VERTEX® SL XSPM SOLAR LIGHTING SYSTEM

Stand-alone Solar Pathway and Area Lighting System



Product Overview

Mission critical lighting for discerning organisations that value reliability & performance.

Vertex® SL XSPM Solar Lighting Systems are designed and built specifically for AS/NZS 1158.3.1 Pedestrian category lighting applications.

Utilizing the high output Cree XSPM LED luminaire mounted on a slimline 180mm OD enlarged base solar pole with the solar panel array attached at the top.

The LiFePO4 battery pack and Energy Management System (EMS) with MPPT Charge Controller and LED Driver are securely concealed within the enlarged base section of the pole behind steel locked doors using *Riv-Lok®* Friction Drive Security Fixings for easier maintenance access.

Performance Summary

Designed in Australia by Orca Solar Lighting

Autonomy: Up to 5 Days (subject to location requirements)
Battery Capacity: 76Ah 12.8V (973 Wh)
PV Module: 150W Monocrystalline
Lumen Output: Up to 4,000 Lumens
Luminaire Efficacy: Up to 150 LPW
Colour Rendering Index: Minimum 70 CRI
Colour Temperature: 3000K/4000K
Warranty: 5 Year Limited Warranty with Performance Guarantee

Specification Criteria

Project Name:		Type/Label Reference:	
Configuration Code:			

Example: VSL-XSPM-6M-16W-3SH-30K-BP1.8-PCGY-D2D

Product	Pole Height	Power Profile *	Optic Distribution	Colour Temperature (CCT)	Footing Type ^	Finish	Power Profile +
Vertex® SL	6m	30W **[30W]**	Type 3 Short **[3SH]**	3000K **[30K]**	Bored Pier Footing	Powder Coat Grey	Dusk-Dawn
XSPM	**[6M]**	25W **[25W]**	Type 3 Medium **[3ME]**	4000K **[40K]**	**[BP1.8]**	**[PCGY]**	**[D2D]**
[VSL-XSPM]		20W **[20W]**	Type 4 Medium **[4ME]**		Surefoot	Powder Coat Black	2 Timers
		16W **[16W]**	Other **[___]**		(Concrete-Free)	**[PCBK]**	**[2T_HR__W-_HR__W]**
		14W **[14W]**			**[SF400]**		3 Timers
		12W **[12W]**			Other/Custom		**[3T_HR__W-__W-_HR__W]**
		9W **[9W]**			**[_____]**		Other / Custom
		6W **[6W]**					**[_T___W-___]**

Notes

* Power setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power options to suit your project.
\+ Power Profile setting availability may be subject to location conditions. Please consult your sales representative for assistance on suitable power profile options to suit your project.
^ Footing types are subject to site soil testing and engineered footing design. Please consult your sales consultant for advice on footing design options.
~Option may only be available as a special order and may incur additional lead time for delivery and may be subject to minimum order quantities.

Power Profile Definitions:

Dusk to Dawn **[D2D]** – Runs the luminaire at static power level from dusk through to dawn
2 Timers **[2T..]** – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting for the remainder of the night (example: 5 hours at 25W, dim to 9W for the rest of the night)
3 Timers **[3T..]** – Operates the luminaire from dusk for pre-set time frame at one power level, then runs the light at a second power setting and then for a third timer and power level (example: 2 hours at 25W, dim to 9W, return to 25W prior to dawn).
Other **[_T..]** – Orca Solar can program systems for dimming level and or running time according to project requirements.

Please refer to Page 4 for more information on power profiles or consult your sales representative for assistance on suitable profile options to suit your project.

Vertex® SL Solar Lighting Systems are designed in accordance with AS/NZS 4509.2-2010 – Stand-alone Power Systems (System Sizing Reports available upon request). All products supplied by Orca Solar Lighting adhere to AS/NZS 4509, AS/NZS 5033, AS/NZS 5139 and AS/NZS 3000 electrical, battery and photovoltaic safety standards where applicable.

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VERTEX® XSPM SOLAR LIGHTING SYSTEM

Stand-alone High Output LED Area Lighting System

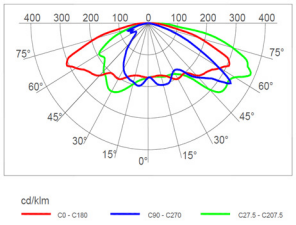
RECOMMENDED CREE® OUTDOOR LUMINAIRE LUMEN MAINTENANCE FACTORS (LMF)					
Ambient	Init. LMF	25k hr [2]	50k hr [2]	75k hr [3]	100k hr [3]
15˚C	1.02	0.98	0.95	0.91	0.88
20˚C	1.00	0.96	0.93	0.89	0.86
40˚C	0.98	0.94	0.89	0.84	0.80

Lumen maintenance values at 25˚C are calculated per TM-21 based on LM-80 data and in-situ luminaire testing.
[2] in accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing (DUT) i.e. the packaged LED chip.
[3] According with TM-21 the projected value can be just up to 6x time the test time.

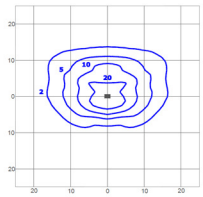
Performance Summary

NanoOptic® Precision Delivery Grid™ Optics
Efficacy: Up to 155Lm/W
Initial Colour Consistency: 4 MacAdam Steps

3SH

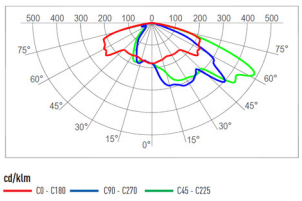


Test Report #: PL112371-012

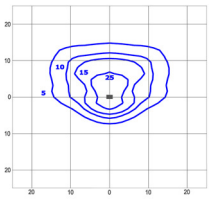


XSPME023SHA40K
Mounting Height: 6m

3ME

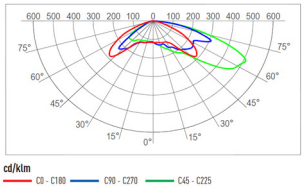


Test Report #: PL11703-031

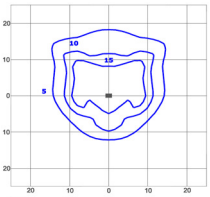


XSPE023MEE40K
Mounting Height: 8m

4ME



Test Report #: PL11703-032



XSPE024MEE40K
Mounting Height: 8m

CREE LIGHTING

XSP High Output Series LED Luminaire



Designed from the ground up as a totally optimized LED street lighting system, XSPM maintains the familiar look of the traditional cobra-head design and delivers substantial energy savings while reducing maintenance time and costs.

Equipped with NanoOptic® Precision Delivery Grid™ optics, XSPM achieves better optical control than traditional street lighting fixtures and efficiently delivers white uniform light for safer-feeling communities.

The luminaire is designed to mount directly to 76mm or 60mm outer dimension tenons or poles with a specific spigot (adjustable arm).

Applications: Roadways, Parking Lots, Walkways and General Area Spaces.

TYPE III SHORT DISTRIBUTION

Input Power (Watts)	3000K Nominal Lumen Output	4000K Nominal Lumen Output
30	3,596	3,785
25	2,976	3,134
20	2,382	2,508
16	1,866	1,964
14	1,631	1,732
12	1,402	1,484
9	1,051	1,113
6	749	788

Initial delivered lumens at 25˚C (77˚F). Actual production yield may vary between -10 and +10% of initial delivered lumens

TYPE III MEDIUM DISTRIBUTION

Input Power (Watts)	3000K Nominal Lumen Output	4000K Nominal Lumen Output
30	3,720	3,916
25	3,079	3,242
20	2,464	2,594
16	1,930	2,032
14	1,687	1,792
12	1,451	1,535
9	1,087	1,152
6	774	815

Initial delivered lumens at 25˚C (77˚F). Actual production yield may vary between -10 and +10% of initial delivered lumens

TYPE IV MEDIUM DISTRIBUTION

Input Power (Watts)	3000K Nominal Lumen Output	4000K Nominal Lumen Output
30	3,758	3,956
25	3,111	3,275
20	2,490	2,621
16	1,950	2,053
14	1,704	1,810
12	1,466	1,551
9	1,099	1,163
6	782	823

Initial delivered lumens at 25˚C (77˚F). Actual production yield may vary between -10 and +10% of initial delivered lumens

CONSTRUCTION AND MATERIALS

Die cast, low copper <0,1%, aluminium alloy housing for long weathering and reliability.

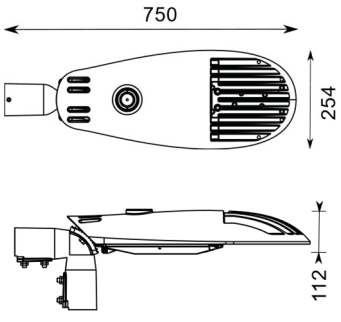
Luminaire is designed to mount directly to 76mm or 60mm outer dimension tenons or poles and can be tilted +/- 20˚, in steps of 5˚ and mounts to 60mm OD tenons.

Exclusive Colourfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation, and abrasion.

FEATURES

- **Lumen output:** 4000 – 7,000lm
- **Efficacy:** Up to 150lm/W
- **CCT:** 3000K, 4000K
- **CRI:** 70 CRI
- **Initial Colour Consistency:** 4 MacAdam steps
- **Lifetime:** L90B10 up to 140,000 hrs Ta=25°C
  (According to IEC/ EN 62717 and IESNA TM-21) Calculated LM80 Report at 22,000 hours.
- **Operative temperature:** -40°C up to +50°C
- **Ingress protection rating:** IP66 per IEC 60529
- **Impact resistance rating:** IK08

WEIGHT AND MAXIMUM WIND AREA	
Weight:	Lateral Surface Wind Exposed:
7 kg	0.08 m²



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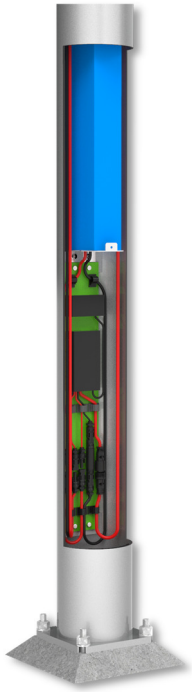
VERTEX® SL XSPM SOLAR LIGHTING SYSTEM

Stand-alone Solar Pathway and Area Lighting System

Design Overview

High Efficiency Multi-Directional Monocrystalline Photovoltaic Array

150W monocrystalline photovoltaic panel with a 25 year performance guarantee to 80% efficiency. With an architecturally designed E-Coat dual powder-coat bevelled aluminium extrusion frame, backing plate.

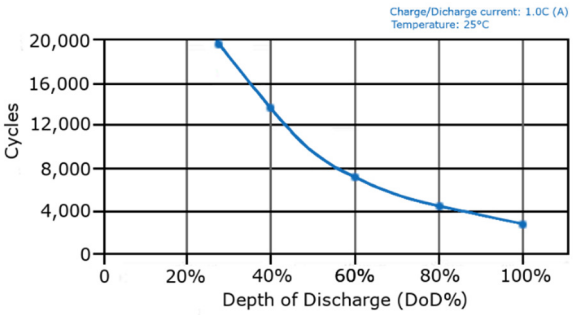


Premium Solar Cycling LiFePO4 Batteries

Vertex® SL XSPM Solar Lighting Systems utilises premium long life LiFePO4 973 Wh (76Ah 12.8V) Lithium batteries specifically designed for solar cycling applications.

Vertex® SL XSPM Solar Lighting Systems are sized and quantified specific to location conditions and autonomy requirements in accordance with AS/NZS 4509.2-2010





Slimline Enlarged Base Solar Light Poles

Vertex® SL XSPM Solar Lighting System poles feature a slimline 180 mm OD cylindrical base section to securely conceal the Vertex® Energy Management System and LiFePO4 Lithium battery pack.

Vertex® SL XSPM Solar Lighting System LiFePO4 battery pack is discretely positioned in a storage chamber above the Energy Management System mounting panel within the base section and securely locked into position on a shelf fixed using patented RivLok® security fixings to prevent unauthorised removal.

All electronic components forming the Energy Management System plus battery pack are conveniently positioned in the base of the pole for ease of maintenance while remaining securely stored using a steel door with patented *RivLok®* security fixings.



Energy Management System

Vertex® SL XSPM Solar Lighting System Energy Management System uses premium high efficiency MPPT (maximum power point tracking) solar charge controllers with Integrated LED Drivers that enable programmable power profile setting and multi-stage time scheduling

All components of the Vertex® SL XSPM Solar Lighting Systems Energy Management System have a minimum ingress protection rating of IP67.

Compliance

Vertex® SL XSPM Solar Lighting Systems are designed to provide a minimum of 30% solar panel oversupply co-efficient as an extra reliability measure in accordance with AS/NZS 4509.2-2010 (Australian standards for stand-alone power systems).

HDG (Hot Dipped Galvanised) steel poles and foundation cages designed in accordance with AS/NZS 4100, AS/NZS 3679, AS/NZS 1163 and AS/NZS 1154.

Vertex® SL XSPM Solar Lighting System Energy Management System and LiFePO4 Battery pack are designed in accordance with AS/NZS 4509.2-2010 (Australian standards for stand-alone power systems).



RivLok® Friction Drive Security Fixings

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VERTEX® SL XSPM SOLAR LIGHTING SYSTEM

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Form and Function

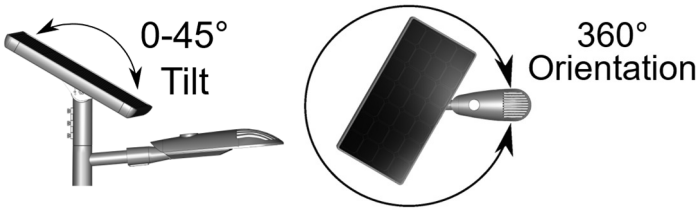
Optimising Solar Collection

Vertex® SL XSPM Solar Lighting Systems feature pole-top mounted photovoltaic modules to enable full flexibility of orientation and tilt angle adjustment ensuring that regardless of which way the luminaire is aimed, solar collection will be optimal.

The full 360° orientation and 0-60° locking tilt adjustment allows the photovoltaic modules to collect the optimal amount of energy with the photovoltaic facing North and tilted to the appropriate angle to suit the install location relative to the suns tracking path.

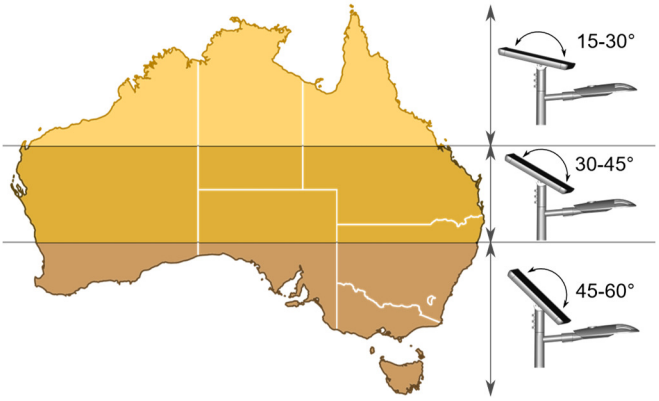
Vertex® SL XSPM Solar Lighting Systems photovoltaic modules are scaled sufficiently to match power load, site location conditions and minimum autonomy requirements.

Vertex® SL XSPM Solar Lighting Systems photovoltaic modules are supplied with 10 years warranty and a 25-year performance guarantee to a minimum 80% efficiency.



PV Tilt Angle:	

PV Module Tilt Angle Guide - Australia



Power Profiles

Vertex® SL XSPM Solar Lighting Systems feature advanced timer and power profiling capabilities which enable the user to set power profile modes and timers to best suit the application.

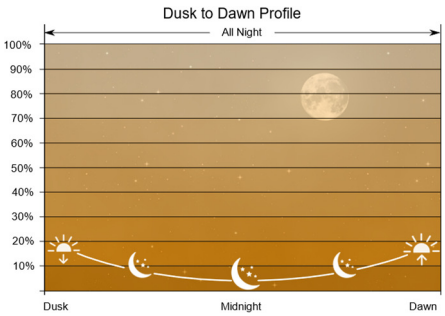
Power profiles offer the ability to control the lighting so that high light levels can be applied when needed and reduced low light levels when not needed.

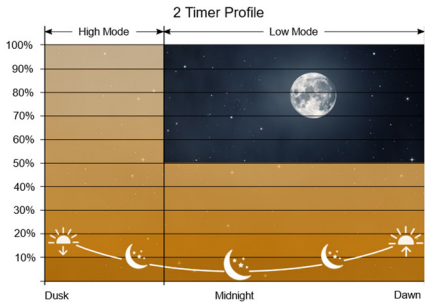
This functionality assists with offering higher light output settings to meet standards requirements while assisting to reduce light pollution and meet obtrusive light limitations during curfew hours (AS/NZS 4282). Power profiles can also assist in meeting International Dark Sky Association recommendations by reducing unwanted light in ecological effected areas.

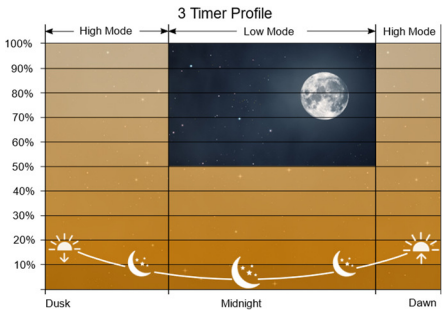
Dusk to Dawn (All Night)
Power

2 Timers	
Power 1	Power 2
Timer 1	Timer 2

3 Timers		
Power 1	Power 2	Power 3
Timer 1	Timer 2	Timer 3







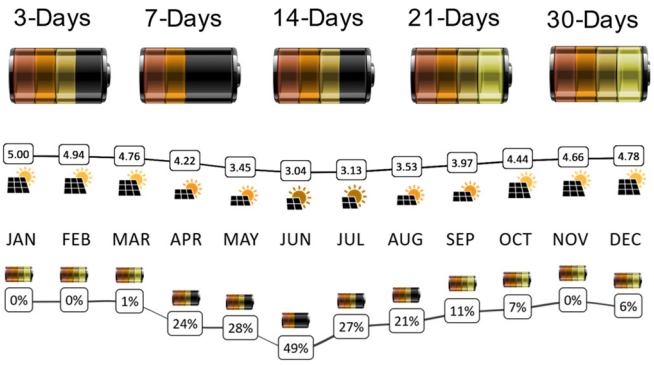
Autonomy (Battery Backup)

Vertex® SL XSPM Solar Lighting Systems are custom designed utilising NASA solar radiation and weather pattern data for the specified location to ensure year-round performance.

Vertex® SL XSPM Solar Lighting Systems are designed in accordance with the methodologies of AS/NZS 4509.2:2010 – Stand-Alone Power Systems to ensure the photovoltaic module is adequately sized and the discharge continuity of the battery system is balanced year-round.

This process ensures the extended life of the premium battery system used in the Vertex® SL XSPM Solar Lighting System.

Site based calculation reports can be supplied upon request to verify solar and battery system sufficiency.



*Example for illustrative purposes only – Autonomy calculations are subject to location conditions.

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Electrical and Mechanical Specifications

Mechanical (Luminaire and PV Module Assembly)		
Construction Material	Aluminium Alloy (<1.0% Cu) with E-Coat Dual Powder Coat Finish	
Fixings	316 Stainless Steel	
Dimensions	1,222 x 696 x 50 (Solar/PV Module)	750 x 253 x 112 (Luminaire)
Weight	26 kg	
Ingress Protection Rating(s)	IP66 (LED Module and Optics)	IP67 (Electronics & Connections)
Impact Rating(s)	IK08 (LED Optical Lens)	IEC 61215 Hail Impact (Solar Module)
Solar/PV Directionality	0-45° tilt at 15° Increments, Full 360° Orientation	
Standards Compliance and Testing	Lighting System Body: AS 1874 (Aluminium) – ISO 12944-5:2007 (Paint Finishes) and ISO 9227 (Corrosion), IEC 60529 (Ingress Protection) Pole(s): AS/NZS 4100 (Steel Structures), AS/NZS 3679 (Structural Steel), AS/NZS 1163 (Cold-formed structural steel hollow sections)	

Luminaire				
LED Type	Cree® XLamp® MD-A			
LED Current	900mA (Maximum)		225mA (Minimum)	
LED Power	30W (Maximum)		9W (Minimum)	
LED Lifespan	L90B10 > 140,000hrs at 25°C Tª (TM-21-2011 @ 22,000 Hrs on LM80 report)			
Lumen Output	Maximum Power Setting		Minimum Power Setting	
	3,758 (3000K)	3,956 (4000K)	1,051 (3000K)	1,113 (4000K)
Correlated Colour Temperature (CCT)	3000K / 4000K			
Colour Rendering Index (CRI)	80+ CRI			
Optics / Distribution Type	Type 3 Short, Type 3 Medium or Type 4 Medium (IESNA)			
Optical Material	Optical Grade Acrylic PMMA			
Operating Temperature Range	-40°C to +50°C			
Standards Compliance and Testing	LM80-08-2008, IES TM-21-2011 & IEC/EN62717 (LED Lifespan at 22,000 Hours), NATA ISO/IEC 17025 (Photometric).			

Photovoltaic / Solar Engine (STC)	
Cell Type	Monocrystalline with 3.2 mm Tempered Glass
Cell Count	36
Rated Power Output (Pmax)	150W
Power Tolerance	≥ 3%
Maximum Power Voltage (Vmp)	18.78V
Open Circuit Voltage (Voc)	22.86V
Short Circuit Current (Isc)	8.2A
Maximum Power Current (Imp)	7.99A
Standards Compliance and Testing	IEC 61730 (Photovoltaic Module Safety), IEC 61215 (Photovoltaic Modules Design)

Battery System		
Chemistry Type	Lithium Iron Phosphate (LiFePO4)	
Rated Capacity	76Ah (Ampere Hours)	973Wh (Watt Hours)
Rated Voltage	12.8V	
Operating Temperature Range	-20°C to +60°C	
Rated Depth of Discharge (DoD)	80%	
Rated Cycle Life @ 0.2C	≥ 4,000 Cycles at to 80% DoD	≥ 6,000 Cycles to 50% DoD
Standards Compliance	IEC 62133 (Lithium Battery Systems)	

Electrical and Control	
Controller Type	Multi-Power Point Tracking (MPPT) with integrated step-up LED driver
System Voltage	12V
Maximum Input Voltage	60V
Maximum Charge Current	15A
Load Conversion Efficiency	95% (Typical)
Load Current Accuracy	≥ 3%
Maximum Load Power	200W
Load Current Range	50mA to 5,600mA
Load Voltage Range	15 - 60 V
Operating Temperature Range	- 35°C to +65°C
Smart City Compatibility	LoRaWAN, Zigbee or NB-IoT (via. Modbus) – Additional components required.
Remote Control	2.4Ghz WIFI Remote Control (Parameter Setting and Diagnostic Reporting)
Standards Compliance and Testing	CE, RoHS (Restriction of Hazardous Substances), IEC 62109-1 (Safety of Power Converters), IEC 60529 (Ingress Protection), EN 60590 (Safety of Information Technology Equipment).

Poles		
Material	Hot Dip Galvanized Steel (dual powder coat or marine finishes optional)	
Height Options	4m, 6m	
Foundation Bolt Arrangement	4 x M20 x 280mm P.C.D.	
Spigot Size	Solar/PV Array	Luminaire Outreach
	Ø 76mm	Ø 60mm (custom spigots available upon request)
Standards Compliance and Testing	AS/NZS 1170 (Structural Design Actions), AS 4100 (Steel Structures), AS/NZS 4600 (Cold-Formed Steel Structures).	
Wind Rating	Region A, B, C (subject to pole foundation type and soil conditions)	

Vertex® SL XSPM Solar Lighting System is designed in accordance with AS 4509.2-2010 – Stand-alone Power Systems (System Sizing Reports available upon request).
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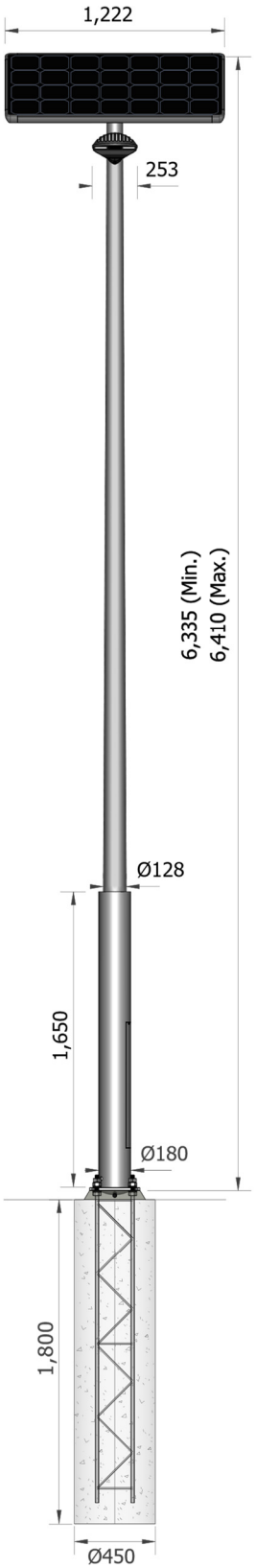
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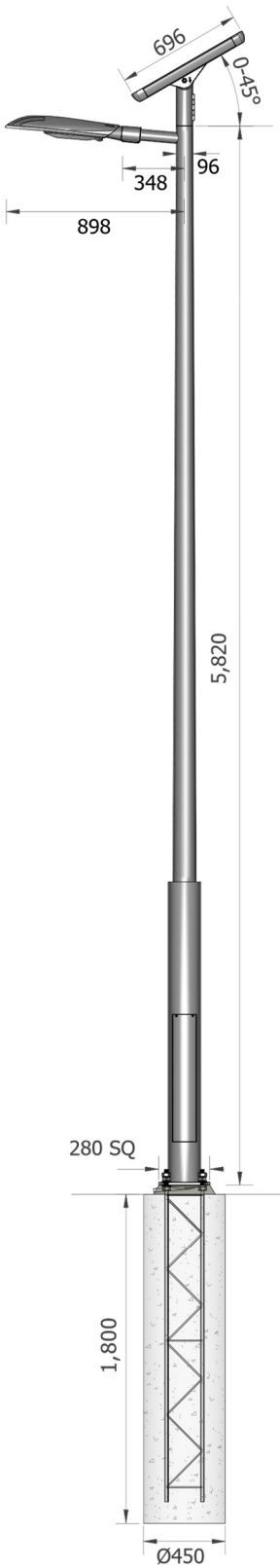
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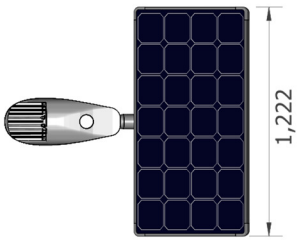
VERTEX® SL XSPM SOLAR LIGHTING SYSTEM

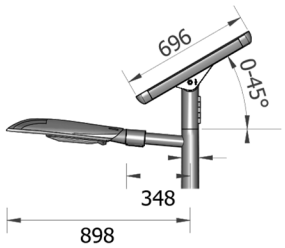
Stand-alone Solar Pathway and Area Lighting System

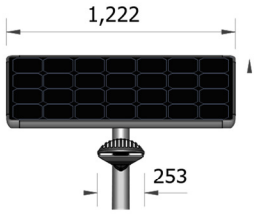
General Arrangement Detail

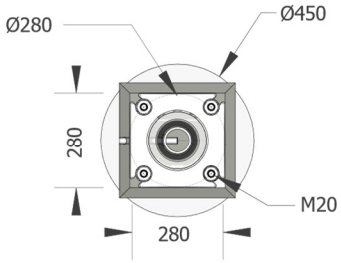












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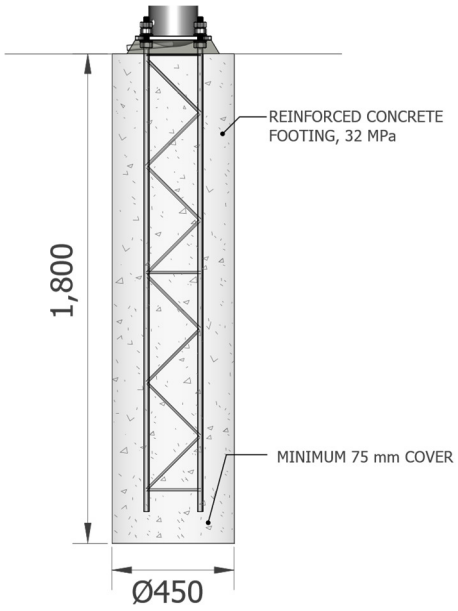
VERTEX® SL XSPM SOLAR LIGHTING SYSTEM

Stand-alone Solar Pathway and Area Lighting System

Footing Options

Bored Pier Footings

BP1.8 – Suitable for Wind Regions A, B and C

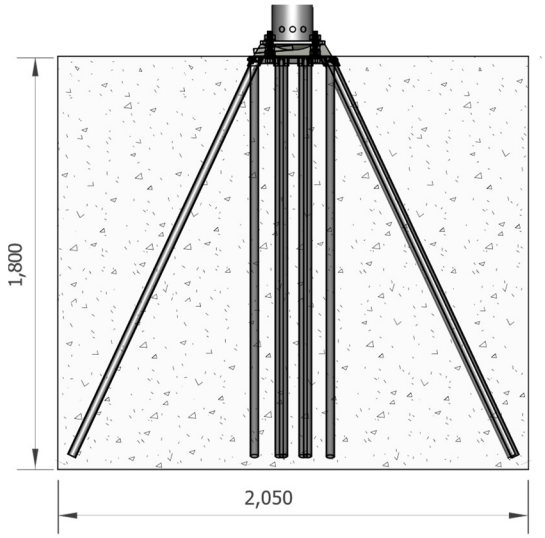


- Depth: 1,800mm
- Diameter: Ø 450mm
- Foundation Bolts: 4 x M20 x 280mm P.C.D.
- Steel Reinforcing: 4 x N20
- Bending Moment: 19.8kNm
- Shear Force: 4.1kN
- Pole Weight: 90kg
- Soil Bearing Capacity: 150kPa

Surefoot (Concrete-Free)

For More Information, visit https://bmsaanchoring.com.au/surefoot-footings/

SF400 12 Pile – Suitable for Wind Regions A and B



- Minimum Embedment Depth: 1,800mm
- Pile Size: 1,930mm x 32mmNB x 2.6mm
- Foundation Bolts: 4 x M20 x 280mm P.C.D.
- Material: 70 uM 500g/m² Hot Dip Galvanised
- Bending Moment: 19.8kNm
- Shear Force: 4.1kN
- Pole Weight: 90kg
- Soil Bearing Capacity: 150kPa

NOTICE:

Footing options are for indication purposes only, subject to final design and analysis of footings based on actual site soil conditions and engineering certification by a qualified geotechnical and structural engineer.

All foundations should only be installed by suitably qualified persons.

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