

TECHNICAL BULLETIN



EFFICIENCY VS. ENERGY: ENERGY YIELD, NOT EFFICIENCY ALONE, IS WHAT MATTERS.

March 19, 2018 | Issue: 1017 Rev. 1

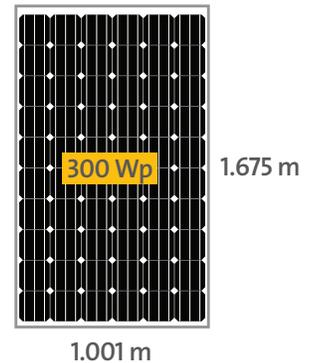
Definition:

Efficiency values published by module manufacturers are defined as the nominal power of the module divided by the physical area of the module at Standard Test Conditions.

$$\text{Efficiency} = \frac{300 \text{ Wp}}{(1.001 \text{ m} \times 1.675 \text{ m})} = 178.93 \text{ Wp/m}^2$$

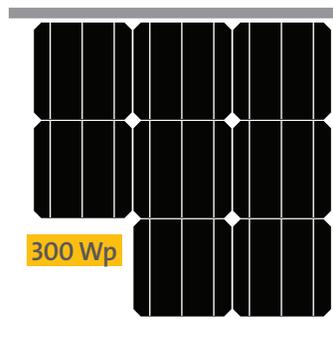
$$\frac{178.93 \text{ Wp/m}^2}{1,000 \text{ W/m}^2} = 17.9 \%$$

Efficiency = 17.9 %

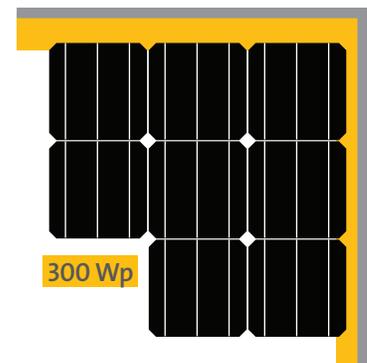


Two modules with the same nominal power rating can have different efficiency values due to the difference in module size.

A difference of 2.5 cm or 1" in each direction of the module can change the efficiency value of a module 0.63 percentage points. (Based on example of 300 Wp modules).



Competitor's module



SolarWorld module

Revision	Date	Description
1	2018.03.19	Updated format; updated module power

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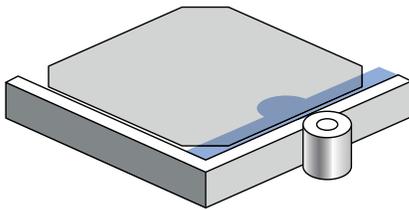
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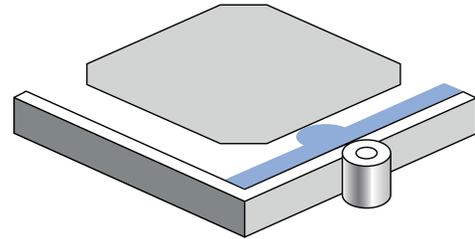
With our OptigrTM cell layout, SolarWorld Americas has carefully considered the placement and spacing of cells relative to each other and to the module frame. Crowding cells together and up against the frame can reduce the overall energy output of the module. SolarWorld has designed Sunmodules with real world issues in mind to help maximize energy output and offset electricity costs.

Mounting hardware used to affix the module to the mounting system can cause shading of the outer cells if they are placed close to the frame.

Mounting hardware can cause shading

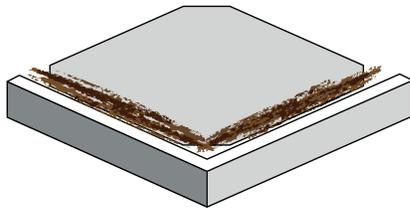


SolarWorld modules avoid shading issues

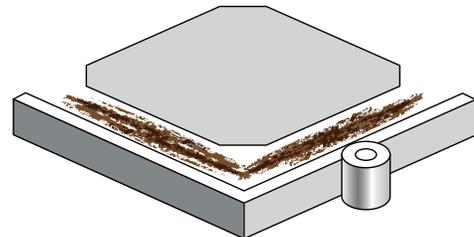


Dirt and debris can build up on modules along the frame of the module. This build-up can start to shade the outer cells if they are placed close to the frame. Shading of the cells can reduce the overall output of a module and affect the performance of a string of modules.

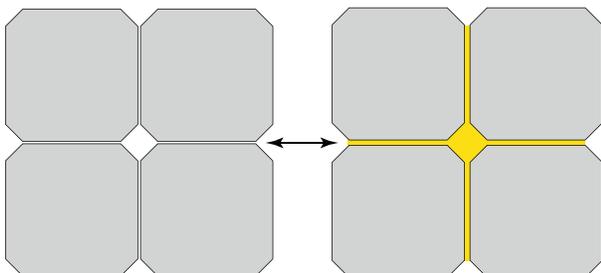
Soil and debris build up, shading cells



SolarWorld module cell spacing prevents soil shading



The spacing of cells is optimized for light capture, energy production, and the expansion and contraction of the materials. These considerations provide for long-term, reliable performance.



Cell spacing is optimized for circuit design and energy output