

STC vs. PTC (and sometimes globally notated as NOTC)

STC stands for **Standard Test Conditions**.

- Irradiance (flash test) of 1000W per square meter
- Cell temperature of 25°C (This is usually achieved with an air temperature of 0 to 2°C)
- Absolute airmass spectra of 1.5
- ASTM G173-03 standard spectrum
 - These test conditions simulate peak sunshine, zero cloud cover, a low air temperature to prevent solar panels from overheating, and a panel position perpendicularly facing the sun.

PTC stands for **PVUSA Test Condition**.

- Irradiance (sunlight) of 1000W per square meter
- Air temperature of 20°C
- Tested at 10 meters above ground level
- A wind speed of 1m/s
- Absolute air mass spectra of 1.5
 - This is much closer to real-world conditions. The PTC value is used by the state of California to calculate rebates for the California Solar Initiative (CSI) Program.

NOTC stands for **Nominal Operating Cell Temperature**.

- Irradiance (sunlight) of 800W per square meter
- Air temperature of 20°C
- Cell temperature of 45°C (+/- 3°C)
- A wind speed of 1m/s
 - International convention for calculating real-world conditions When the solar energy is absorbed cell and overall module temperature will increase while producing electricity.

The Go Solar California website states (the golden standard for PV equipment):

The **PTC** rating, which is lower than the **STC** rating, is generally recognized as a more realistic measure of PV output because the test conditions better reflect real-world solar and climatic conditions, compared to the laboratory **STC** rating.

Note: Neither **PTC** nor **STC (NOTC)** account for all real-world losses. Actual solar systems will produce lower outputs due to soiling, shading, module mismatch, wire losses, inverter and transformer losses, shortfalls in actual nameplate ratings, panel degradation over time, and high-temperature losses for arrays mounted close to or integrated within a roofline. These loss factors can vary by season, geographic location, mounting technique, azimuth, and array tilt.