



Greenshine



LUMINA

Cost Effective Solar Lighting Solutions

# LUMINA | GENERAL SPECIFICATIONS



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## Light Fixture (GS-LED-L30)

|                         |                                    |
|-------------------------|------------------------------------|
| Luminaire Input Voltage | DC 12V   24V                       |
| Power Consumption       | 30W   40W   60W   80W              |
| Lumen                   | 4032   5108   8064   10,214 lumens |
| Color Temperature       | 3000-4000 K                        |
| IES Lighting Type       | Type II   III   V                  |
| Material                | Die-cast aluminum                  |



## Solar Panel (1 or 2 Units)

### 110W

### 180W

|                       |             |             |
|-----------------------|-------------|-------------|
| Rating Power          | 110 W       | 180 W       |
| Maximum Power Voltage | 17.60 V     | 18.95 V     |
| Maximum Power Current | 6.25 A      | 9.50 A      |
| Open Circuit Current  | 21.7 V      | 22.74 V     |
| Short Circuit Current | 6.71        | 9.98 A      |
| Size                  | 47.5" x 27" | 58.5" x 27" |
| Weight                | 29.5 lb     | 23.4 lb     |

## Battery (1 or 2 Units)

|                   |                                                 |
|-------------------|-------------------------------------------------|
| Battery Type      | GEL Deep Cycle Lead-Acid                        |
| Operating Voltage | 12 V                                            |
| Capacity          | 150 Ah at 20 hr-rate to 1.75 V per cell at 77°F |
| Dimensions        | 16(L)×7(W)×9.2(H) (in)                          |
| Expected Life     | 5 ~ 7 years                                     |

## Solar Charger

|                            |                                    |
|----------------------------|------------------------------------|
| Operating Voltage          | 12 V/24 V auto recognition         |
| Max. Charge / Load Current | 5 A/ 10 A/ 20 A (different models) |
| Night / Day Detection      | 2.5 V – 10 V                       |
| IP Class                   | IP68                               |

## Pole

|           |                                     |
|-----------|-------------------------------------|
| Height    | 20 ft                               |
| Diameter  | 6 3/4" at the bottom, 4" at the top |
| Thickness | 5/32"                               |
| Material  | Galvanized Steel                    |
| Finishing | Powder Coating                      |



# LUMINA | GENERAL SPECIFICATIONS



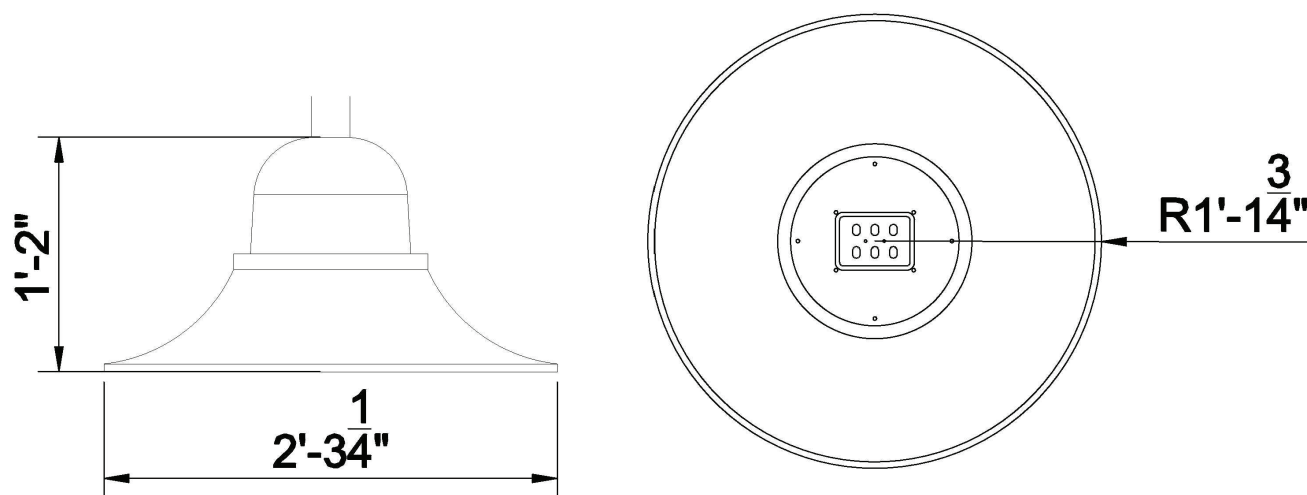
Greenshine

## SPECIFICATIONS

|                         |                                         |
|-------------------------|-----------------------------------------|
| Luminaire Input Voltage | DC 12V   24V                            |
| Power Consumption       | 30W   40W   60W   80W                   |
| Lumen Output            | 4032   5108   8064   10,214 lumens      |
| Color Temperature       | 3000-4000 K                             |
| IES Lighting Type       | Type II   III   V                       |
| Material                | High pressure die-cast aluminum         |
| Lens                    | 5mm toughened glass, optical grade PMMA |
| IP Class                | IP 65                                   |
| Insulation              | Class I                                 |
| Operating Temperature   | -30°C ~+50°C/ -22°F ~+122°F             |
| CRI                     | ≥70                                     |

**Weight:** 8.3 kg | 18.3 lb

## DIMENSIONS



# GREENSHINE SOLAR PANEL

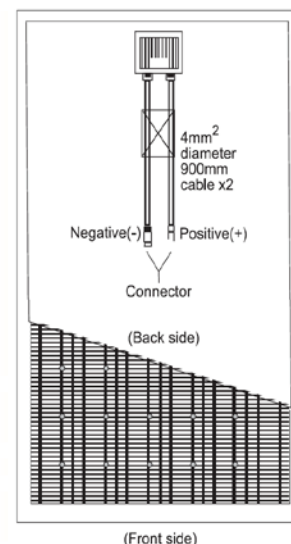
Solar Powered LED Lighting System



Greenshine

## OVERVIEW

- Mono-Crystalline solar cells
- Aluminum frame with a unique design to withstand strong winds
- Highly resistant tempered glass
- Multilayer EVA encapsulation with triple layer back sheet
- 25-year power output warranty: 5 years/95%, 12 years/90%, 25 years/80%.



## Rating Power

110W

180W

|                       |                                                        |                                                  |
|-----------------------|--------------------------------------------------------|--------------------------------------------------|
| Product Tolerance     | ± 3%                                                   | ± 3%                                             |
| Maximum Power Voltage | 17.60V                                                 | 18.95V                                           |
| Maximum Power Current | 6.25A                                                  | 9.50A                                            |
| Open Circuit Voltage  | 21.7 V                                                 | 22.74 V                                          |
| Short Circuit Current | 6.71 A                                                 | 9.98 A                                           |
| Frame                 | Anodized aluminum, 4mm thickness                       |                                                  |
| Dimensions            | 1208mm x 682mm<br>47.5" x 27"<br>13kg   29.5lb         | 1486mm x 682mm<br>58.5" x 27"<br>10.6kg   23.4lb |
| Test Temperature      | 25°C   77°F, 1000w/m², Air Mass 1.5                    |                                                  |
| Junction Box / Wiring | IP65 Junction box with 900mm cable with MC4 connectors |                                                  |



# GREENSHINE GEL-TYPE BATTERY

Solar Powered LED Lighting System



Greenshine

## OVERVIEW

GEL deep cycle battery with a 12 years floating design life is especially designed for frequent cyclic discharge under extreme temperature.



GS-GEL-H80

GS-GEL-H120

GS-GEL-H150

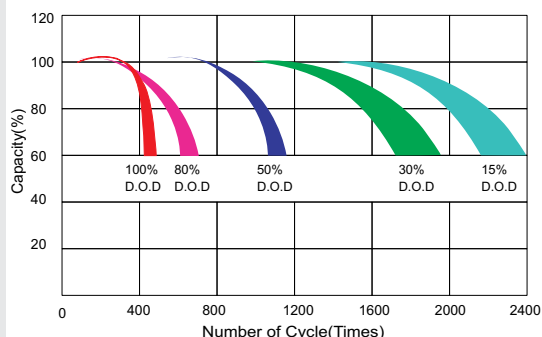
GS-GEL-H200

|                                         |                                                                                                                                                                              |                                                   |                                                   |                                                   |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| Cells per unit                          | 6                                                                                                                                                                            | 6                                                 | 6                                                 | 6                                                 |
| Voltage per unit                        | 12V                                                                                                                                                                          | 12V                                               | 12V                                               | 12V                                               |
| Capacity                                | 80Ah @ 20hr-rate to 1.75V per cell @ 25°C / 77°F                                                                                                                             | 120Ah @ 20hr-rate to 1.75V per cell @ 25°C / 77°F | 150Ah @ 20hr-rate to 1.75V per cell @ 25°C / 77°F | 200Ah @ 20hr-rate to 1.75V per cell @ 25°C / 77°F |
| Weight                                  | 26kg / 58lb                                                                                                                                                                  | 38kg / 84lb                                       | 46kg / 100lb                                      | 59.2kg / 131.5lb                                  |
| Dimensions<br>L x W x H                 | 330 x 172 x 214(mm)<br>13" x 7" x 8.5"                                                                                                                                       | 406 x 173 x 233(mm)<br>16" x 7" x 9.2"            | 483 x 170 x 240(mm)<br>19" x 6.7" x 9.5"          | 522 x 240 x 218(mm)<br>20.5" x 9.44" x 8.7"       |
| Max Discharge<br>Current                | 800A (5 Sec)                                                                                                                                                                 | 1200A (5 Sec)                                     | 1500A (5 Sec)                                     | 2000A (5 Sec) <sup>2</sup>                        |
| Operating Temp.<br>range                | -40°C~60°C   -40°F~140°F                                                                                                                                                     |                                                   |                                                   |                                                   |
| Flot Charging<br>Voltage                | 13.6 to 13.8 VDC / unit average at 25°C / 77°F                                                                                                                               |                                                   |                                                   |                                                   |
| Recommended<br>max. charging<br>current | 16A                                                                                                                                                                          | 24A                                               | 30A                                               | 40A                                               |
| Self-discharge                          | Valve Regulated Lead Acid can be stored for more than 6 months at 25°C/77°F. Self-discharge ratio less than 3% per month at 25°C/77°F. Please charge batteries before using. |                                                   |                                                   |                                                   |
| Equalization and<br>cycle service       | 14.6 to 14.8 VDC / unit average at 25°C / 77°F                                                                                                                               |                                                   |                                                   |                                                   |
| Terminal type                           | 5ft cooper wire leads from the battery case                                                                                                                                  |                                                   |                                                   |                                                   |

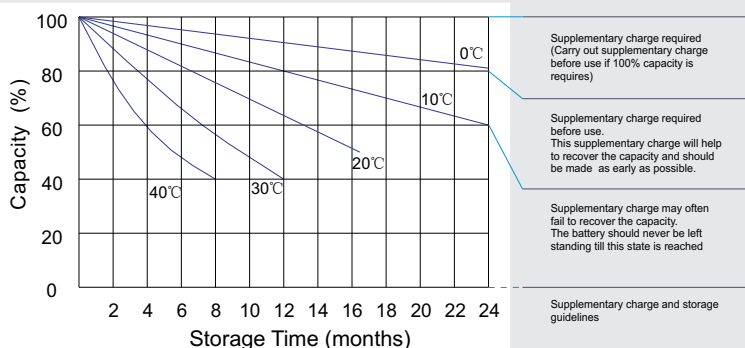
# GREENSHINE GEL-TYPE BATTERY



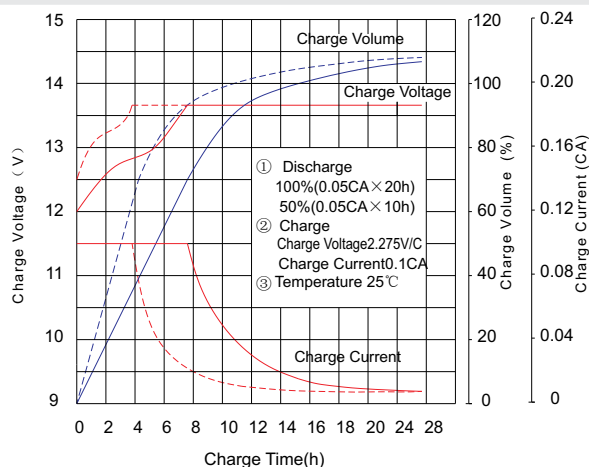
Life characteristics of cyclic use



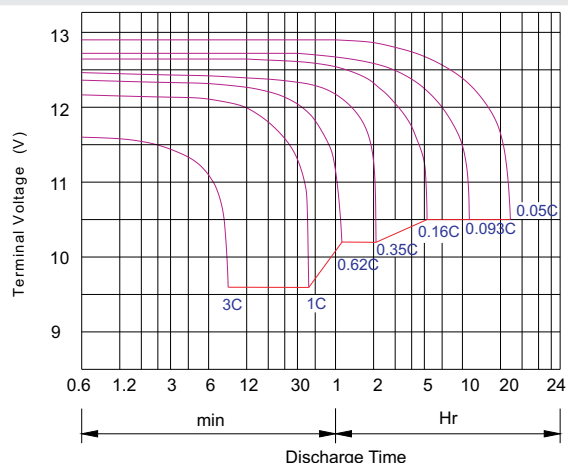
Storage characteristic



Charge characteristic curve for cyclic use



Discharge characteristic curve



## Capacity Factors With Different Temperature

| Battery Type |        | -20°C | -10°C | 0°C | 5°C | 10°C | 20°C | 25°C | 30°C | 40°C | 45°C |
|--------------|--------|-------|-------|-----|-----|------|------|------|------|------|------|
| GEL Battery  | 6V&12V | 50%   | 70%   | 83% | 85% | 90%  | 98%  | 100% | 102% | 104% | 105% |
|              | 2V     | 60%   | 75%   | 85% | 88% | 92%  | 99%  | 100% | 103% | 105% | 106% |
| AGM Battery  | 6V&12V | 46%   | 66%   | 76% | 83% | 90%  | 98%  | 100% | 103% | 107% | 109% |
|              | 2V     | 55%   | 70%   | 80% | 85% | 92%  | 99%  | 100% | 104% | 108% | 110% |

## Discharge Current VS. Discharge Voltage

|                                 |           |                  |           |
|---------------------------------|-----------|------------------|-----------|
| Final Discharge Voltage V /cell | 1.75V     | 1.70V            | 1.60V     |
| Discharge Current (A)           | (A) ≤0.2C | 0.2C < (A) <1.0C | (A) ≥1.0C |

**Charge the batteries at least once every six months, if they are stored at 25°C.**

Charging Method:

|                  |                                            |
|------------------|--------------------------------------------|
| Constant Voltage | -0.2Cx2h+14.4-14.7Vx24h, Max. Current 0.2C |
| Constant Current | -0.2Cx2h+0.1Cx12h                          |
| Fast             | -0.2Cx2h+0.2Cx6h                           |

| Bolt     | M5                    | M6               | M8                    |
|----------|-----------------------|------------------|-----------------------|
| Terminal | F3 F4 F13 F18 T25 T26 | F8 F11 F12-1 F15 | F5 F9 F10 F12 F14 F16 |
| Torque   | 6-7N-m                | 8-10N-m          | 10-12N-m              |

## Maintenance & Cautions

### Cycle service

- ※ Avoid battery over discharge, especially battery series connection use.
- ※ Charged with recommend voltage, ensure battery can be full recharged.
- In general, recharge capacity should be 1.1-1.15 times discharge capacity.
- ※ Effect of temperature on cycle charge voltage: -4mV/°C/Cell.
- ※ There are a number of factors that will affect the length of cyclic service.
- The most significant are depth of discharge, ambient temperature, discharge rate, and the manner in which the battery is recharged.
- Generally speaking, the most important factors is depth of discharge.

# GREENSHINE CONTROLLER

## Solar Powered LED Lighting System



### FEATURES

- Corrosion-proof epoxy-encapsulated PCB (IP68)
- Four-stage battery charging (main, float, boost, equalization)
- Temperature compensated
- Automatic system voltage recognition (12V/24V)
- Customized by Greenshine to fit specific needs of clients
- Easy to install

### SPECIFICATIONS

System Voltage

Max. charge / load current

#### Deep discharge protection:

Cut-off Voltage

Reconnect Level

Overvoltage Protection

Undervoltage Protection

Max. Panel Voltage

Temperature compensation

(Charge Voltage)

Ambient Temperature

Max. Altitude

Battery Type

#### Adjustment Range:

Evening / Morning Hours

Night / Day Detection

Wire Cross Section

Type of Protection

12V | 24 Auto Recognition

5A | 10A | 20A (Different Models)

11V - 12V | 22V - 24V

12.8V | 25.6V

15.5V | 31.0V

10.5V | 21V

$U_{BATmin} + 30V$  (if module and battery are connected with correct polarity)

-25mV | K at 12V

-50mV | K at 24V

-40°C to +60°C, -40°F to +140°F

4,000m above sea level

Lead acid (GEL, AGM, flooded)

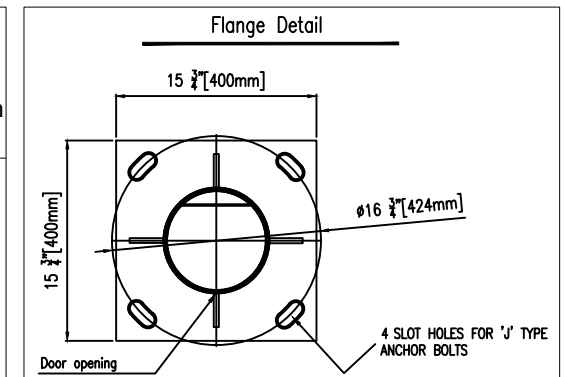
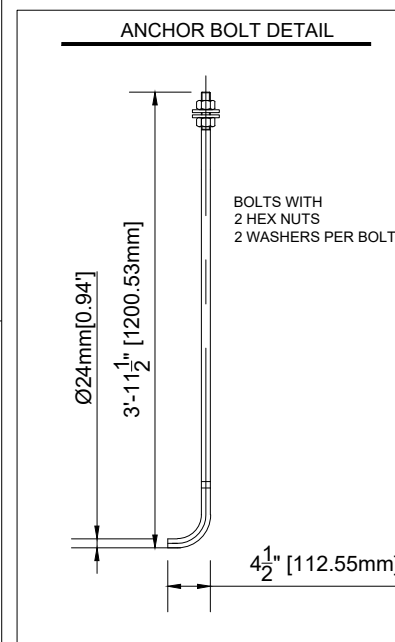
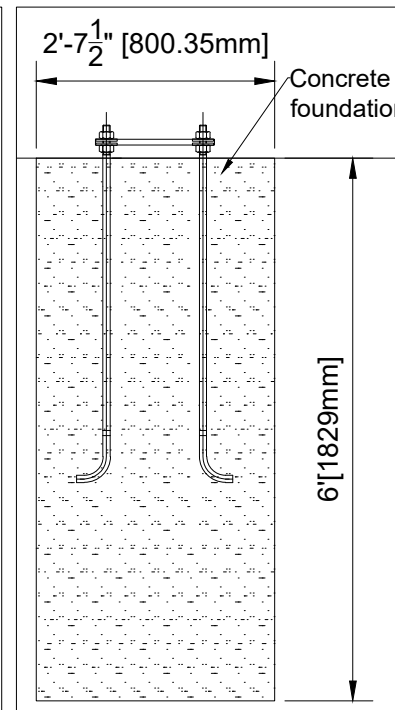
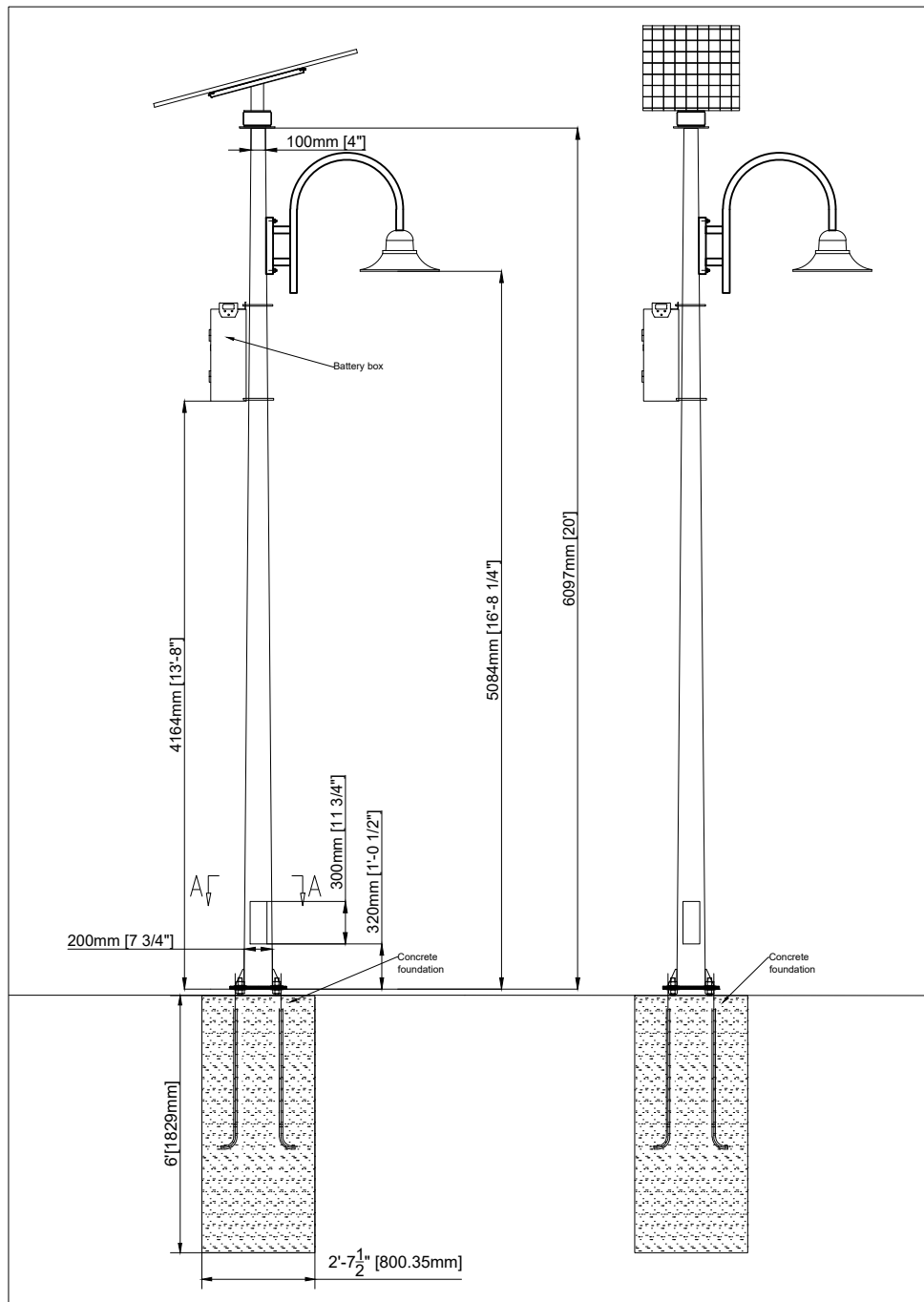
0 – 15h | 0 – 14h

2.5V – 10V

1.5mm<sup>2</sup>/ 1.5mm<sup>2</sup>/ 2.5mm<sup>2</sup>, 15 (AWG)

IP68 (1.5 m, 72 h)





- Foundation dimensions shall be confirmed by a local engineering company, Greenshine New energy will not be held liable for any defect of the concrete foundation due to improper sizing.
- Drawings are based using hot-dipped galvanized steel, powder coating with a thickness of  $\frac{5}{32}$ ".
- \*EPA of the system exclude the EPA of the pole, includes the solar panels, brackets, arm and LED fixture and battery box.
- \*\*Wind resistance of the poles are indicative and further customization can be provided.

| Tilt angle of the solar panels | 15   | 30   | 45    | 60    |
|--------------------------------|------|------|-------|-------|
| EPA (ft <sup>2</sup> )*        | 3.94 | 7.58 | 10.76 | 13.13 |
| Wind resistance** (mph)        | 150  | 150  | 150   | 150   |

|                                                                            |                                                                                      |      |           |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------|-----------|
| Proposal                                                                   |  |      |           |
| System                                                                     | LUMINA - 20' POLE - 1 PANEL                                                          |      |           |
| By                                                                         | Luis Jimenez                                                                         | Date | 9/27/2019 |
| <a href="http://www.streetlights-solar.com">www.streetlights-solar.com</a> |                                                                                      |      |           |

## Project 1



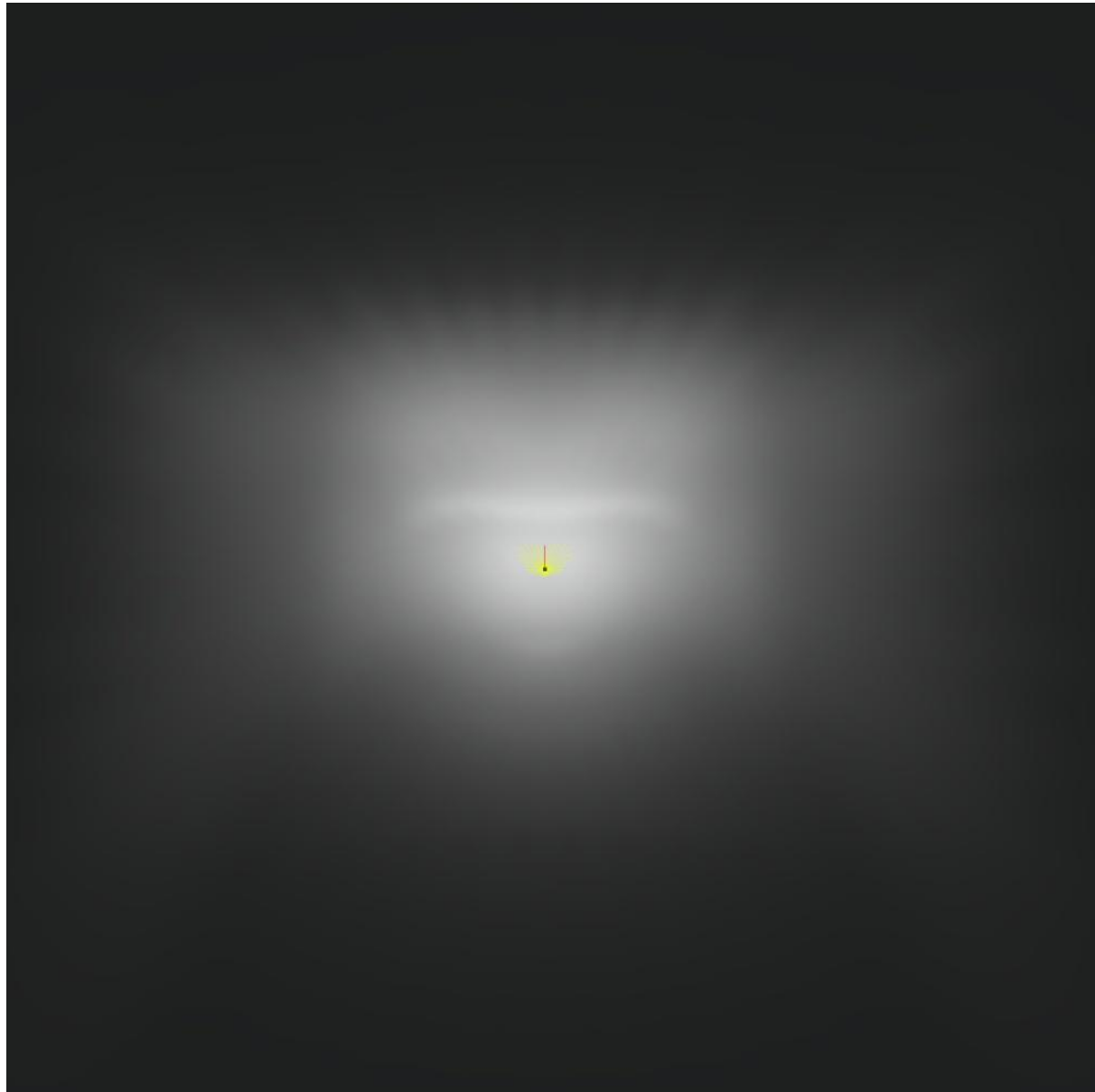
03 / 23 / 2020

Greenshine New Energy

23661 Birtcher Dr  
Lake Forest, CA 92630

Operator Luis Jimenez  
Telephone 949-609-9636 X 104  
Fax  
e-Mail [luis.jimenez@streetlights-solar.com](mailto:luis.jimenez@streetlights-solar.com)

## LUMINA 30W - 20' POLE / 3D Rendering



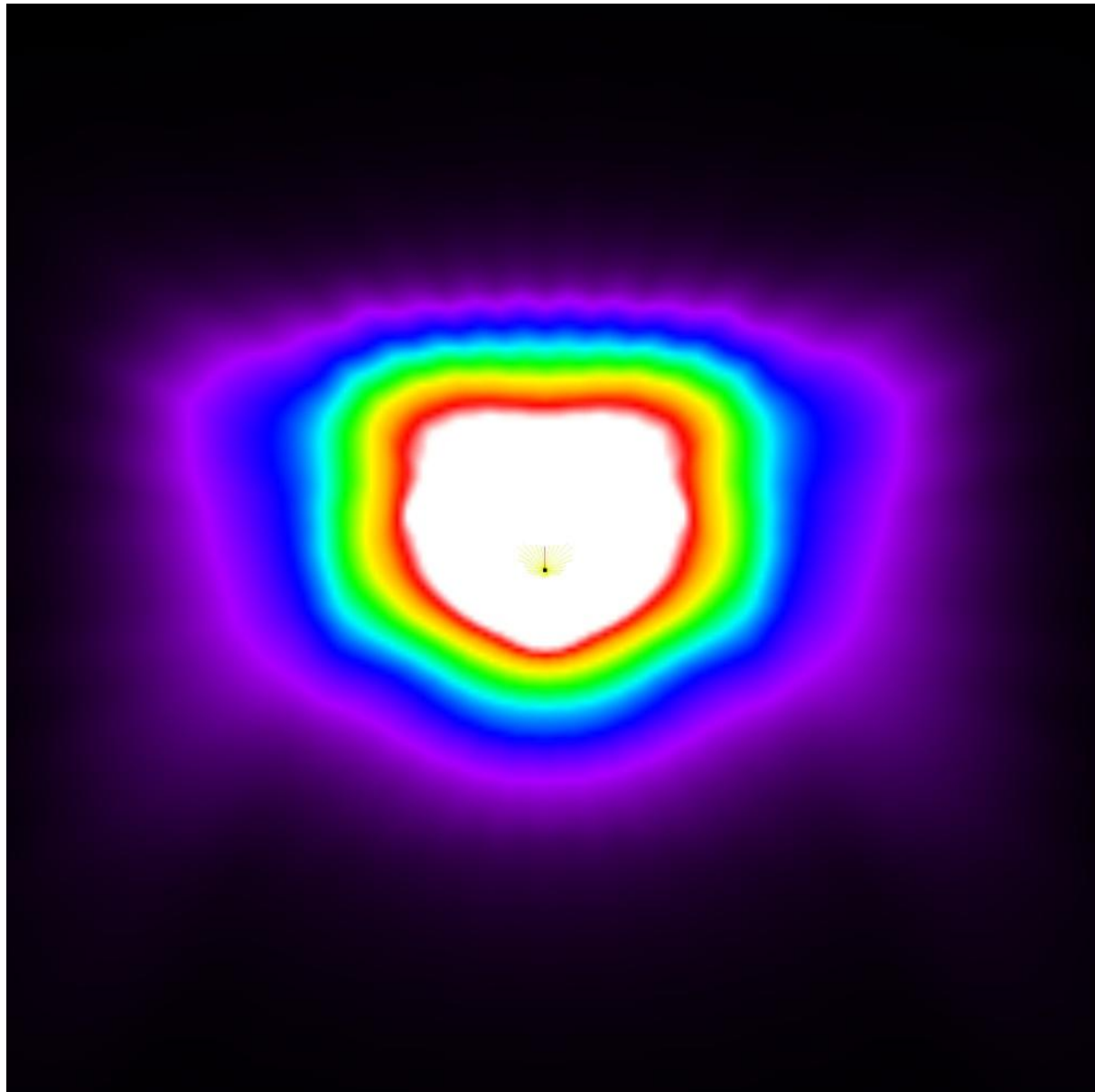


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Fax  
e-Mail luis.jimenez@streetlights-solar.com

## LUMINA 30W - 20' POLE / False Color Rendering

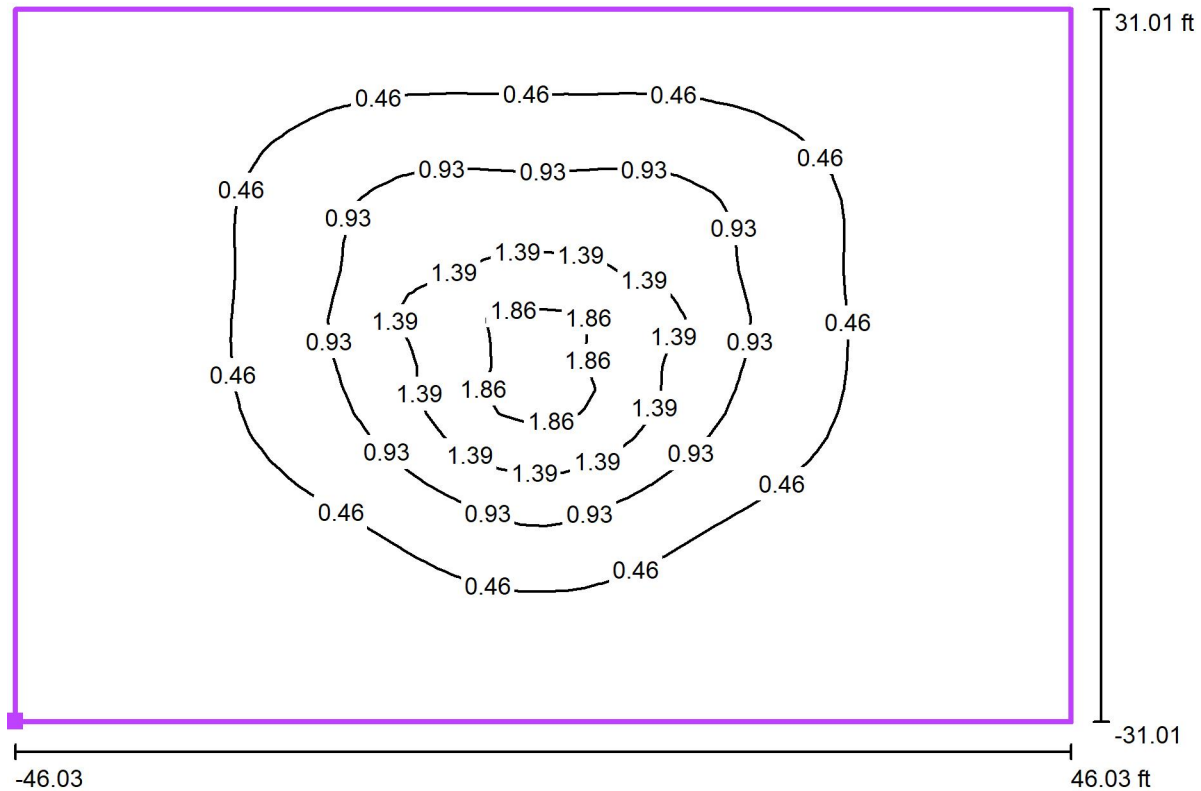


0 0.13 0.25 0.38 0.50 0.63 0.75 0.88 1.00 fc

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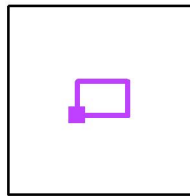
Operator Luis Jimenez  
Telephone 949-609-9636 X 104  
Fax  
e-Mail luis.jimenez@streetlights-solar.com

## LUMINA 30W - 20' POLE / Calculation Grid 1 / Isolines (E, Perpendicular)



Values in Footcandles, Scale 1 : 201

Position of surface in external scene:  
Marked point: (126.012 ft, 144.319 ft,  
0.000 ft)



Grid: 50 x 30 Points

$E_{av}$  [fc]  
0.47

$E_{min}$  [fc]  
0.04

$E_{max}$  [fc]  
2.02

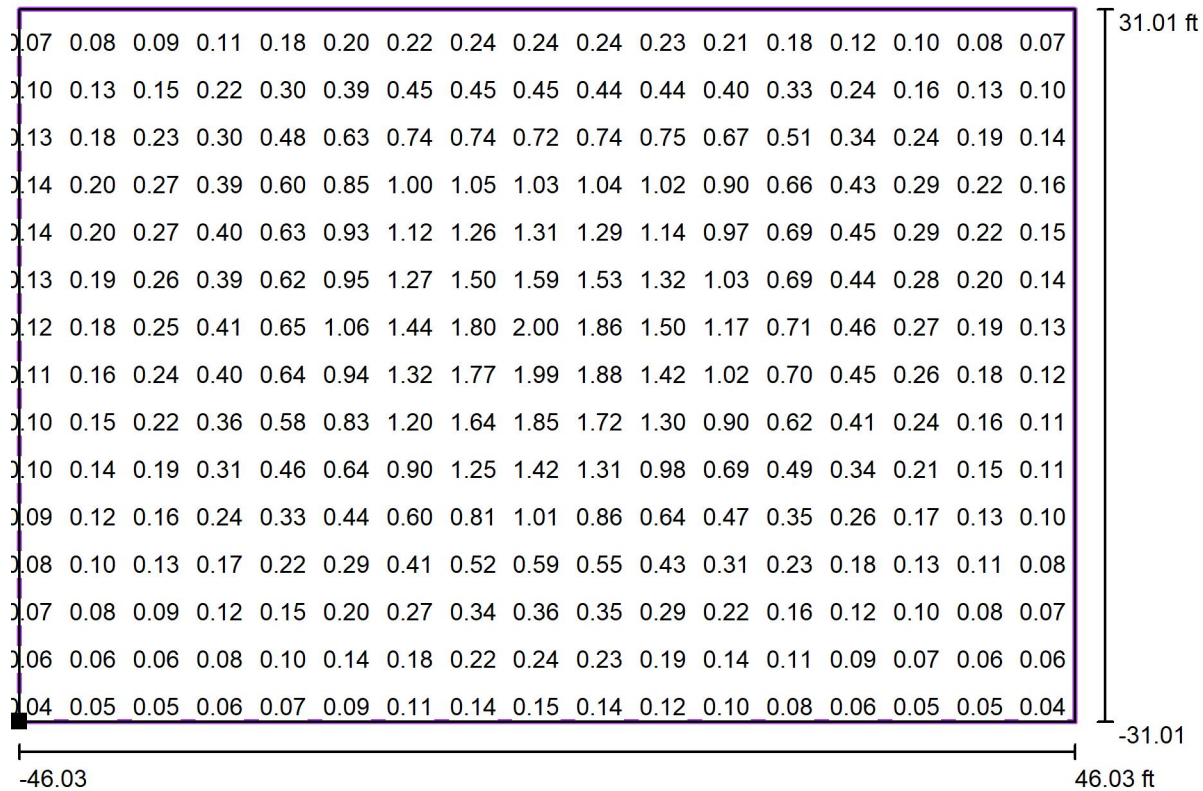
$u_0$   
0.09

$E_{min} / E_{max}$   
0.02

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Lake Forest, CA 92630

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e-Mail luis.jimenez@streetlights-solar.com

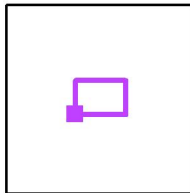
## LUMINA 30W - 20' POLE / Calculation Grid 1 / Value Chart (E, Perpendicular)



Values in Footcandles, Scale 1 : 201

Not all calculated values could be displayed.

Position of surface in external scene:  
Marked point: (126.012 ft, 144.319 ft,  
0.000 ft)



Grid: 50 x 30 Points

$E_{av}$  [fc]  
0.47

$E_{min}$  [fc]  
0.04

$E_{max}$  [fc]  
2.02

$u_0$   
0.09

$E_{min} / E_{max}$   
0.02