

Facts on Solar Power



What does BP Solar say about the efficiencies of various crystalline cells?

It sounds like a simple question. However, in practice there are a few variables. The simple answer is approximately 14 to 16% for monocrystalline cells (such as the BP Series) and 13 to 15% for polycrystalline cells (such as the SX Series). High efficiency monocrystalline cells (such as the BP Saturn cells) featured on page 6 and 7, have an efficiency of approximately 16.5%.



Monocrystalline cells BP Series (page 6)

Variables include the type of anti-reflective coating the cell receives (most mono cells don't use it; all poly cells have it) and also its encapsulation in a module. Both factors improve the efficiency of a cell.

Module efficiency is another matter. Polycrystalline cells make better use of the modules surface area while mono cells can't be as closely packed due to their shape.

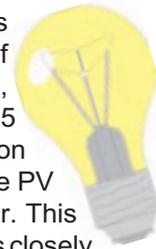
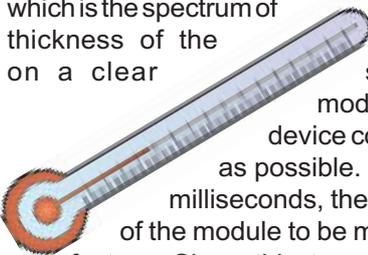
For the end user, module efficiency is the most relevant perspective and the easiest to calculate. First, take the outer dimensions of the module's rated power and divide it by its surface area. The resulting Watts per Square Meter will give you an estimate of the modular efficiency of a specific module, where 1000 Watts per Square Meter represents 100% efficiency.



Polycrystalline cells SX Series (page 4)

What does BP Solar say about how modules are rated?

PV modules are rated at a well-defined set of conditions known as Standard Test Conditions (STC). These conditions include the temperature of the PV cells (25°C), the intensity of radiation (1kW/square meter) and the spectral distribution of the light (air mass 1.5 or AM1.5, which is the spectrum of sunlight that has been filtered by passing through 1.5 thickness of the earth's atmosphere). These conditions correspond to noon on a clear sunny day with the sun about 60° above the horizon. The PV modules are tested in a chamber known as a flash simulator. This device contains a flash bulb and filter designed to mimic sunlight as closely as possible. It is accurate within about 3.1%. Because the flash takes place in only 50 milliseconds, the cells do not heat up appreciably. This allows the electrical characteristics of the module to be measured at a single temperature, the ambient temperature of the module/factory. Since this temperature is usually close to 25°C, a minor adjustment corrects output characteristics to the 25° standard temperature.



Current and voltage output of a single solar cell under varying light levels

