18743.9 N
Pressure per fixing	266.2 N	292.9 N

Pullout force of each fixing	778.5 N
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The wind loading is less than the pullout force of the fixings



Q_p is derived from fig. 34 in MCS's Guide to the Installation of Photovoltaic Systems for a roof ridge 5-10m high, in windzone 3, in Urban terrain, at a distance of over 20km from the sea. C_a is derived using an altitude of 0.0m. There is assumed to be 64 fixings. The fixing thread length screwed through the timber is assumed to be 45mm, with a diameter of 6.3mm. The pullout force was calculated using these values with the tables and formulae in BS5268 part 2 for C16 timber.