



| Connecting Strength

K2 Base Report

MMU-Arts and Humanities

Project address	Manchester M15 6BG
Customer	Everwarm
Company	edge management
Author	claire fitzpatrick
Issue date & version	21/06/2024 K2 Base Version 3.1.133.5



Contents

Project overview	4
MMU-A&H-4th floor	7
Assembly plan	10
Results	13
Structural analysis report	15
Bill of material	20
MMU-A&H-5th Floor	21
Assembly plan	24
Results	26
Structural analysis report	28
Bill of material	33
MMU-A&H-6th Floor	34
Assembly plan	37
Results	40
Structural analysis report	42
Bill of material	47
Bill of material	48

About us

K2 Systems. Innovative mounting system from a strong team.

Since 2004 we have been developing pioneering and highly functional mounting system solutions for photovoltaic installations around the world. Our systems are designed in our own product development department where we continually optimize and adapt mounting systems to the ever-changing market.

A knowledgeable and friendly team

Just like a mountain climbing team, K2 Systems is built on mutual trust. This applies to our customer service as well as within the company itself, because we believe a trusting partnership leads to successful photovoltaic projects.

Our employees place total focus on the needs and wishes of our customer. This is true in all company departments.

10 locations and worldwide sales network

In our international team, everyone works together to provide customers with competent, comprehensive and entirely personalized service.

This is especially true in the constant training our employees undergo with regards to product optimization, quality assurance, or innovations in construction techniques.

Quality management and certificates

K2 Systems stands for Connecting Strength, the highest quality, and precision-crafted and customized components. Our customers and business partners deeply appreciate all of these factors. Three independent authorities have tested, confirmed, and certified our skills and components. External authorities are not the only ones to have put K2 Systems to the test. Our internal quality control ensures that all our products are subject to a constant review process.

These measures all ensure the outstanding quality standards that exemplify products from K2 Systems, and which we maintain through largely exclusive "Made in Germany" or "Made in Europe" practices.



Product guarantee

K2 Systems offers a 12-year product warranty on all products in its integrated range. The use of high quality materials and a three-level quality inspection ensure these standards.

In a nutshell

As roof-top specialists, we offer effective and economical solutions for roofs all around the world and provide professional, fast and reliable support for our customers in the solar industry.

The static report is not including module and building verification.



Project overview

Roofs

Roof	System	Module	Height	Quantity	Total power
<u>MMU-A&H-4th floor</u>  Flat	<u>S-Dome 6.10 Classic</u>	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	10.00 m	77	28.875 kWp
<u>MMU-A&H-5th Floor</u>  Flat	<u>S-Dome 6.10 Classic</u>	TSM-440NEG9R.28 (Vertex S+) 1,762×1,134×30 mm 440 Wp	13.00 m	32	14.08 kWp
<u>MMU-A&H-6th Floor</u>  Flat	<u>S-Dome 6.10 Classic</u>	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	16.00 m	44	16.5 kWp
Total				153	59.46 kWp

Project information

Address	Manchester M15 6BG
Customer	Everwarm
Author	claire fitzpatrick

Load settings

Design method	BS EN
Failure consequence class (CC)	CC1
Design working life	25 years
Terrain category	Town Terrain
Basic wind speed	22.5 m/s
Distance to shoreline	1.00 km
Distance inside town terrain	25.00 km
Snow load zone	3
Snow load on ground level	0.50 kN/m ²



Project overview

Material values

Aluminium EM-AW 6063 (EP, ET, ER/B) T66

Elastic module	E	= 70.000 N/mm ²
Shear module	G	= 26.923 N/mm ²
Density	g	= 2.700 kg/m ³
Thermal coefficient	α _T	= 2.3e ⁻⁵
Yielding strength	f _{o,k}	= 200 N/mm ²
Ultimate strength	f _{u,k}	= 245 N/mm ²



THE PROJECT IS VERIFIED.

The selected mounting system can be installed as planned
Thank you for choosing a K2 mounting system.

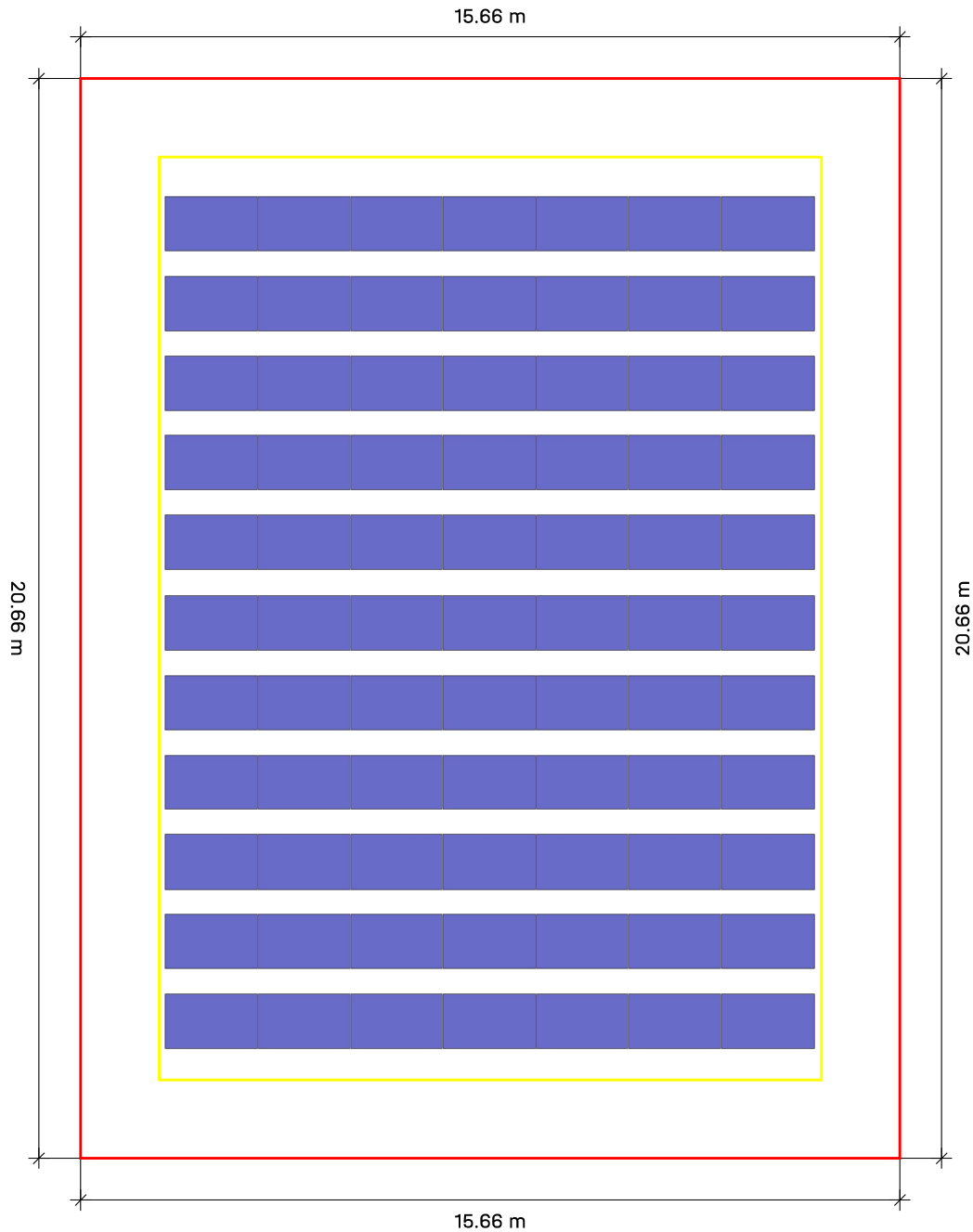
MMU-Arts and Humanities



Project information

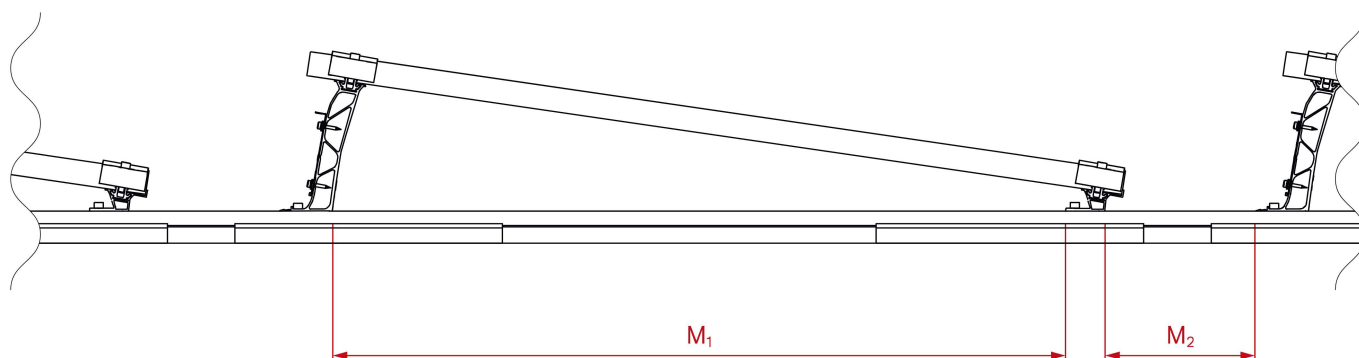
Address	Manchester M15 6BG
Customer	Everwarm
Author	claire fitzpatrick

Roofs | MMU-A&H-4th floor



Roof	System	Module	Height	Quantity	Total power
MMU-A&H-4th floor Flat	S-Dome 6.10 Classic	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	10.00 m	77	28.875 kWp

Roofs | MMU-A&H-4th floor | Pre-assembly / assembly



Module Array 1

M1 908.75 mm

M2 484.80 mm



Roofs | MMU-A&H-4th floor | Assembly plan

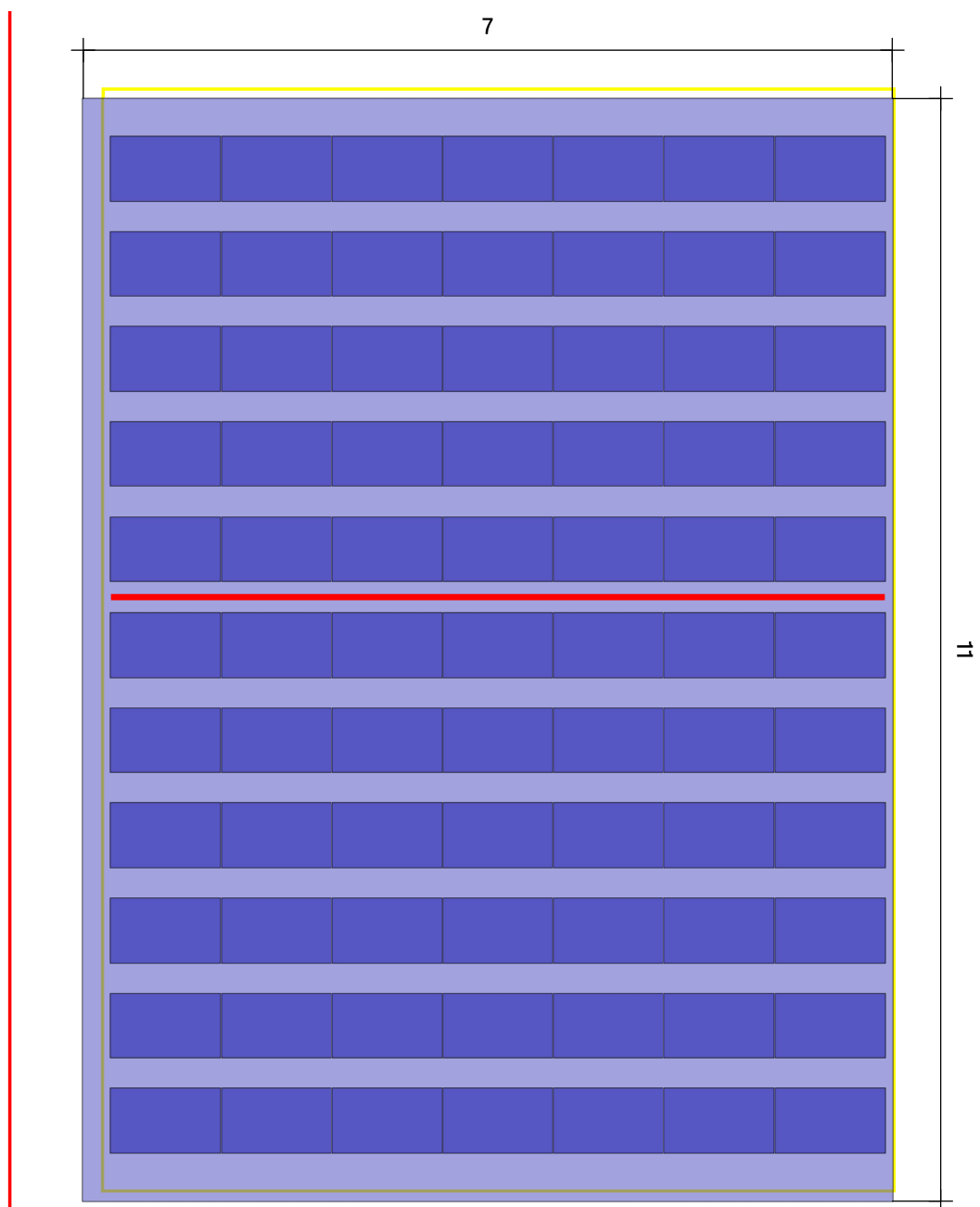
Base Rails

Type	Whole Rails		Rail cutting		
	Total Rail Length	Quantity 3.65 m	Part of Rail / Rest	Length	Rest
8*A	7.179 m	1*3.65 m	3.650	3.529 from 3.650	0.111
4*B	8.703 m	2*3.65 m	3.650	1.403 from 3.650	<u>2.237</u>
4*C	8.703 m	2*3.65 m	<u>2.237</u>	1.403 from 2.237	0.825

1 cm is viewed as lost for each cutting

Red numbers are leftover rails which will not be used any longer

Roofs | MMU-A&H-4th floor | Module array 1



Roof ① Module array ①

Mounting System

[S-Dome 6.10 Classic](#)

Module

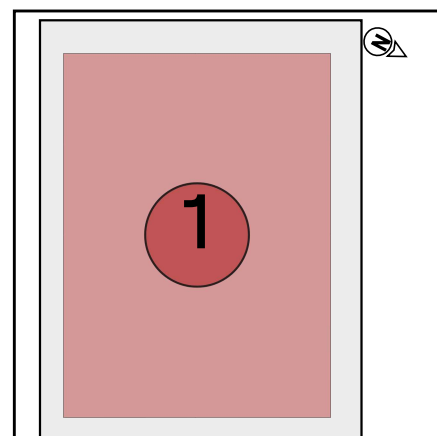
77(28.875 kWp) x
LR4-60HPH-375M

Row spacing

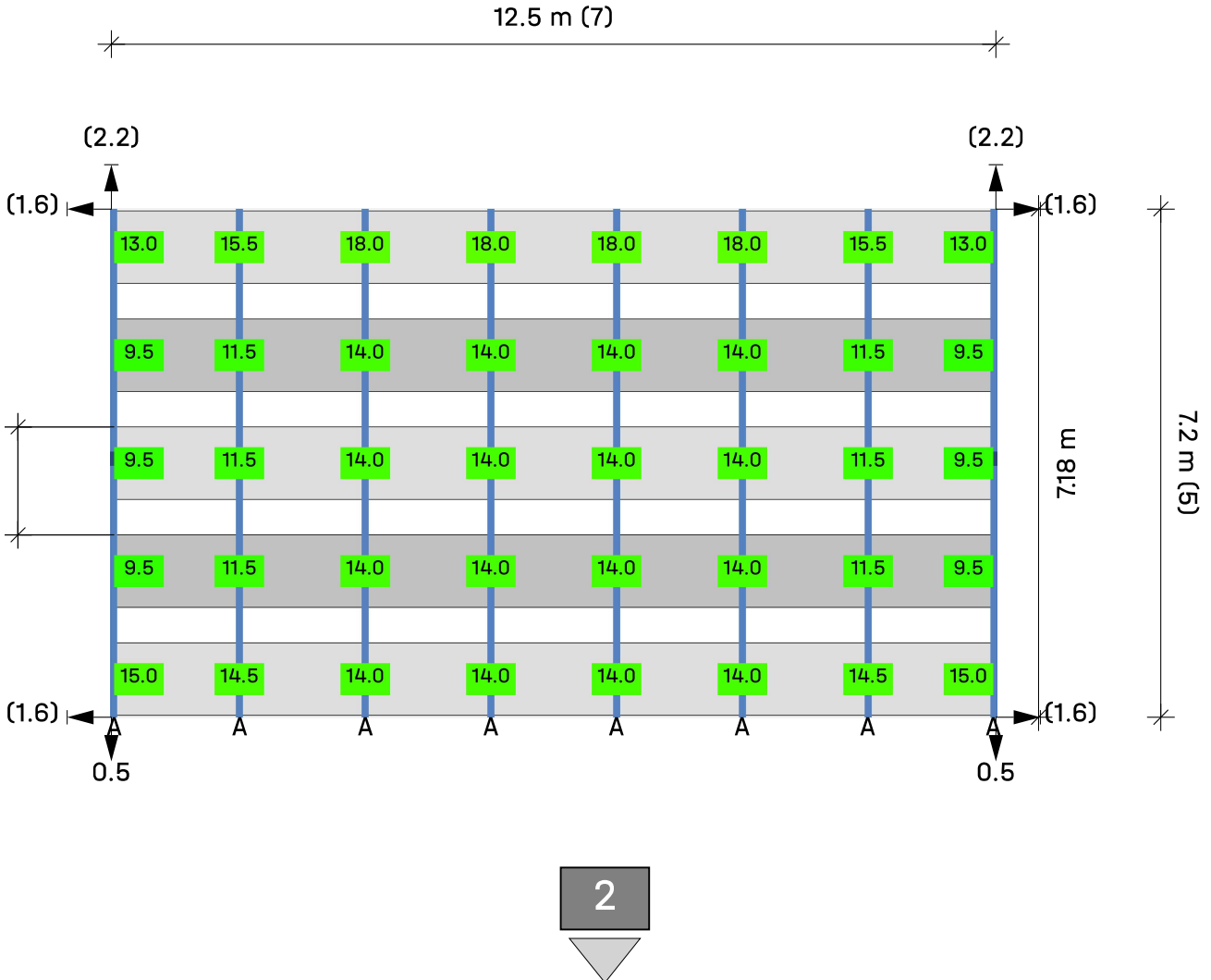
1.52 m

service corridor

0.50 m



Roofs | MMU-A&H-4th floor | Module array 1 | Module blocks

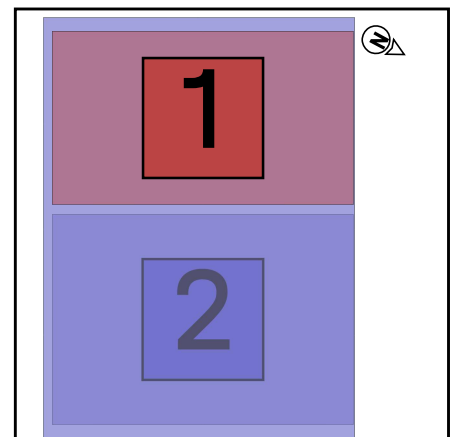


Roof ① Module array ① Module block 1

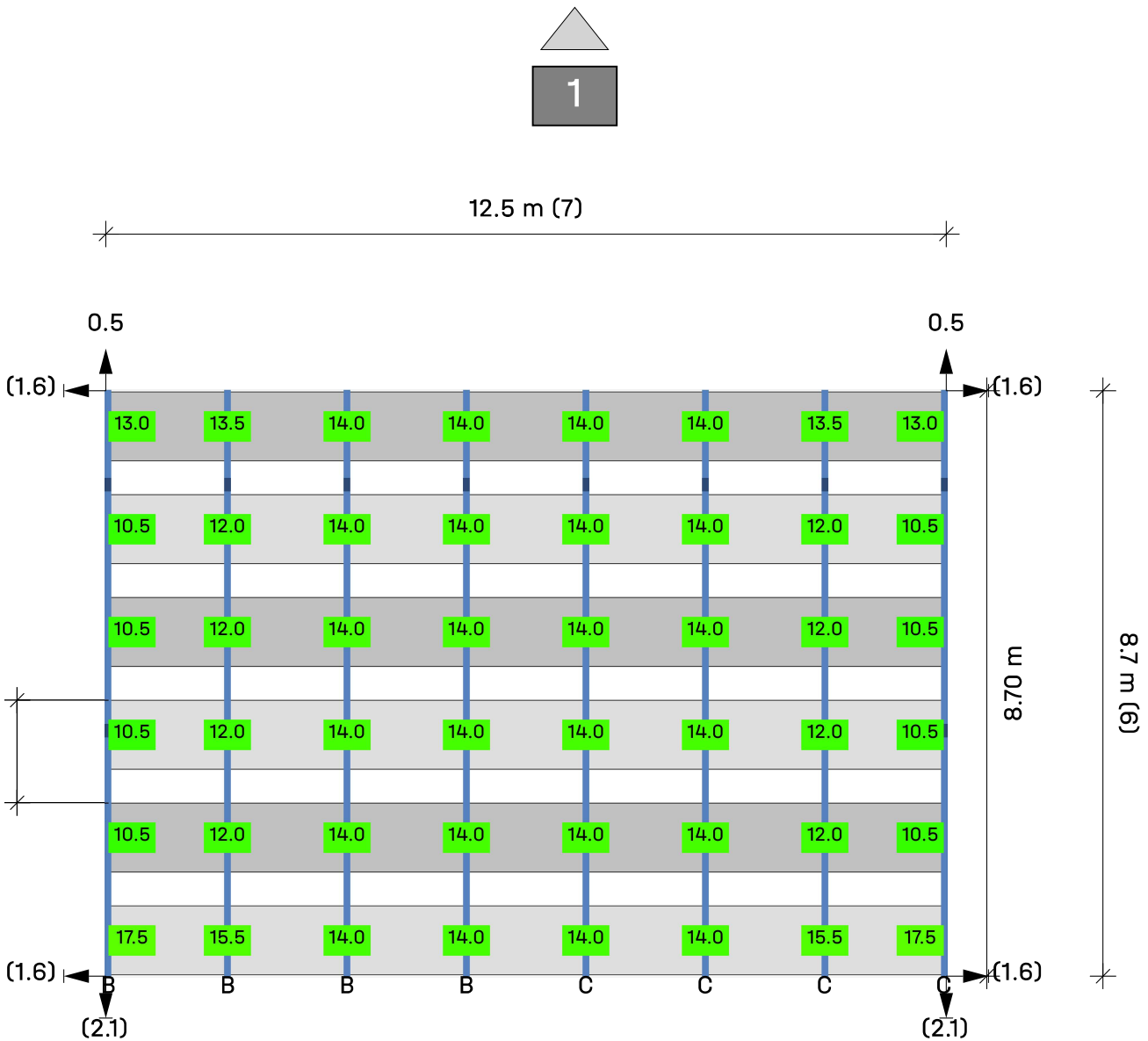
Modules $7 \times 5 = 35$

Legend

- Next block indicator
- Mounting rail
- Row distance [m]
- Distance to Roof Edge [m]
- Dist. to neighbour module block/array [m]
- Ballast in kilogram (kg)
- Porter Ballast



Roofs | MMU-A&H-4th floor | Module array 1 | Module blocks

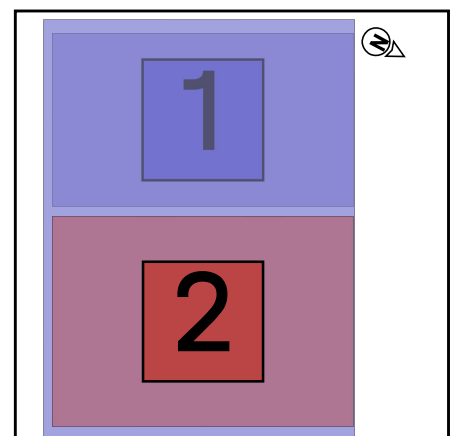


Roof ① Module array ① Module block 2

Modules $7 \times 6 = 42$

Legend

- Next block indicator
- Mounting rail
- Row distance [m]
- Distance to Roof Edge [m]
- Dist. to neighbour module block/array [m]
- Ballast in kilogram (kg)
- Porter Ballast





Results | MMU-A&H-4th floor

Roof	System	Module	Height	Quantity	Total power
<u>MMU-A&H-4th floor</u>  Flat	<u>S-Dome 6.10</u> <u>Classic</u>	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	10.00 m	77	28.875 kWp

Module

Name	LR4-60HPH-375M
Manufacturer	Longi Solar
Output power	375 Wp
Dimensions	1,755×1,038×35 mm
Weight	19.5 kg
Panel Tilt	9.5 °

Module clamps

module clamp	DomeClamp Black MC Set 30-50
end clamp	DomeClamp Black EC Set 30-50

Ballast capacity

Speed Porter	40.0 kg
Porter	108.0 kg

Verification system utilisation

Type	pressure	suction
Verification system utilisation	24.43%	36.00%
Loads on modules (ultimate state)	1.40 kN/m ₂	-0.94 kN/m ²
Loads on modules (Serviceability)	1.05 kN/m ²	-0.66 kN/m ²

Specific loads

Module block	No. of modules	Ballast [kg]	Dead weight [kg]	Module block area [m ²] (incl. service corridor)	Dead Load [kN/m ²]	Dead load (roof surface area) [kN/m ²]
Block 1	35	538.0	1,364.00	89.64	0.15	
Block 2	42	635.0	1,626.20	108.67	0.15	
Total	77	1,173.0	2,990.20			0.09



Results | MMU-A&H-4th floor

Notes

- The proof of static equilibrium and load capacity of the system are carried out by checking the load cases lifting and sliding by wind and by further static calculations.
- You will find a short version of the wind tunnel report and a certificate for the further static calculations on our homepage.
- The structure was statically verified in accordance with Eurocode 9: Design of aluminium structures (DIN EN 1999-1-1:2021) and offers sufficient load-bearing capacity and stability for the loads specified in the chapter 'Maximum actions on the components'.
- Adjustment factor for wind load regarding service life period, f_W , is according to DIN EN 1991-1-4/ NA, NDP for 4.2 (2P) note 5, table 3
- Adjustment factor for snow load regarding service life period, f_S , is according to DIN EN 1991-1-3/ annex D, table 4
- All resistance values of components are determined from an extern static engineering office.
- The structural design complies with BS EN 1990 - Basis of Structural Design.
- Snow loads are determined in accordance with National Annex BS NA EN 1991-1-3 (2018) - UK National Annex to EC1 - Action on structures - general actions - snow loads.
- Wind loads are determined in accordance with National Annex BS NA EN 1991-1-4 - UK National Annex to EC1 - Action on structures, general actions - wind actions.
- If the distance to the coast is less than one kilometer, the materials must be checked for corrosion resistance and adjusted if necessary.
- Service life is recognised according to 'Eurocode EN 1991 - Action on structures, Snow loads' and 'Eurocode EN 1991 - Actions on structures, Wind actions'. Subject to the Building Regulations and for security-relevant reasons the installation has to be dismantled at the end of its service life.
- Failure consequence class is considered according to 'Eurocode EN 1990 - Basis of structural design'.
- Data and results must be verified with regard to local conditions and checked by a suitably qualified person. Please see our TCU under <https://k2-systems.com/en/base-tcu> , in particular § 2 ("technical and specialist requirements for the customer"), § 7 ("warranty provisions") and § 8 ("limitation of liability").



Structural analysis report | MMU-A&H-4th floor

General information

Name	MMU-Arts and Humanities
Mounting System	S-Dome 6.10 Classic
Author	claire fitzpatrick

Location information

Address	Manchester M15 6BG
Ground elevation	43.30 m

Roof information

Building height	10.00 m
Roof type	Flat roof
Roof pitch	2°
Fastening method	with Ballast
Roof covering	Flat
Min. roof edge distance	1.50 m
Parapet wall height	0.01 m
Material	Gravel
Dumping height	0.050 m
Friction coefficient	0.6

The friction coefficients given here must be checked onsite. If a lower value is found, this must be specified here for the ballast calculation!

Loads

Design method	BS EN
Failure consequence class (CC)	CC1
Design working life	25 years
Terrain category	Town Terrain
Distance to shoreline	1.00 km
Distance inside town terrain	25.00 km

Wind load

Velocity pressure, 50	$q_{p,50} = 0.713 \text{ kN/m}^2$
Adjustment factor for service life	$f_w = 1.000$
Velocity pressure, 25	$q_{p,25} = 0.656 \text{ kN/m}^2$



Structural analysis report | MMU-A&H-4th floor

Snow load

Snow load zone	3
Snow guard	No
Snow load on ground level	$s_k = 0.500 \text{ kN/m}^2$
Shape Coefficient for Snow	$\mu_i = 0.800$
Factor for roof pitch	$d_i = 0.999$
Snow load on roof, 50	$s_{i,50} = 0.400 \text{ kN/m}^2$
Adjustment factor for service life	$f_s = 1.000$
Snow load on roof, 25	$s_{i,25} = 0.371 \text{ kN/m}^2$

Dead Load

Weight of module	$G_M = 19.5 \text{ kg}$
Weight of mounting system per module	$= 4.1 \text{ kg}$
Module area	$A_M = 1.82 \text{ m}^2$
Dead weight of module per m^2	$= 10.70 \text{ kg/m}^2$
Dead weight of mounting system per m^2	$= 2.25 \text{ kg/m}^2$
Total Dead Load (excl. ballast) per m^2	$= 0.13 \text{ kN/m}^2$

Load Combinations

Ultimate limit state

Partial safety factor unfavourable permanent load	$\gamma_{G,sup} = 1.35$
Partial safety factor favourable permanent load	$\gamma_{G,inf} = 1.00$
Partial safety factor destabilising permanent load	$\gamma_{G,dst} = 1.10$
Partial safety factor stabilising permanent load	$\gamma_{G,stab} = 0.90$
Partial safety factor variable loads	$\gamma_Q = 1.50$
Combination coefficient with regards to wind	$\psi_{0,W} = 0.60$
Combination coefficient with regards to wind (additional varying influences)	$\psi_{1,W} = 0.20$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$
Importance factor permanent	$\kappa_{Ft,G} = 0.90$
Importance factor variable	$\kappa_{Ft,Q} = 0.85$
Characteristic dead weight	G_k
Characteristic snow load on the roof	$S_{i,n}$
Characteristic wind load	W_k
Load case combination 01	$LCC\ 01_{uls} = \gamma_{G,sup} * \kappa_{Ft,G} * G_k + \gamma_Q * \kappa_{Ft,Q} * S_{i,n}$
Load case combination 02	$LCC\ 02_{uls} = \gamma_{G,sup} * \kappa_{Ft,G} * G_k + \gamma_Q * \kappa_{Ft,Q} * W_{k,Pressure}$
Load case combination 03	$LCC\ 03_{uls} = \gamma_{G,sup} * \kappa_{Ft,G} * G_k + \gamma_Q * \kappa_{Ft,Q} * (W_{k,Pressure} + \psi_{0,S} * S_{i,n})$



Structural analysis report | MMU-A&H-4th floor

Load case combination 04	$LCC\ 04_{uls} = \gamma_{G,sup} * \kappa_{FI,G} * G_k + \gamma_Q * \kappa_{FI,Q} * (S_{i,n} + \psi_{0,W} * W_{k,Pressure})$
Load case combination 06	$LCC\ 06_{uls} = \gamma_{G,inf} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,Suction}$

Static equilibrium

Uplift Verification	$LCC\ up = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Uplift}$
Displacement verification	$LCC\ displ = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Displacement}$

Serviceability limit state

Combination coefficient with regards to wind	$\psi_{0,w} = 0.60$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$

Load case combination 01	$LCC\ 01_{sls} = G_k + S_{i,n}$
Load case combination 02	$LCC\ 02_{sls} = G_k + W_{k,Pressure}$
Load case combination 03	$LCC\ 03_{sls} = G_k + W_{k,Pressure} + \psi_{0,S} * S_{i,n}$
Load case combination 04	$LCC\ 04_{sls} = G_k + S_{i,n} + \psi_{0,W} * W_{k,Pressure}$
Load case combination 06	$LCC\ 06_{sls} = G_k + W_{k,Suction}$

Max. Pressure on insulation

General information

dead load system	$g_{System} = 0.13\ kN/m^2$
aerodynamic coefficient	$c_{p,Pressure} = 0.20$

Load distribution underneath the building protection mat under Peak (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 0.91\ m^2$
maximum ballast	$G_{ballast\ required} = 11.9\ kg$

Load distribution underneath the building protection mat under SD (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 0.91\ m^2$
maximum ballast	$G_{ballast\ required} = 6.1\ kg$

Structural analysis report | MMU-A&H-4th floor

Load Combinations

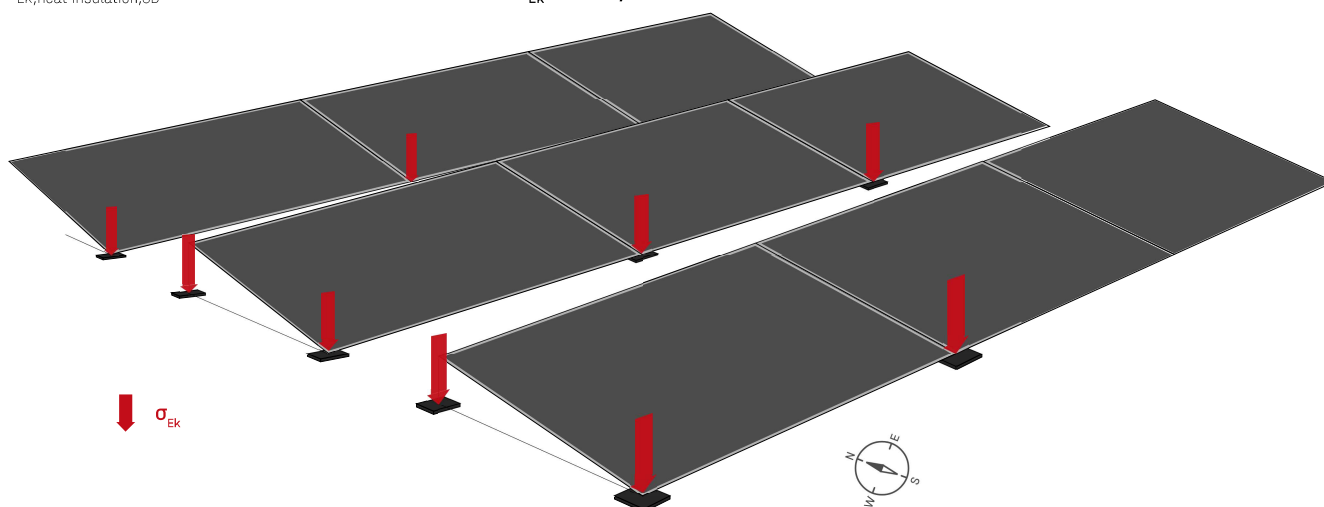
	$\sigma_{Ek, \text{heat insulation, S6_10Eco}}$ [Pa]	$\sigma_{Ek, \text{heat insulation, SD}}$ [Pa]
Load case combination 00	8,116	6,142
Load case combination 01	19,783	17,809
Load case combination 02	12,295	10,321
Load case combination 03	18,128	16,154
Load case combination 04	22,290	20,316

Dead loads (PV system + ballast)

$\sigma_{Ek, \text{heat insulation, S6_10Eco}}$	$\sigma_{Ek} = 8,116 \text{ Pa}$
$\sigma_{Ek, \text{heat insulation, SD}}$	$\sigma_{Ek} = 6,142 \text{ Pa}$

Maximum actions (sum of dead loads and the maximum variable actions from wind and snow)

$\sigma_{Ek, \text{heat insulation, S6_10Eco}}$	$\max \sigma_{Ek} = 22,290 \text{ Pa}$
$\sigma_{Ek, \text{heat insulation, SD}}$	$\max \sigma_{Ek} = 20,316 \text{ Pa}$



Structural analysis report | MMU-A&H-4th floor

H-V-loads

According to wind tunnel report by I.F.I. Institut für Industrieaerodynamik GmbH

General information

Total number of modules	77	
Roof areas covered with modules	A	= ca. 198.30 m ²
Dead Load	$g_{k, \text{System incl. ballast}}$	= 0.15 kN/m ²

Aerodynamic coefficients

	$C_{p, \text{Pressure}}$	= according to EN 1991-1-4
	$C_{F, x, \text{average}}$	= 0.01
	$C_{F, y, \text{averaged}}$	= -0.02
edge distance correction	$k_{s, xy}$	= 1.00
Parapet wall- correction coefficient	k_p	= 1.00
Factor building height		= 1.00

Horizontal pressure

$$W_{k, F, x} = 0.006 \text{ kN/m}^2$$

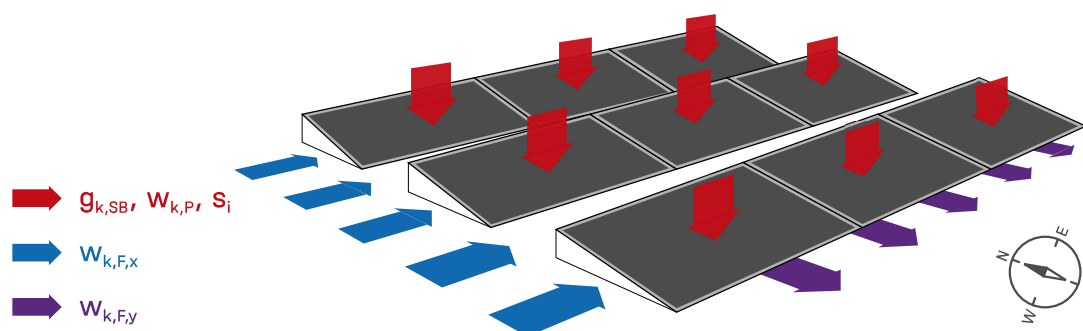
$$W_{k, F, y} = -0.012 \text{ kN/m}^2$$

Vertical pressure

$$g_{k, \text{System incl. ballast}} = 0.15 \text{ kN/m}^2$$

$$W_{k, \text{Pressure}} - \text{according to EN 1991-1-4}$$

$$S_i - \text{according to EN 1991-1-3}$$



Comment:

Flat roof vertical wind loads are essentially determined by its displacement effect and remain unchanged even with a flat pv structure. We advise using the aerodynamic coefficients according to DIN EN 1991-1-4 to calculate flat roofs.



Roofs | MMU-A&H-4th floor | Bill of material

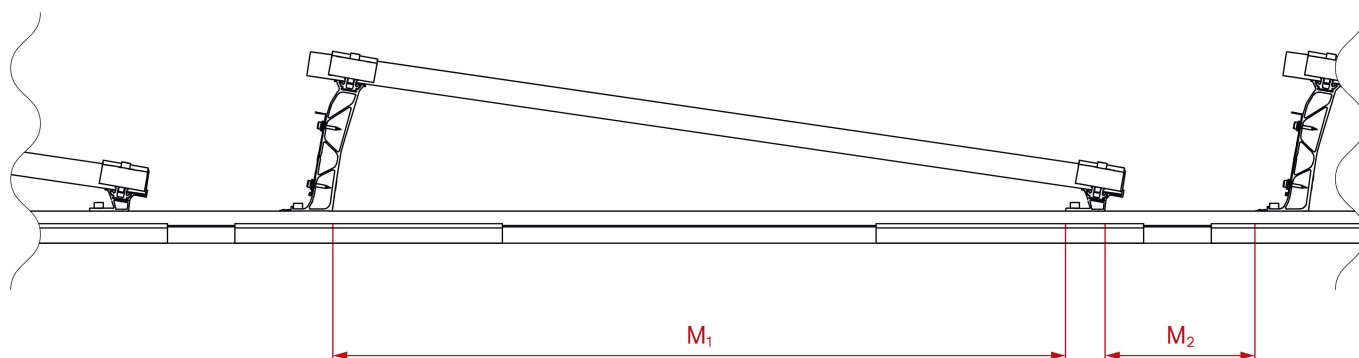
Position	Item no.	Item description	Quantity	Weight
1	2004125	Dome 6.10 Peak	88	26.4 kg
2	1001643	MK2	176	3.1 kg
3	2001729	Socket Head Bolt serrated M8×20	176	2.3 kg
4	2003243	Dome 6.10 SD	88	26.7 kg
5	2003126	Dome Mat S 380	176	64.8 kg
6	2003249	S-Dome 6.10 Windbreaker short	77	138.6 kg
7	2002937	Thread-forming metal screw 6×25	176	1.2 kg
8	2004277	K2 BasicRail 22; 3.65 m	36	84.5 kg
9	1006039	Dome FlatConnector Set	24	4.7 kg
10	2002870	K2 Solar Cable Manager	77	0.2 kg
11	2004141	Mat-S Tool	1	0.0 kg
12	2002609	DomeClamp Black MC Set 30-50	132	7.7 kg
13	2002610	DomeClamp Black EC Set 30-50	44	2.9 kg
14	2002300	Dome SpeedPorter	176	13.4 kg
Total				376.3 kg

Roofs | MMU-A&H-5th Floor



Roof	System	Module	Height	Quantity	Total power
MMU-A&H-5th Floor Flat	S-Dome 6.10 Classic	TSM-440NEG9R.28 (Vertex S+) 1,762×1,134×30 mm 440 Wp	13.00 m	32	14.08 kWp

Roofs | MMU-A&H-5th Floor | Pre-assembly / assembly



Module Array 1

M1 1,005.96 mm

M2 484.80 mm



Roofs | MMU-A&H-5th Floor | Assembly plan

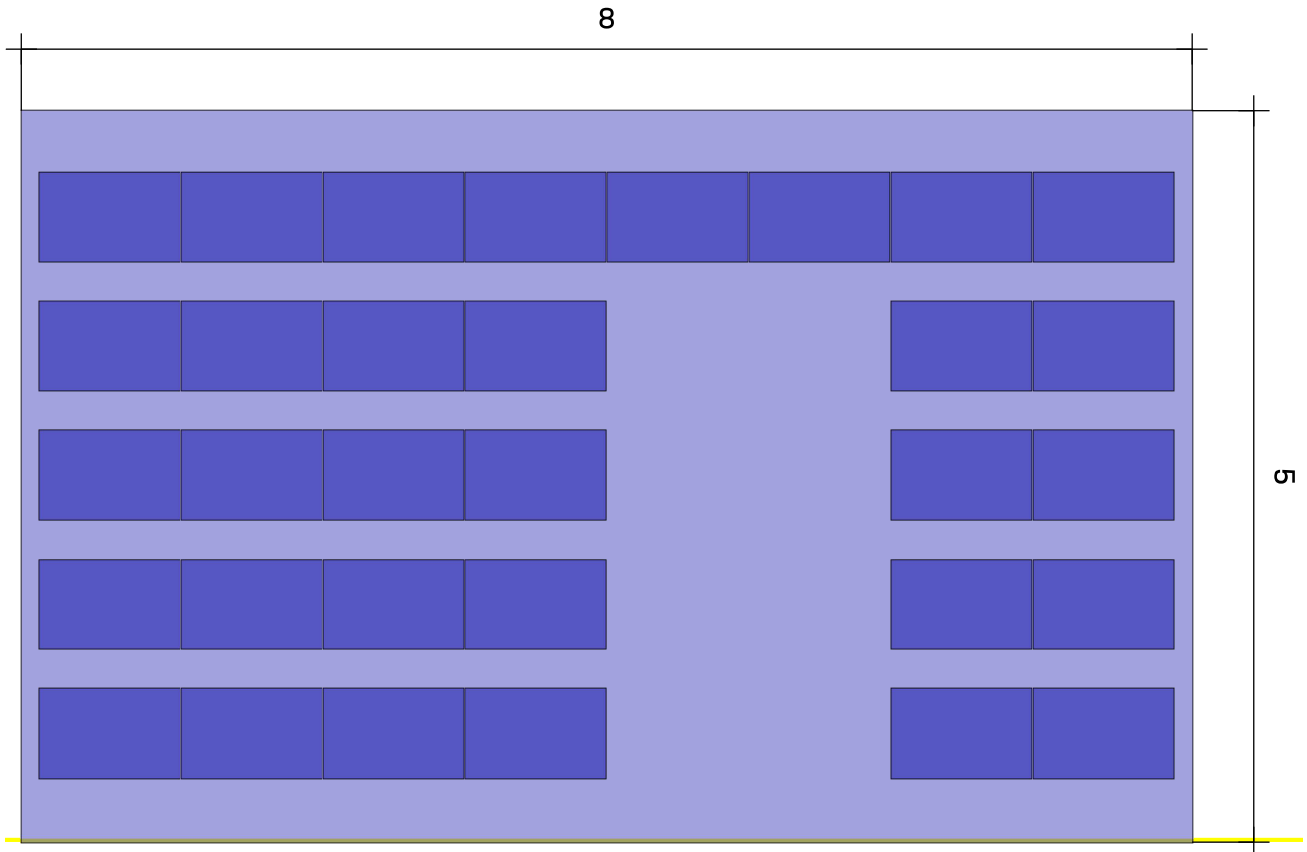
Base Rails

Type	Whole Rails		Rail cutting		
	Total Rail Length	Quantity 3.65 m	Part of Rail / Rest	Length	Rest
1*A	1.180 m		3.650	1.180 from 3.650	<u>2.460</u>
1*B	7.664 m	2*3.65 m	<u>2.460</u>	0.700 from 2.460	<u>1.750</u>
1*C	7.664 m	2*3.65 m	<u>1.750</u>	0.700 from 1.750	<u>1.040</u>
1*D	7.664 m	2*3.65 m	<u>1.040</u>	0.700 from 1.040	0.330
1*E	7.664 m	2*3.65 m	3.650	0.700 from 3.650	<u>2.940</u>
1*F	7.664 m	2*3.65 m	<u>2.940</u>	0.700 from 2.940	<u>2.230</u>
1*G	7.664 m	2*3.65 m	<u>2.230</u>	0.700 from 2.230	<u>1.520</u>
1*H	7.664 m	2*3.65 m	<u>1.520</u>	0.700 from 1.520	<u>0.810</u>
1*I	7.664 m	2*3.65 m	<u>0.810</u>	0.700 from 0.810	0.100

1 cm is viewed as lost for each cutting

Red numbers are leftover rails which will not be used any longer

Roofs | MMU-A&H-5th Floor | Module array 1



Roof ② Module array ①

Mounting System

[S-Dome 6.10 Classic](#)

Module

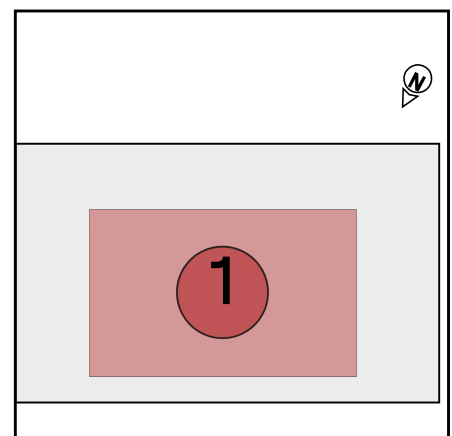
32(14.08 kWp) x
TSM-440NEG9R.28 (Vertex
S+)

Row spacing

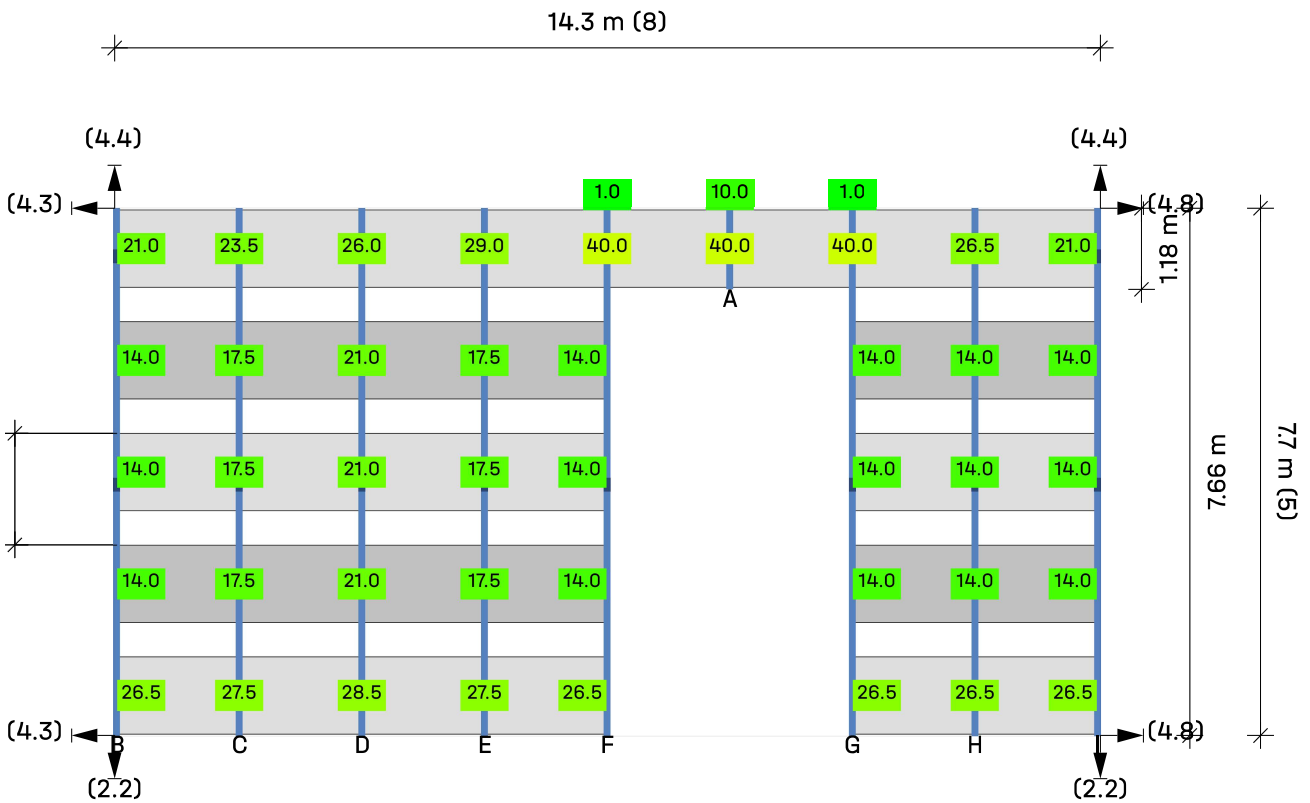
1.62 m

service corridor

0.50 m



Roofs | MMU-A&H-5th Floor | Module array 1 | Module blocks



Roof ② Module array ① Module block 1

Modules (8 × 5) - 8 = 32

Legend

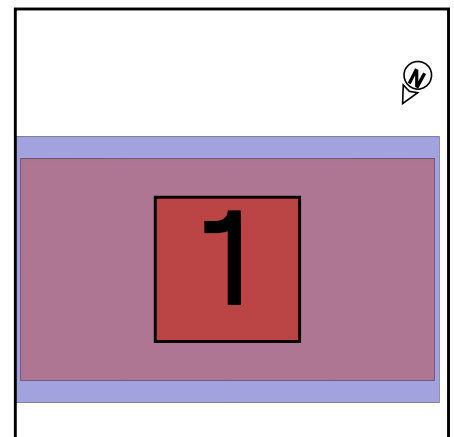
— Mounting rail

— Row distance [m]

→ Distance to Roof Edge [m]

25 Ballast in kilogram (kg)

Porter Ballast





Results | MMU-A&H-5th Floor

Roof	System	Module	Height	Quantity	Total power
<u>MMU-A&H-5th Floor</u>  Flat	<u>S-Dome 6.10 Classic</u>	TSM-440NEG9R.28 (Vertex S+) 1,762×1,134×30 mm 440 Wp	13.00 m	32	14.08 kWp

Module

Name	TSM-440NEG9R.28 (Vertex S+)
Manufacturer	Trina Solar Energy
Output power	440 Wp
Dimensions	1,762×1,134×30 mm
Weight	21.0 kg
Panel Tilt	8.6 °

Module clamps

module clamp	DomeClamp Black MC Set 30-50
end clamp	DomeClamp Black EC Set 30-50

Ballast capacity

Speed Porter	40.0 kg
Porter	108.0 kg

Verification system utilisation

Type	pressure	suction
Verification system utilisation	39.67%	46.49%
Loads on modules (ultimate state)	1.56 kN/m ²	-1.10 kN/m ²
Loads on modules (Serviceability)	1.16 kN/m ²	-0.78 kN/m ²

Specific loads

Module block	No. of modules	Ballast [kg]	Dead weight [kg]	Module block area [m ²] (incl. service corridor)	Dead Load [kN/m ²]	Dead load (roof surface area) [kN/m ²]
Block 1	32	873.0	1,676.20	87.12	0.19	
Total	32	873.0	1,676.20			0.05



Results | MMU-A&H-5th Floor

Notes

- The proof of static equilibrium and load capacity of the system are carried out by checking the load cases lifting and sliding by wind and by further static calculations.
- You will find a short version of the wind tunnel report and a certificate for the further static calculations on our homepage.
- The structure was statically verified in accordance with Eurocode 9: Design of aluminium structures (DIN EN 1999-1-1:2021) and offers sufficient load-bearing capacity and stability for the loads specified in the chapter 'Maximum actions on the components'.
- Adjustment factor for wind load regarding service life period, f_W , is according to DIN EN 1991-1-4/ NA, NDP for 4.2 (2P) note 5, table 3
- Adjustment factor for snow load regarding service life period, f_S , is according to DIN EN 1991-1-3/ annex D, table 4
- All resistance values of components are determined from an external static engineering office.
- The structural design complies with BS EN 1990 - Basis of Structural Design.
- Snow loads are determined in accordance with National Annex BS NA EN 1991-1-3 (2018) - UK National Annex to EC1 - Action on structures - general actions - snow loads.
- Wind loads are determined in accordance with National Annex BS NA EN 1991-1-4 - UK National Annex to EC1 - Action on structures, general actions - wind actions.
- If the distance to the coast is less than one kilometer, the materials must be checked for corrosion resistance and adjusted if necessary.
- Service life is recognised according to 'Eurocode EN 1991 - Action on structures, Snow loads' and 'Eurocode EN 1991 - Actions on structures, Wind actions'. Subject to the Building Regulations and for security-relevant reasons the installation has to be dismantled at the end of its service life.
- Failure consequence class is considered according to 'Eurocode EN 1990 - Basis of structural design'.
- Data and results must be verified with regard to local conditions and checked by a suitably qualified person. Please see our TCU under <https://k2-systems.com/en/base-tcu>, in particular § 2 ("technical and specialist requirements for the customer"), § 7 ("warranty provisions") and § 8 ("limitation of liability").



Structural analysis report | MMU-A&H-5th Floor

General information

Name	MMU-Arts and Humanities
Mounting System	S-Dome 6.10 Classic
Author	claire fitzpatrick

Location information

Address	Manchester M15 6BG
Ground elevation	43.30 m

Roof information

Building height	13.00 m
Roof type	Flat roof
Roof pitch	2°
Fastening method	with Ballast
Roof covering	Flat
Min. roof edge distance	1.50 m
Parapet wall height	0.01 m
Material	Gravel
Dumping height	0.050 m
Friction coefficient	0.6

The friction coefficients given here must be checked onsite. If a lower value is found, this must be specified here for the ballast calculation!

Loads

Design method	BS EN
Failure consequence class (CC)	CC1
Design working life	25 years
Terrain category	Town Terrain
Distance to shoreline	1.00 km
Distance inside town terrain	25.00 km

Wind load

Velocity pressure, 50	$q_{p,50} = 0.786 \text{ kN/m}^2$
Adjustment factor for service life	$f_w = 1.000$
Velocity pressure, 25	$q_{p,25} = 0.724 \text{ kN/m}^2$



Structural analysis report | MMU-A&H-5th Floor

Snow load

Snow load zone	3
Snow guard	No
Snow load on ground level	$s_k = 0.500 \text{ kN/m}^2$
Shape Coefficient for Snow	$\mu_i = 0.800$
Factor for roof pitch	$d_i = 0.999$
Snow load on roof, 50	$s_{i,50} = 0.400 \text{ kN/m}^2$
Adjustment factor for service life	$f_s = 1.000$
Snow load on roof, 25	$s_{i,25} = 0.371 \text{ kN/m}^2$

Dead Load

Weight of module	$G_M = 21.0 \text{ kg}$
Weight of mounting system per module	$= 4.1 \text{ kg}$
Module area	$A_M = 2.00 \text{ m}^2$
Dead weight of module per m^2	$= 10.51 \text{ kg/m}^2$
Dead weight of mounting system per m^2	$= 2.05 \text{ kg/m}^2$
Total Dead Load (excl. ballast) per m^2	$= 0.12 \text{ kN/m}^2$

Load Combinations

Ultimate limit state

Partial safety factor unfavourable permanent load	$\gamma_{G,sup} = 1.35$
Partial safety factor favourable permanent load	$\gamma_{G,inf} = 1.00$
Partial safety factor destabilising permanent load	$\gamma_{G,dst} = 1.10$
Partial safety factor stabilising permanent load	$\gamma_{G,stab} = 0.90$
Partial safety factor variable loads	$\gamma_Q = 1.50$
Combination coefficient with regards to wind	$\psi_{0,W} = 0.60$
Combination coefficient with regards to wind (additional varying influences)	$\psi_{1,W} = 0.20$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$
Importance factor permanent	$\kappa_{F1,G} = 0.90$
Importance factor variable	$\kappa_{F1,Q} = 0.85$
Characteristic dead weight	G_k
Characteristic snow load on the roof	$S_{i,n}$
Characteristic wind load	W_k
Load case combination 01	$LCC\ 01_{uls} = \gamma_{G,sup} * \kappa_{F1,G} * G_k + \gamma_Q * \kappa_{F1,Q} * S_{i,n}$
Load case combination 02	$LCC\ 02_{uls} = \gamma_{G,sup} * \kappa_{F1,G} * G_k + \gamma_Q * \kappa_{F1,Q} * W_{k,Pressure}$
Load case combination 03	$LCC\ 03_{uls} = \gamma_{G,sup} * \kappa_{F1,G} * G_k + \gamma_Q * \kappa_{F1,Q} * (W_{k,Pressure} + \psi_{0,S} * S_{i,n})$



Structural analysis report | MMU-A&H-5th Floor

Load case combination 04	$LCC\ 04_{uls} = \gamma_{G,sup} * \kappa_{FI,G} * G_k + \gamma_Q * \kappa_{FI,Q} * (S_{i,n} + \psi_{0,W} * W_{k,Pressure})$
Load case combination 06	$LCC\ 06_{uls} = \gamma_{G,inf} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,Suction}$

Static equilibrium

Uplift Verification	$LCC\ up = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Uplift}$
Displacement verification	$LCC\ displ = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Displacement}$

Serviceability limit state

Combination coefficient with regards to wind	$\psi_{0,w} = 0.60$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$

Load case combination 01	$LCC\ 01_{sls} = G_k + S_{i,n}$
Load case combination 02	$LCC\ 02_{sls} = G_k + W_{k,Pressure}$
Load case combination 03	$LCC\ 03_{sls} = G_k + W_{k,Pressure} + \psi_{0,S} * S_{i,n}$
Load case combination 04	$LCC\ 04_{sls} = G_k + S_{i,n} + \psi_{0,W} * W_{k,Pressure}$
Load case combination 06	$LCC\ 06_{sls} = G_k + W_{k,Suction}$

Max. Pressure on insulation

General information

dead load system	$g_{System} = 0.12\ kN/m^2$
aerodynamic coefficient	$c_{p,Pressure} = 0.20$

Load distribution underneath the building protection mat under Peak (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 1.00\ m^2$
maximum ballast	$G_{ballast\ required} = 36.4\ kg$

Load distribution underneath the building protection mat under SD (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 1.00\ m^2$
maximum ballast	$G_{ballast\ required} = 13.6\ kg$



Structural analysis report | MMU-A&H-5th Floor

Load Combinations

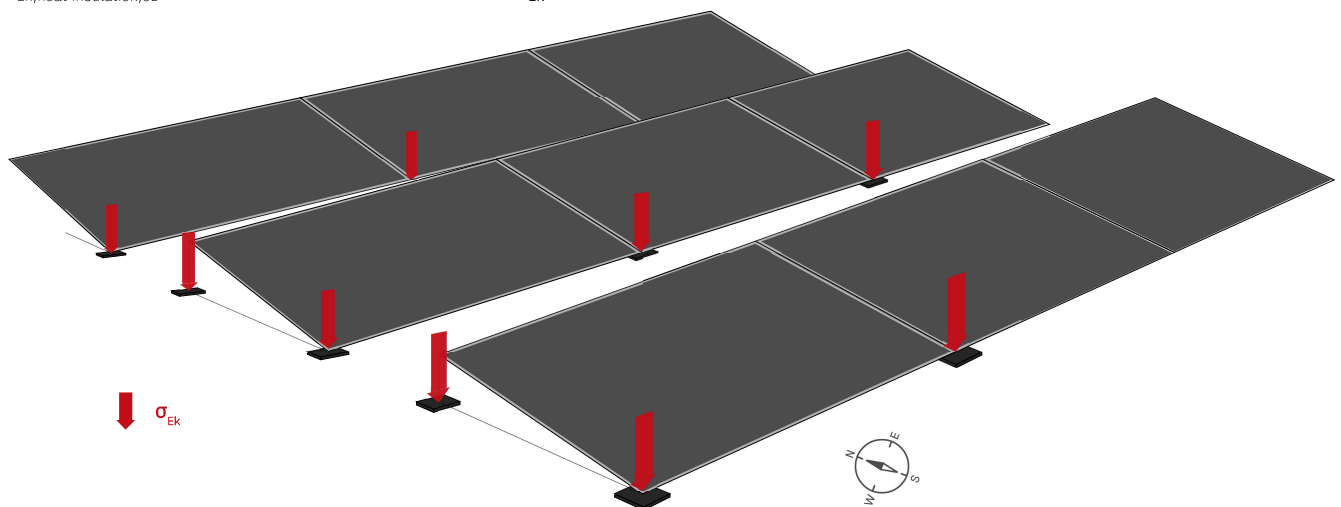
	$\sigma_{\text{Ek,heat insulation,S6_10Eco}}$ [Pa]	$\sigma_{\text{Ek,heat insulation,SD}}$ [Pa]
Load case combination 00	16,776	8,962
Load case combination 01	29,603	21,789
Load case combination 02	21,833	14,019
Load case combination 03	28,247	20,433
Load case combination 04	32,637	24,823

Dead loads (PV system + ballast)

$$\begin{aligned}\sigma_{\text{Ek,heat insulation,S6_10Eco}} & \sigma_{\text{Ek}} = 16,776 \text{ Pa} \\ \sigma_{\text{Ek,heat insulation,SD}} & \sigma_{\text{Ek}} = 8,962 \text{ Pa}\end{aligned}$$

Maximum actions (sum of dead loads and the maximum variable actions from wind and snow)

$$\begin{aligned}\sigma_{\text{Ek,heat insulation,S6_10Eco}} & \max \sigma_{\text{Ek}} = 32,637 \text{ Pa} \\ \sigma_{\text{Ek,heat insulation,SD}} & \max \sigma_{\text{Ek}} = 24,823 \text{ Pa}\end{aligned}$$



Structural analysis report | MMU-A&H-5th Floor

H-V-loads

According to wind tunnel report by I.F.I. Institut für Industrieaerodynamik GmbH

General information

Total number of modules	32	
Roof areas covered with modules	A	= ca. 87.12 m ²
Dead Load	$g_{k, \text{System incl. ballast}}$	= 0.19 kN/m ²

Aerodynamic coefficients

	$C_{p, \text{Pressure}}$	= according to EN 1991-1-4
	$C_{F, x, \text{average}}$	= 0.01
	$C_{F, y, \text{averaged}}$	= -0.02
edge distance correction	$k_{s, xy}$	= 1.00
Parapet wall- correction coefficient	k_p	= 1.00
Factor building height		= 1.00

Horizontal pressure

$$W_{k, F, x} = 0.007 \text{ kN/m}^2$$

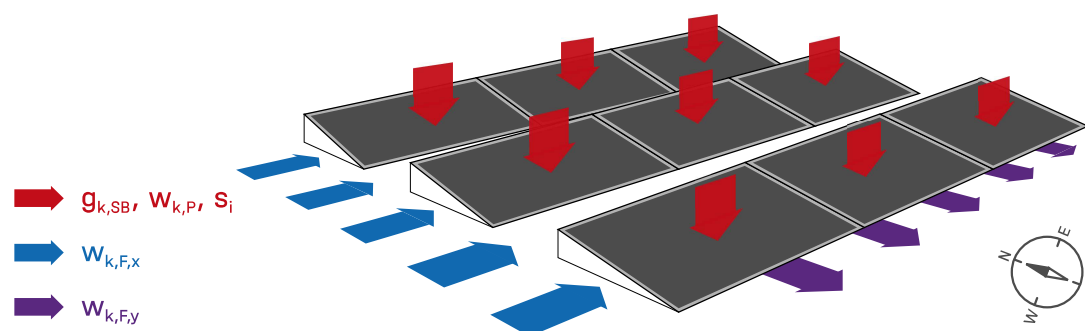
$$W_{k, F, y} = -0.013 \text{ kN/m}^2$$

Vertical pressure

$$g_{k, \text{System incl. ballast}} = 0.19 \text{ kN/m}^2$$

$$W_{k, \text{Pressure}} - \text{according to EN 1991-1-4}$$

$$S_i - \text{according to EN 1991-1-3}$$



Comment:

Flat roof vertical wind loads are essentially determined by its displacement effect and remain unchanged even with a flat pv structure. We advise using the aerodynamic coefficients according to DIN EN 1991-1-4 to calculate flat roofs.

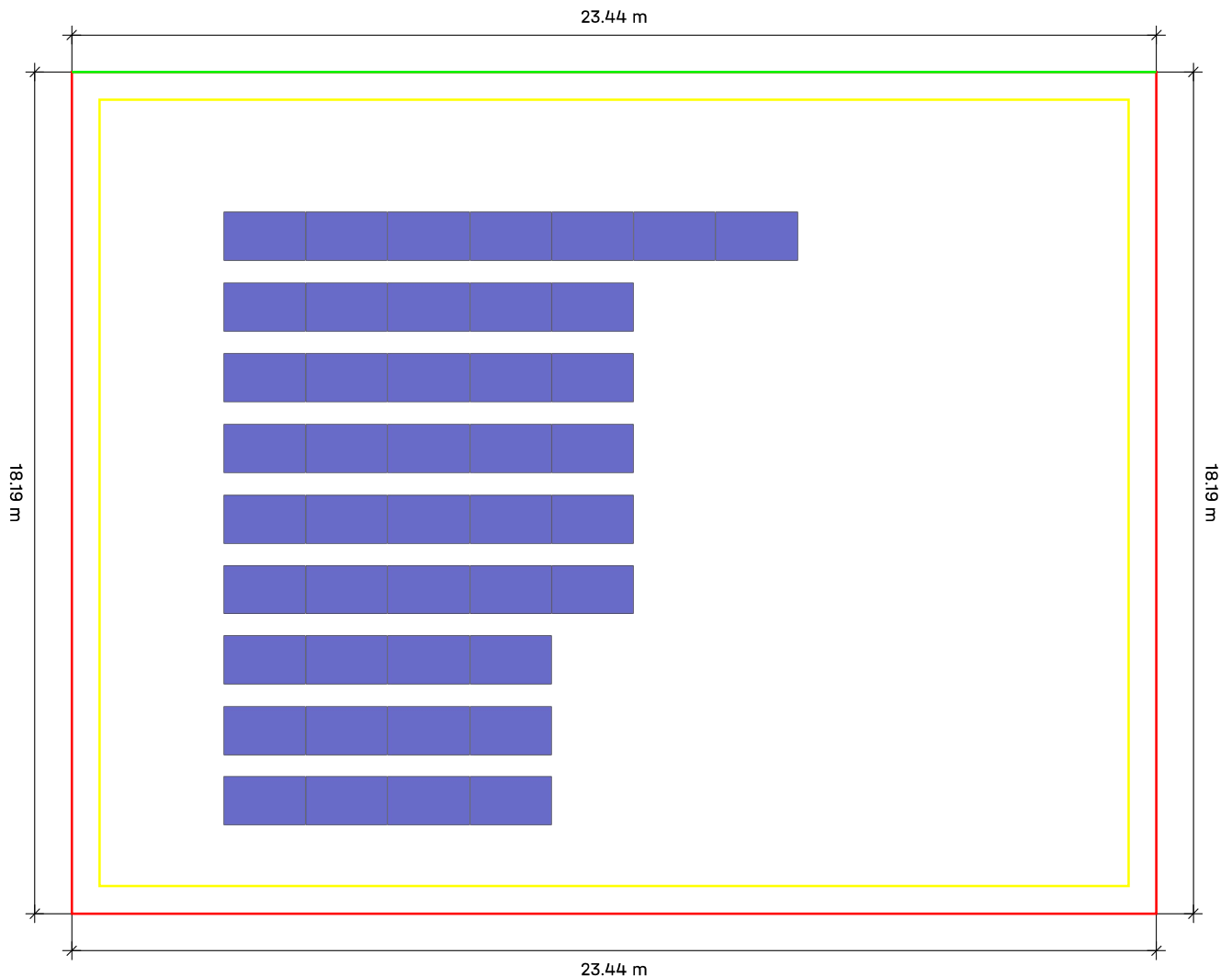


Roofs | MMU-A&H-5th Floor | Bill of material

Position	Item no.	Item description	Quantity	Weight
1	2004125	Dome 6.10 Peak	41	12.3 kg
2	1001643	MK2	82	1.4 kg
3	2001729	Socket Head Bolt serrated M8×20	82	1.1 kg
4	2003243	Dome 6.10 SD	41	12.4 kg
5	2003126	Dome Mat S 380	82	30.2 kg
6	2003249	S-Dome 6.10 Windbreaker short	32	57.6 kg
7	2002937	Thread-forming metal screw 6×25	82	0.6 kg
8	2004277	K2 BasicRail 22; 3.65 m	18	42.2 kg
9	1006039	Dome FlatConnector Set	16	3.1 kg
10	2002870	K2 Solar Cable Manager	32	0.1 kg
11	2004141	Mat-S Tool	1	0.0 kg
12	2002609	DomeClamp Black MC Set 30-50	46	2.7 kg
13	2002610	DomeClamp Black EC Set 30-50	36	2.4 kg
14	2002300	Dome SpeedPorter	88	6.7 kg
Total				172.8 kg

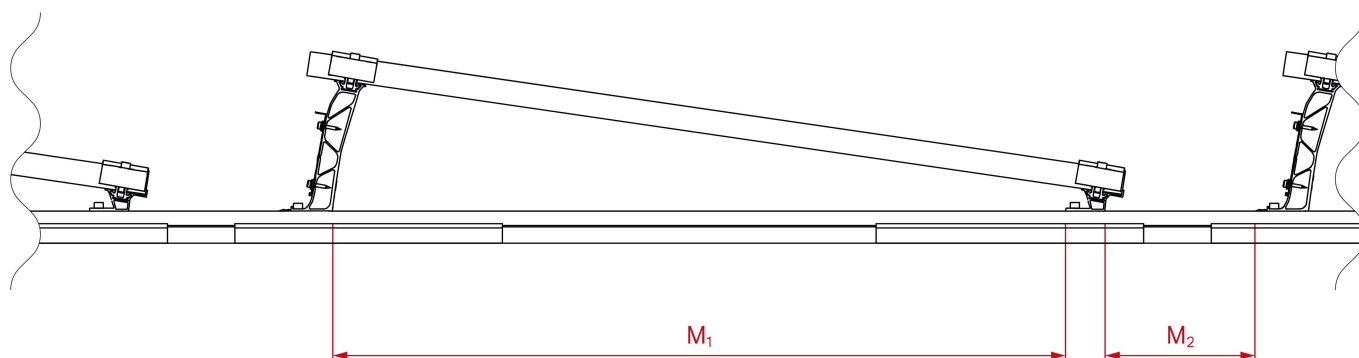


Roofs | MMU-A&H-6th Floor



Roof	System	Module	Height	Quantity	Total power
<u>MMU-A&H-6th Floor</u>  Flat	<u>S-Dome 6.10</u> <u>Classic</u>	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	16.00 m	44	16.5 kWp

Roofs | MMU-A&H-6th Floor | Pre-assembly / assembly



Module Array 1

M1 908.75 mm

M2 484.80 mm



Roofs | MMU-A&H-6th Floor | Assembly plan

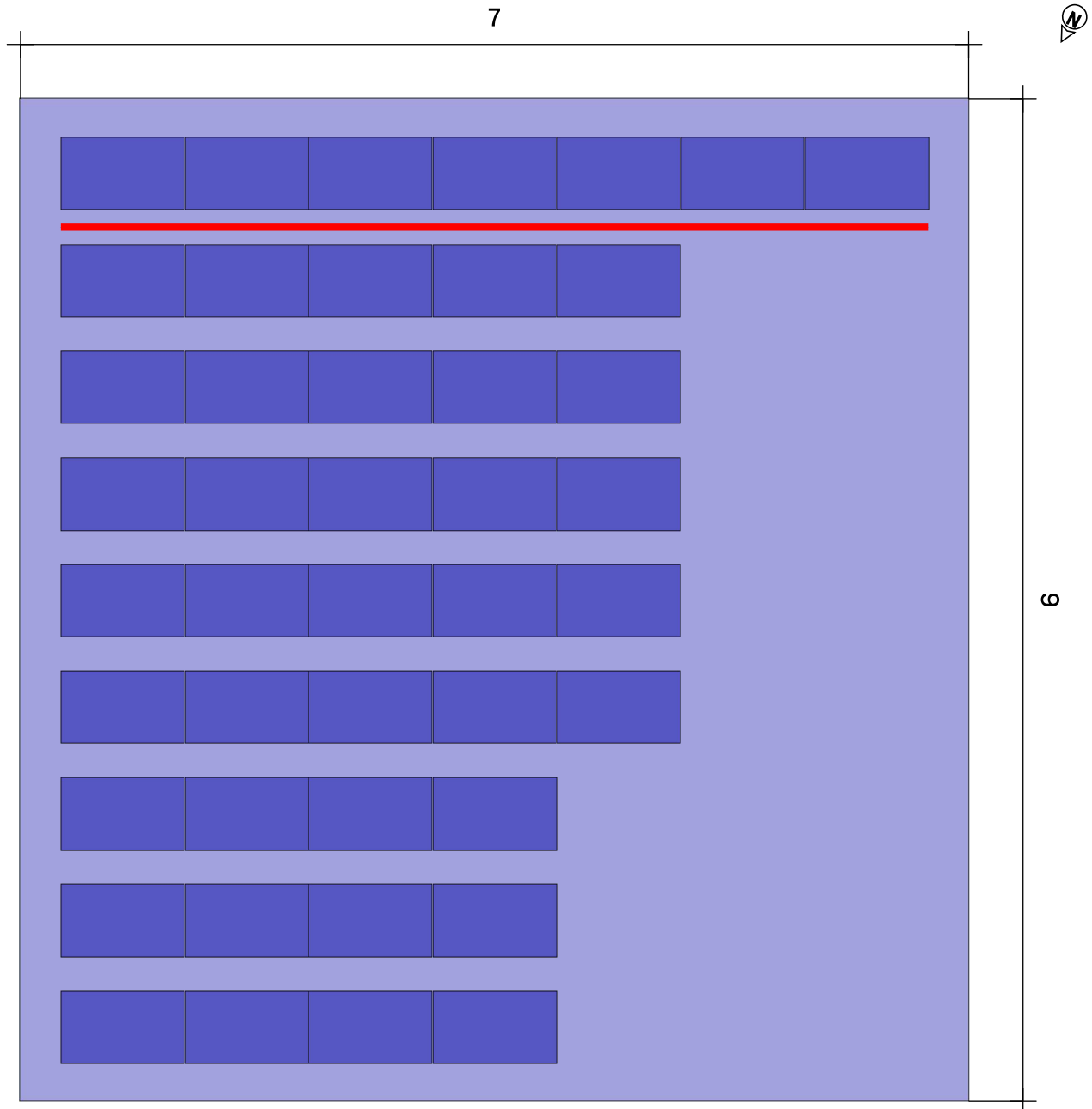
Base Rails

Type	Whole Rails		Rail cutting		
	Total Rail Length	Quantity 3.65 m	Part of Rail / Rest	Length	Rest
1*A	7.179 m	1*3.65 m	3.650	3.529 from 3.650	0.111
3*B	1.083 m		3.650	1.083 from 3.650	<u>2.558</u>
3*C	1.083 m		<u>2.558</u>	1.083 from 2.558	<u>1.465</u>
2*D	1.083 m		<u>1.465</u>	1.083 from 1.465	0.372
1*E	11.751 m	3*3.65 m	1.465	0.801 from 1.465	0.654
1*F	11.751 m	3*3.65 m	3.650	0.801 from 3.650	<u>2.839</u>
1*G	11.751 m	3*3.65 m	<u>2.839</u>	0.801 from 2.839	<u>2.029</u>
1*H	11.751 m	3*3.65 m	<u>2.029</u>	0.801 from 2.029	<u>1.218</u>
1*I	11.751 m	3*3.65 m	<u>1.218</u>	0.801 from 1.218	0.408

1 cm is viewed as lost for each cutting

Red numbers are leftover rails which will not be used any longer

Roofs | MMU-A&H-6th Floor | Module array 1



Roof ③ Module array ①

Mounting System

[S-Dome 6.10 Classic](#)

Module

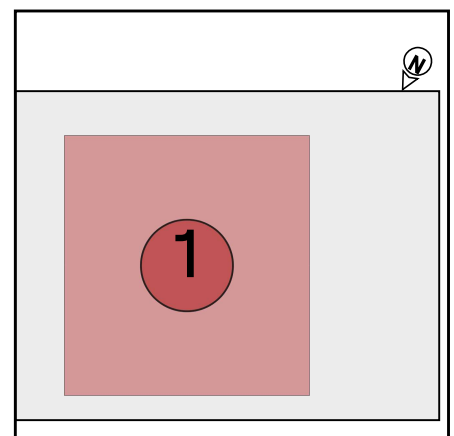
44(16.5 kWp) x
LR4-60HPH-375M

Row spacing

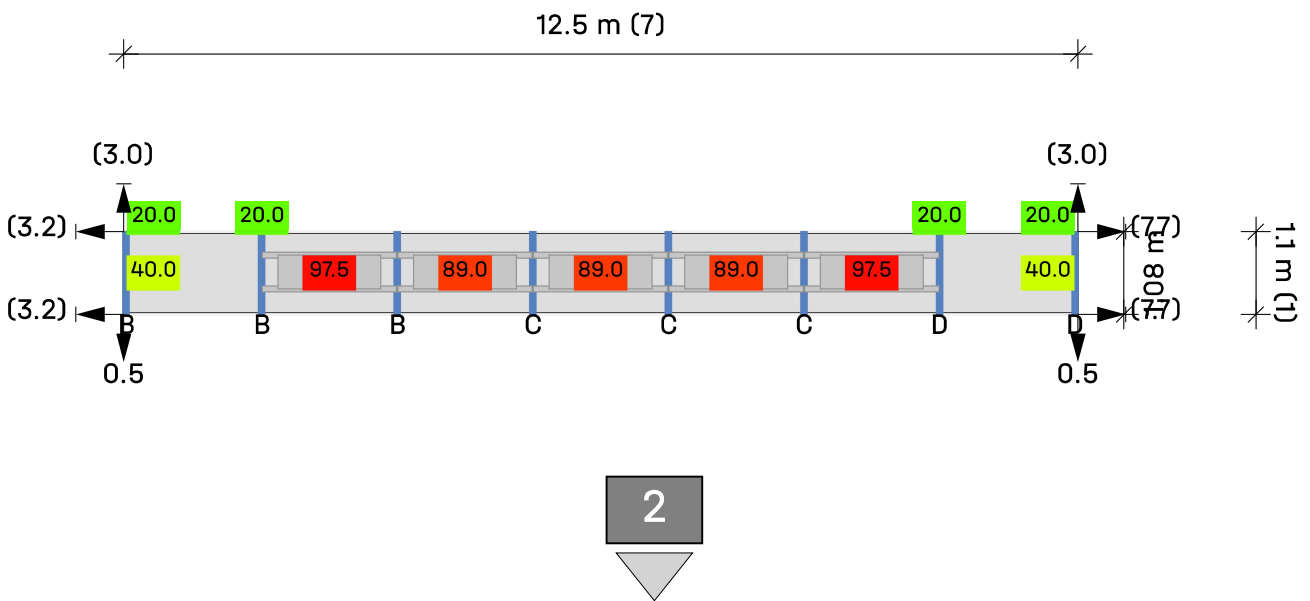
1.52 m

service corridor

0.50 m



Roofs | MMU-A&H-6th Floor | Module array 1 | Module blocks

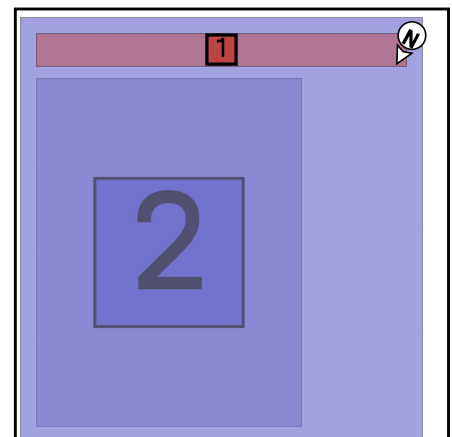


Roof ③ Module array ① Module block 1

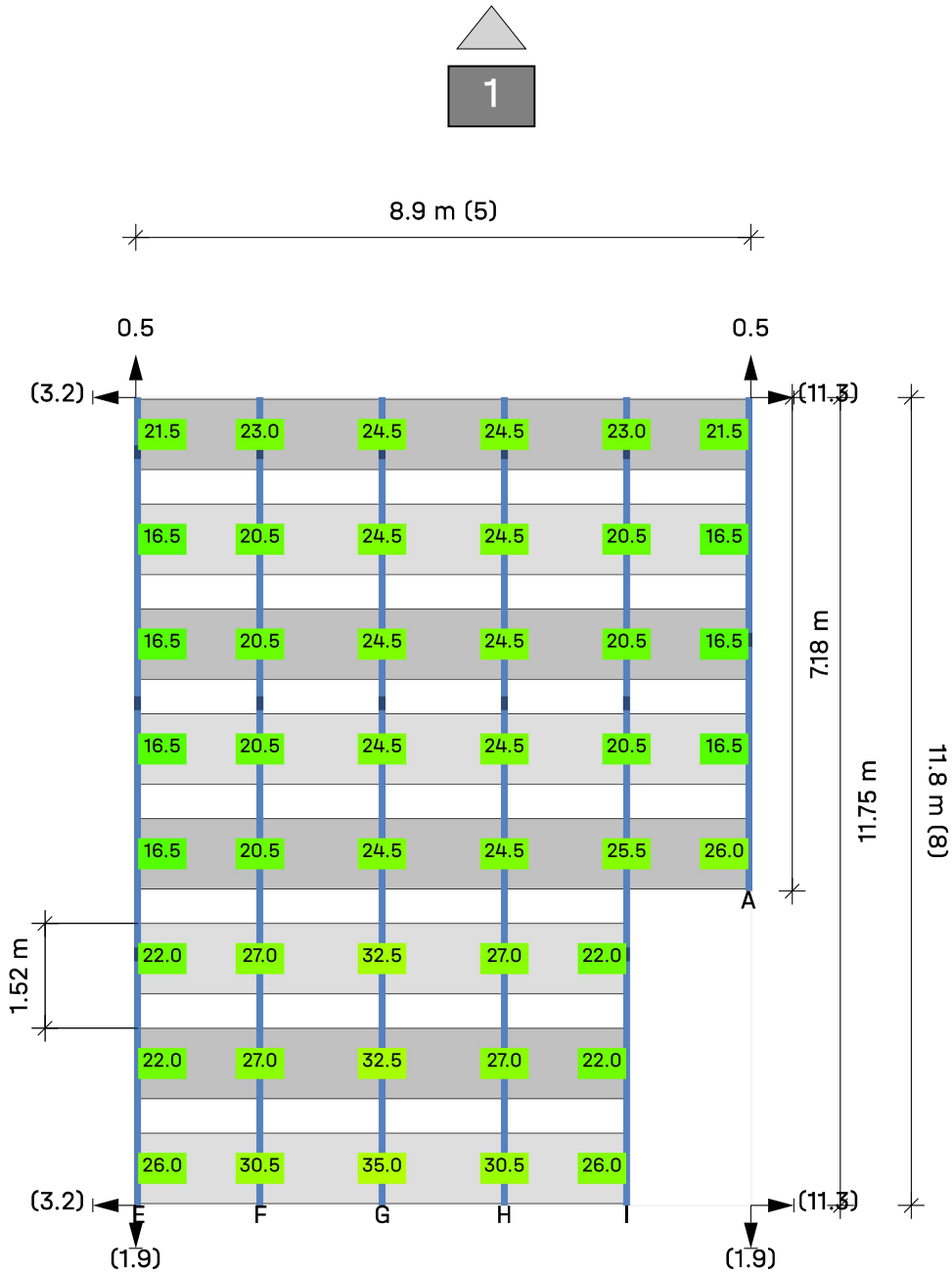
Modules $7 \times 1 = 7$

Legend

- Next block indicator
- Mounting rail
- Row distance [m]
- Distance to Roof Edge [m]
- Dist. to neighbour module block/array [m]
- Ballast in kilogram (kg)
- Porter Ballast



Roofs | MMU-A&H-6th Floor | Module array 1 | Module blocks

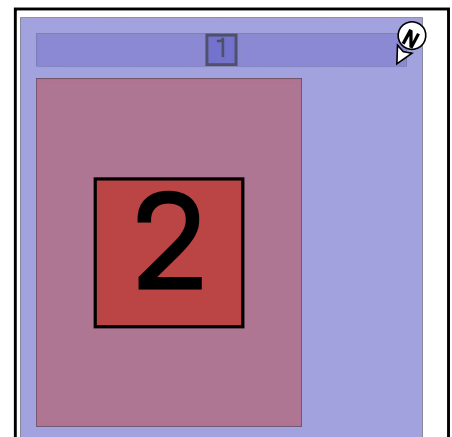


Roof ③ Module array ① Module block 2

Modules (5 × 8) - 3 = 37

Legend

- Next block indicator
- Mounting rail
- Row distance [m]
- Distance to Roof Edge [m]
- Dist. to neighbour module block/array [m]
- Ballast in kilogram (kg)
- Porter Ballast





Results | MMU-A&H-6th Floor

Roof	System	Module	Height	Quantity	Total power
<u>MMU-A&H-6th Floor</u>  Flat	<u>S-Dome 6.10</u> <u>Classic</u>	LR4-60HPH-375M 1,755×1,038×35 mm 375 Wp	16.00 m	44	16.5 kWp

Module

Name	LR4-60HPH-375M
Manufacturer	Longi Solar
Output power	375 Wp
Dimensions	1,755×1,038×35 mm
Weight	19.5 kg
Panel Tilt	9.5 °

Module clamps

module clamp	DomeClamp Black MC Set 30-50
end clamp	DomeClamp Black EC Set 30-50

Ballast capacity

Speed Porter	40.0 kg
Porter	108.0 kg

Verification system utilisation

Type	pressure	suction
Verification system utilisation	72.85%	43.29%
Loads on modules (ultimate state)	1.59 kN/m ²	-1.12 kN/m ²
Loads on modules (Serviceability)	1.19 kN/m ²	-0.80 kN/m ²

Specific loads

Module block	No. of modules	Ballast [kg]	Dead weight [kg]	Module block area [m ²] (incl. service corridor)	Dead Load [kN/m ²]	Dead load (roof surface area) [kN/m ²]
Block 1	7	622.0	787.20	13.52	0.57	
Block 2	37	1,053.5	1,926.70	96.96	0.19	
Total	44	1,675.5	2,713.90			0.06



Results | MMU-A&H-6th Floor

Notes

- The proof of static equilibrium and load capacity of the system are carried out by checking the load cases lifting and sliding by wind and by further static calculations.
- You will find a short version of the wind tunnel report and a certificate for the further static calculations on our homepage.
- The structure was statically verified in accordance with Eurocode 9: Design of aluminium structures (DIN EN 1999-1-1:2021) and offers sufficient load-bearing capacity and stability for the loads specified in the chapter 'Maximum actions on the components'.
- Adjustment factor for wind load regarding service life period, f_W , is according to DIN EN 1991-1-4/ NA, NDP for 4.2 (2P) note 5, table 3
- Adjustment factor for snow load regarding service life period, f_S , is according to DIN EN 1991-1-3/ annex D, table 4
- All resistance values of components are determined from an extern static engineering office.
- The structural design complies with BS EN 1990 - Basis of Structural Design.
- Snow loads are determined in accordance with National Annex BS NA EN 1991-1-3 (2018) - UK National Annex to EC1 - Action on structures - general actions - snow loads.
- Wind loads are determined in accordance with National Annex BS NA EN 1991-1-4 - UK National Annex to EC1 - Action on structures, general actions - wind actions.
- If the distance to the coast is less than one kilometer, the materials must be checked for corrosion resistance and adjusted if necessary.
- Service life is recognised according to 'Eurocode EN 1991 - Action on structures, Snow loads' and 'Eurocode EN 1991 - Actions on structures, Wind actions'. Subject to the Building Regulations and for security-relevant reasons the installation has to be dismantled at the end of its service life.
- Failure consequence class is considered according to 'Eurocode EN 1990 - Basis of structural design'.
- Data and results must be verified with regard to local conditions and checked by a suitably qualified person. Please see our TCU under <https://k2-systems.com/en/base-tcu> , in particular § 2 ("technical and specialist requirements for the customer"), § 7 ("warranty provisions") and § 8 ("limitation of liability").



Structural analysis report | MMU-A&H-6th Floor

General information

Name	MMU-Arts and Humanities
Mounting System	S-Dome 6.10 Classic
Author	claire fitzpatrick

Location information

Address	Manchester M15 6BG
Ground elevation	43.30 m

Roof information

Building height	16.00 m
Roof type	Flat roof
Roof pitch	2°
Fastening method	with Ballast
Roof covering	Flat
Min. roof edge distance	0.60 m
Parapet wall height	0.01 m
Material	Single ply membrane
Friction coefficient	0.5

The friction coefficients given here must be checked onsite. If a lower value is found, this must be specified here for the ballast calculation!

Loads

Design method	BS EN
Failure consequence class (CC)	CC1
Design working life	25 years
Terrain category	Town Terrain
Distance to shoreline	1.00 km
Distance inside town terrain	25.00 km

Wind load

Velocity pressure, 50	$q_{p,50} = 0.844 \text{ kN/m}^2$
Adjustment factor for service life	$f_w = 0.921$
Velocity pressure, 25	$q_{p,25} = 0.777 \text{ kN/m}^2$



Structural analysis report | MMU-A&H-6th Floor

Snow load

Snow load zone	3
Snow guard	No
Snow load on ground level	$s_k = 0.500 \text{ kN/m}^2$
Shape Coefficient for Snow	$\mu_i = 0.800$
Factor for roof pitch	$d_i = 0.999$
Snow load on roof, 50	$s_{i,50} = 0.400 \text{ kN/m}^2$
Adjustment factor for service life	$f_s = 0.929$
Snow load on roof, 25	$s_{i,25} = 0.371 \text{ kN/m}^2$

Dead Load

Weight of module	$G_M = 19.5 \text{ kg}$
Weight of mounting system per module	$= 4.1 \text{ kg}$
Module area	$A_M = 1.82 \text{ m}^2$
Dead weight of module per m^2	$= 10.70 \text{ kg/m}^2$
Dead weight of mounting system per m^2	$= 2.25 \text{ kg/m}^2$
Total Dead Load (excl. ballast) per m^2	$= 0.13 \text{ kN/m}^2$

Load Combinations

Ultimate limit state

Partial safety factor unfavourable permanent load	$\gamma_{G,sup} = 1.35$
Partial safety factor favourable permanent load	$\gamma_{G,inf} = 1.00$
Partial safety factor destabilising permanent load	$\gamma_{G,dst} = 1.10$
Partial safety factor stabilising permanent load	$\gamma_{G,stab} = 0.90$
Partial safety factor variable loads	$\gamma_Q = 1.50$
Combination coefficient with regards to wind	$\psi_{0,W} = 0.60$
Combination coefficient with regards to wind (additional varying influences)	$\psi_{1,W} = 0.20$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$
Importance factor permanent	$\kappa_{Fl,G} = 0.90$
Importance factor variable	$\kappa_{Fl,Q} = 0.85$
Characteristic dead weight	G_k
Characteristic snow load on the roof	$S_{i,n}$
Characteristic wind load	W_k
Load case combination 01	$LCC\ 01_{uls} = \gamma_{G,sup} * \kappa_{Fl,G} * G_k + \gamma_Q * \kappa_{Fl,Q} * S_{i,n}$
Load case combination 02	$LCC\ 02_{uls} = \gamma_{G,sup} * \kappa_{Fl,G} * G_k + \gamma_Q * \kappa_{Fl,Q} * W_{k,Pressure}$
Load case combination 03	$LCC\ 03_{uls} = \gamma_{G,sup} * \kappa_{Fl,G} * G_k + \gamma_Q * \kappa_{Fl,Q} * (W_{k,Pressure} + \psi_{0,S} * S_{i,n})$



Structural analysis report | MMU-A&H-6th Floor

Load case combination 04	$LCC\ 04_uls = \gamma_{G,sup} * \kappa_{FI,G} * G_k + \gamma_Q * \kappa_{FI,Q} * (S_{i,n} + \psi_{0,W} * W_{k,Pressure})$
Load case combination 06	$LCC\ 06_uls = \gamma_{G,inf} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,Suction}$

Static equilibrium

Uplift Verification	$LCC\ up = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Uplift}$
Displacement verification	$LCC\ displ = \gamma_{G,stab} * G_k + \gamma_Q * \kappa_{FI,Q} * W_{k,n,Displacement}$

Serviceability limit state

Combination coefficient with regards to wind	$\psi_{0,w} = 0.60$
Combination coefficient with regards to Snow	$\psi_{0,S} = 0.50$

Load case combination 01	$LCC\ 01_sls = G_k + S_{i,n}$
Load case combination 02	$LCC\ 02_sls = G_k + W_{k,Pressure}$
Load case combination 03	$LCC\ 03_sls = G_k + W_{k,Pressure} + \psi_{0,S} * S_{i,n}$
Load case combination 04	$LCC\ 04_sls = G_k + S_{i,n} + \psi_{0,W} * W_{k,Pressure}$
Load case combination 06	$LCC\ 06_sls = G_k + W_{k,Suction}$

Max. Pressure on insulation

General information

dead load system	$g_{System} = 0.13\ kN/m^2$
aerodynamic coefficient	$c_{p,Pressure} = 0.20$

Load distribution underneath the building protection mat under Peak (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 0.91\ m^2$
maximum ballast	$G_{ballast\ required} = 61.5\ kg$

Load distribution underneath the building protection mat under SD (45°)

Dimensions	$380.0 \times 75.3 \times 27.6\ mm$
	$A_{eff} = 28,614.00\ mm^2$
	$A_{load\ range\ area} = 0.91\ m^2$
maximum ballast	$G_{ballast\ required} = 31.7\ kg$



Structural analysis report | MMU-A&H-6th Floor

Load Combinations

	$\sigma_{Ek, \text{heat insulation, S6_10Eco}} [\text{Pa}]$	$\sigma_{Ek, \text{heat insulation, SD}} [\text{Pa}]$
Load case combination 00	25,137	14,910
Load case combination 01	36,804	26,577
Load case combination 02	30,084	19,858
Load case combination 03	35,918	25,691
Load case combination 04	39,772	29,546

Dead loads (PV system + ballast)

 $\sigma_{Ek, \text{heat insulation, S6_10Eco}}$

$$\sigma_{Ek} = 25,137 \text{ Pa}$$

 $\sigma_{Ek, \text{heat insulation, SD}}$

$$\sigma_{Ek} = 14,910 \text{ Pa}$$

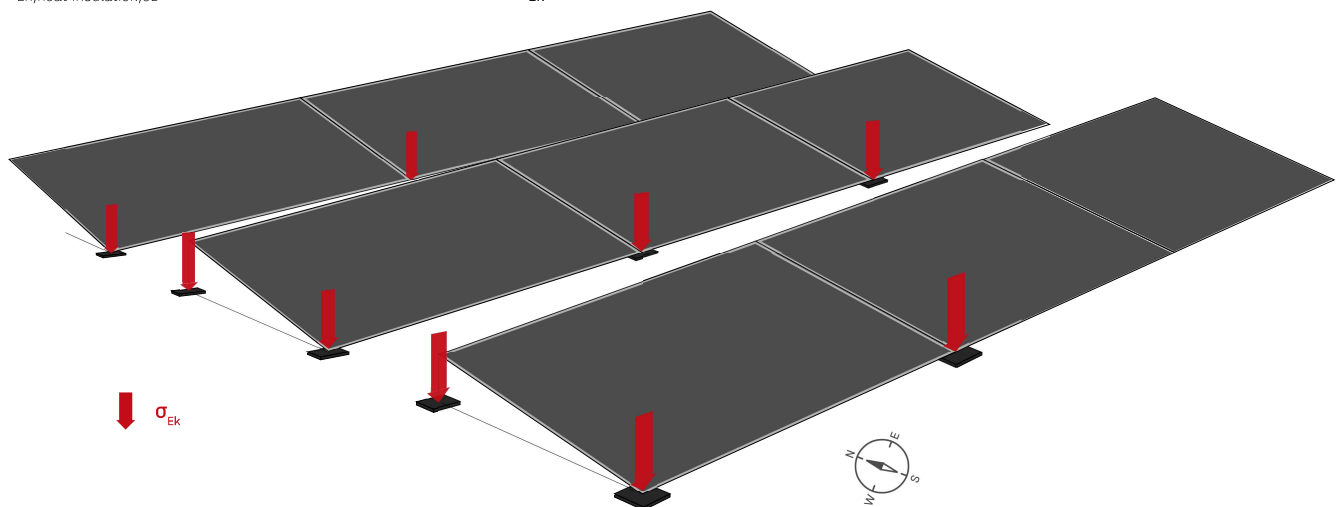
Maximum actions (sum of dead loads and the maximum variable actions from wind and snow)

 $\sigma_{Ek, \text{heat insulation, S6_10Eco}}$

$$\max \sigma_{Ek} = 39,772 \text{ Pa}$$

 $\sigma_{Ek, \text{heat insulation, SD}}$

$$\max \sigma_{Ek} = 29,546 \text{ Pa}$$



Structural analysis report | MMU-A&H-6th Floor

H-V-loads

According to wind tunnel report by I.F.I. Institut für Industrieaerodynamik GmbH

General information

Total number of modules	44	
Roof areas covered with modules	A	= ca. 110.47 m ²
Dead Load	$g_{k, \text{System incl. ballast}}$	= 0.24 kN/m ²

Aerodynamic coefficients

	$C_{p, \text{Pressure}}$	= according to EN 1991-1-4
	$C_{F, x, \text{average}}$	= 0.01
	$C_{F, y, \text{averaged}}$	= -0.03
edge distance correction	$k_{s, xy}$	= 1.00
Parapet wall- correction coefficient	k_p	= 1.00
Factor building height		= 1.00

Horizontal pressure

$$W_{k, F, x} = 0.007 \text{ kN/m}^2$$

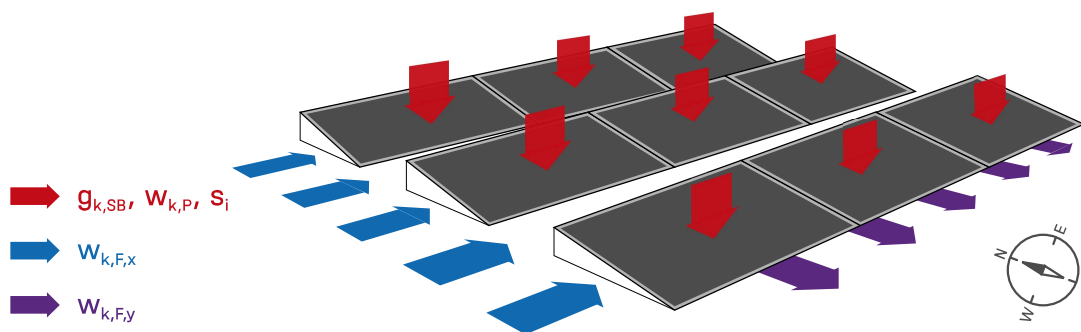
$$W_{k, F, y} = -0.019 \text{ kN/m}^2$$

Vertical pressure

$$g_{k, \text{System incl. ballast}} = 0.24 \text{ kN/m}^2$$

$$W_{k, \text{Pressure}} \text{ - according to EN 1991-1-4}$$

$$S_i \text{ - according to EN 1991-1-3}$$



Comment:

Flat roof vertical wind loads are essentially determined by its displacement effect and remain unchanged even with a flat pv structure. We advise using the aerodynamic coefficients according to DIN EN 1991-1-4 to calculate flat roofs.



Roofs | MMU-A&H-6th Floor | Bill of material

Position	Item no.	Item description	Quantity	Weight
1	2004125	Dome 6.10 Peak	53	15.9 kg
2	1001643	MK2	126	2.2 kg
3	2001729	Socket Head Bolt serrated M8×20	126	1.6 kg
4	2003243	Dome 6.10 SD	53	16.1 kg
5	2003126	Dome Mat S 380	106	39.0 kg
6	2003249	S-Dome 6.10 Windbreaker short	44	79.2 kg
7	2002937	Thread-forming metal screw 6×25	106	0.7 kg
8	2004277	K2 BasicRail 22; 3.65 m	21	49.3 kg
9	1006039	Dome FlatConnector Set	16	3.1 kg
10	2002870	K2 Solar Cable Manager	44	0.1 kg
11	2004141	Mat-S Tool	1	0.0 kg
12	2002609	DomeClamp Black MC Set 30-50	70	4.1 kg
13	2002610	DomeClamp Black EC Set 30-50	36	2.4 kg
14	2003150	Dome Porter short	10	14.8 kg
15	2002300	Dome SpeedPorter	102	7.8 kg
Total				236.3 kg



Bill of material

Position	Item no.	Item description	Quantity	Weight
1	2004125	Dome 6.10 Peak	182	54.6 kg
2	1001643	MK2	384	6.7 kg
3	2001729	Socket Head Bolt serrated M8×20	384	5.0 kg
4	2003243	Dome 6.10 SD	182	55.1 kg
5	2003126	Dome Mat S 380	364	134.0 kg
6	2003249	S-Dome 6.10 Windbreaker short	153	275.4 kg
7	2002937	Thread-forming metal screw 6×25	364	2.5 kg
8	2004277	K2 BasicRail 22; 3.65 m	75	176.0 kg
9	1006039	Dome FlatConnector Set	56	10.9 kg
10	2002870	K2 Solar Cable Manager	153	0.4 kg
11	2004141	Mat-S Tool	3	0.1 kg
12	2002609	DomeClamp Black MC Set 30-50	248	14.4 kg
13	2002610	DomeClamp Black EC Set 30-50	116	7.7 kg
14	2002300	Dome SpeedPorter	366	27.8 kg
15	2003150	Dome Porter short	10	14.8 kg
Total				785.4 kg



| Connecting Strength

Thank you for choosing a K2 mounting system.

Systems from K2 Systems are quick and easy to install.

We hope these instructions have helped.

Please contact us with any questions or suggestions for improvement.

Our contact data:

k2-systems.com/en/contact

Our General Terms of Business apply. Please refer to k2-systems.com

K2 Solar Mounting Solutions Ltd

Unit 46 Easter Park

Benyon Road

Aldermaston, RG7 2PQ

Great Britain

+44 1189 701280

info@k2-systems.uk.com

k2-systems.com/en