

# ASTORIOS

per aspera ad astra

## PHOTOVOLTAIC MODULE

ASTR 144HC/6 Series 440-460 Wp

HALF CUT PERC CELLS

**460 Wp**  
MAXIMUM POWER OUTPUT

**21.2%**  
MAXIMUM MODULE EFFICIENCY



### MORE YIELD

PV modules are positive tolerance current lever sorted bringing to increase in energy yield and avoiding solar panel degradation due to mismatch.



### HOT SPOTS RISK REDUCTION

Sophisticated electrical design, cells sorting, cutting and soldering technology leads to low hot spot risk and temperature control



### HIGH QUALITY GLASS

Additional yield and easy maintenance are provided by high transparent and self-cleaning glass



### MULTI BUSBAR TECHNOLOGY

Better light absorption and current collection for better power output



### MINIMIZING THE SHADING IMPACT

Better partial-shade tolerance due to separated half panel string wiring



### PID RESISTANT

Selected encapsulants, precision in manufacturing quality control makes modules highly PID resistant and snail trails free



### SAND, AMMONIA AND SALT MIST RESISTANCE

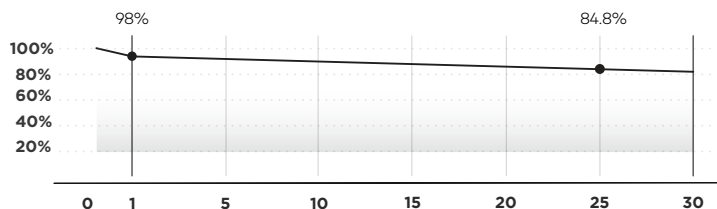
Sand blowing, ammonia and salt mist resistance tests have been passed by international standards to ensure operation in harsh conditions



### SUPERIOR SAFETY AND RELIABILITY

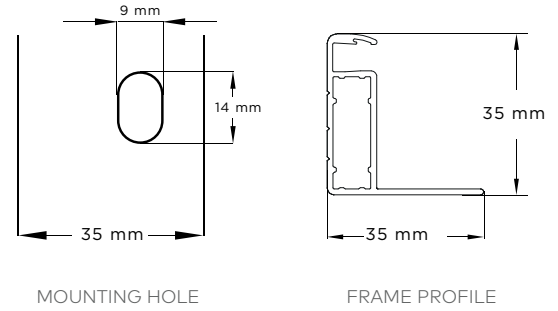
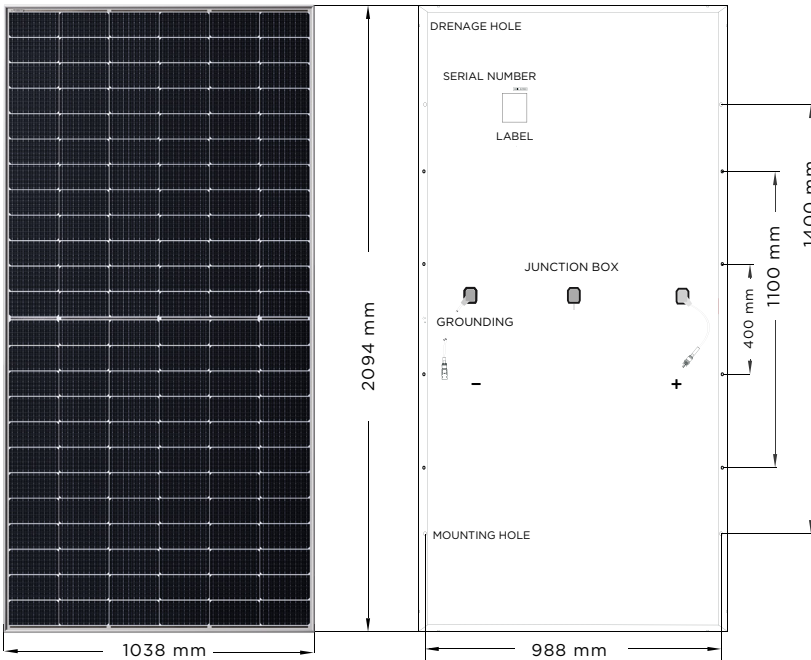
Tested to avoid microcracks and welding cracks, can withstand high pressure loads, passed multi-step quality control

## PERFORMANCE



**30 YEARS**  
Performance Guarantee

**15 YEARS**  
Product Warranty



## MATERIAL CHARACTERISTICS

|                 |  |
|-----------------|--|
| Dimensions      | 2094 x 1038 x 35 mm                                |
| Weight          | 24.3 kg  |
| Number Of Cells | 144 pcs (6x24)                                     |
| Cells           | Mono-crystalline, Half Cut PERC 9BB (166mm)3.2 mm, |
| Glass           | High transparency, AR coated                       |
| Frame           | Silver color, Anodized aluminum alloy              |
| Junction box    | IP68 Rated, 3 bypass diodes                        |
| Connector type  | Staubli MC4-Evo 2 / MC4 (Original)                 |
| Cable           | 4 mm <sup>2</sup> , 300 mm                         |

## TEMPERATURE PARAMETERS

|   |                |
|---|----------------|
| Temperature Coefficient of Pmax             | -0.39 % / °C   |
| Temperature Coefficient of Voc              | -0.30 % / °C   |
| Temperature Coefficient of Isc              | +0.06 % / °C   |
| Operating Temperature                       | -40°C to +85°C |
| Nominal Module Operating Temperature (NMOT) | 44±2°C         |

## MAXIMUM RATINGS

|                         |               |
|-------------------------|---------------|
| Max. System Voltage     | 1500V DC -(H) |
| Max. Series Fuse Rating | 20 A          |
| Uplift load (wind)      | 2400 Pa*      |
| Downforce load (snow)   | 5400 Pa*      |

## PACKAGING INFORMATION

|                       |         |
|-----------------------|---------|
| One pallet quantity   | 31 pcs  |
| 40 ft HC/HQ container | 682 pcs |

\*For more information please refer to Instruction Manual

| MODULE TYPE 144HC/6               | 440 Wp    |        | 445 Wp |        | 450 Wp |        | 455 Wp |        | 460 Wp |        |
|-----------------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                   | STC       | NMOT   | STC    | NMOT   | STC    | NMOT   | STC    | NMOT   | STC    | NMOT   |
| <b>ELECTRICAL CHARACTERISTICS</b> |           |        |        |        |        |        |        |        |        |        |
| Maximum power (Pmax / Wp)         | 440       | 326.08 | 445    | 329.78 | 450    | 333.48 | 455    | 337.26 | 460    | 340.94 |
| Open circuit voltage (Voc / V)    | 49.25     | 46.30  | 49.55  | 46.50  | 49.84  | 46.70  | 50.13  | 46.90  | 50.42  | 47.10  |
| Short circuit current (Isc / A)   | 11.14     | 9.13   | 11.17  | 9.20   | 11.20  | 9.26   | 11.23  | 9.32   | 11.26  | 9.38   |
| Maximum power voltage (Vmp / V)   | 41.40     | 37.90  | 41.75  | 38.10  | 42.10  | 38.30  | 42.45  | 38.50  | 42.80  | 38.70  |
| Maximum power current (Imp / A)   | 10.63     | 8.61   | 10.66  | 8.66   | 10.69  | 8.71   | 10.72  | 8.76   | 10.75  | 8.81   |
| Module efficiency at STC (ηm / %) | 20.3      |        | 20.5   |        | 20.7   |        | 20.9   |        | 21.2   |        |
| Power tolerance (Pmax)            | (0,+5) Wp |        |        |        |        |        |        |        |        |        |

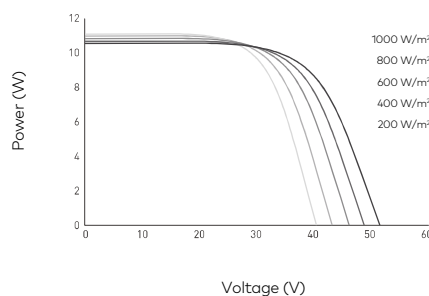
STC: Irradiance of 1000 W/m<sup>2</sup> with spectrum AM 1.5 and a module temperature of 25°C  
 NMOT: Irradiance 800 W/m<sup>2</sup>, ambient temperature 20°C and wind speed 1 m/s

## CERTIFICATES

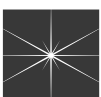
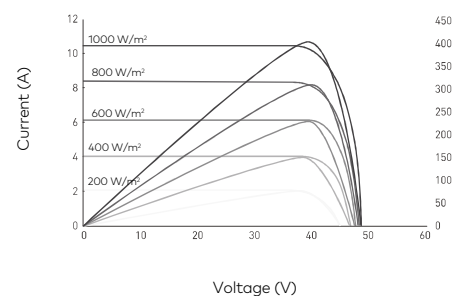
IEC62716 (Ammonia)  
 IEC60068-2-68 (Sand)  
 IEC61215 / 61730 / 61701



P-V Curve at Different Irradiation (440 W)  
 Cell Temperature 25°C



I-V Curve (440 W)  
 Cell Temperature 25°C



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