Solar Panel Efficiencies: Aurinco vs Solara

Aurinco is insinuating that some solar panel manufacturers are trying to mislead the public by publishing cell efficiency figures rather than panel efficiencies. They are also suggesting that some manufacturers are embellishing results using tactics learned from VW. Normally this sort of rhetoric would be quickly dismissed as being disingenuous and unprofessional, but it does merit some analysis.

There are several ways to measure solar panel efficiency. Some are shown below, all at Standard Test Conditions (STC)

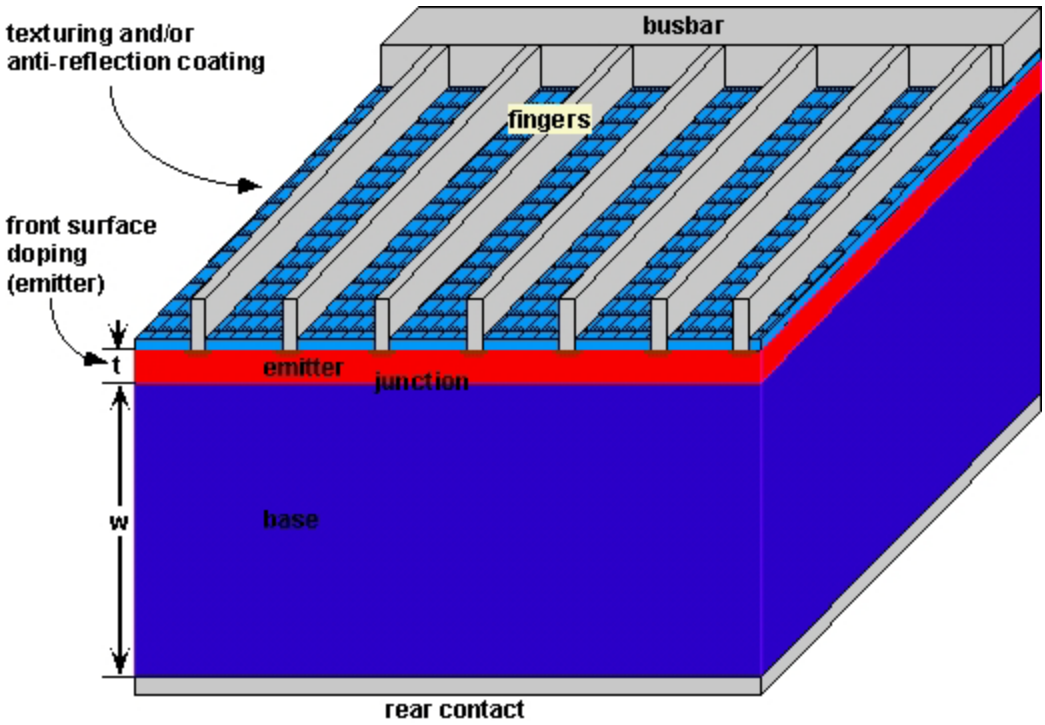
1. ***Single Cell Efficiency*** - Solara has always stated cell efficiencies, not panel efficiencies, which can be very misleading (see below).
2. ***Overall Panel Efficiency*** - This takes into account the overall panel dimensions, and so can vary wildly between one panel manufacturer and another dependent on how they construct their panels. If a manufacturer is willing to risk edge damage and water intrusion by fabricating a panel with very small edge margins, then it will inevitably look to be more efficient than a similar panel that has wider, and subsequently much safer, edge margins and overlaps.
3. ***True Panel Efficiency*** - This is calculated from the actual total cell surface area, ignoring space between cells and margins/borders, and is by far the more reliable gauge of panel efficiency.

Panel	Cell Efficiency	Overall Panel Efficiency	True Panel Efficiency
Aurinco Compact 147ST	N/A	16.6%	20.0%
Solara Power M 140	22.5%	17.2%	21.3%

- **Cells** - Aurinco uses standard monocrystalline cells with bus lines and collector fingers on the surface that reduce effective surface area and actually create their own shadows at low light angles. Solara Power M panels use genuine high-grade back-contact SunPower® cells that give superior performance in low irradiance, low light angle, and high cell temperature conditions.
- **Soldered Connections** - The Aurinco 147ST panel looks to have almost 600 soldered cell connections. The Solara Power M 140 has less than 100. The more soldered connections there are, the higher the series resistance of the panel and the higher the possibility of poor/weak/bad soldered connections. Vibration is a big contributor to solar panel failures on boats, and the fewer soldered connections the better.
- **Diodes -** The Aurinco 147ST panel has no by-pass or blocking diodes. These are deemed essential in series-parallel configurations to reduce power losses due to shading, and also to minimize the risk of cell burning and hot-spots. The Solara Power M 140 has a separate diode box that contains two by-pass diodes, plus a blocking diode that is not connected unless multiple panels are connected electrically in parallel.
- **Shading**- As shading is proportionate to the amount of cell surface it covers, the larger the cell, the less the effects from shading. Shading on boats is seen to be predominately long shadows from lines, rigging etc. that fall across the whole panel, and multiple-section panels have no advantage in these situations.
- **Construction** - Aurinco panels are laminated, with very little edge margins. Solara panels are totally encapsulated, with a 5mm overlap to ensure no possibility of water damage from edge penetration.
- **Wiring** - Aurinco panels are supplied with just two thin wires 12" long exiting from the edge of the panel. This type of construction is known to be a weak point where water can easily wick into the interior of the panel. Solara panels are constructed with 8' of UV resistant cable that exits from a fully potted, low profile, Junction Box which cannot get caught on lines, sheets, etc., and is tough enough to withstand blows from winch handles. Solara panels may be ordered with junction boxes on the rear, but availability will be dependent on volume and manufacturing accessibility.
- **Backing Panel** - Aurinco panels have glass fiber backing panels that could wick water if the exterior is breached or water creeps in through the wire exit. Solara panels have an aluminum sandwich backing panel with a rubber core that cannot wick water.
- **Walk-On Capability** - Aurinco panels are not true "walk-on" panels. They can only "tolerate being stepped on occasionally". Solara panels can be installed in high traffic areas and can be walked on regularly with bare feet or boat shoes.
- **Warranty** - Aurinco's warranty is only full replacement for the first two years after which it is pro-rated. In year 5 it is only 60% coverage. Solara panels have a 5 year true marine replacement warranty covering construction defects.

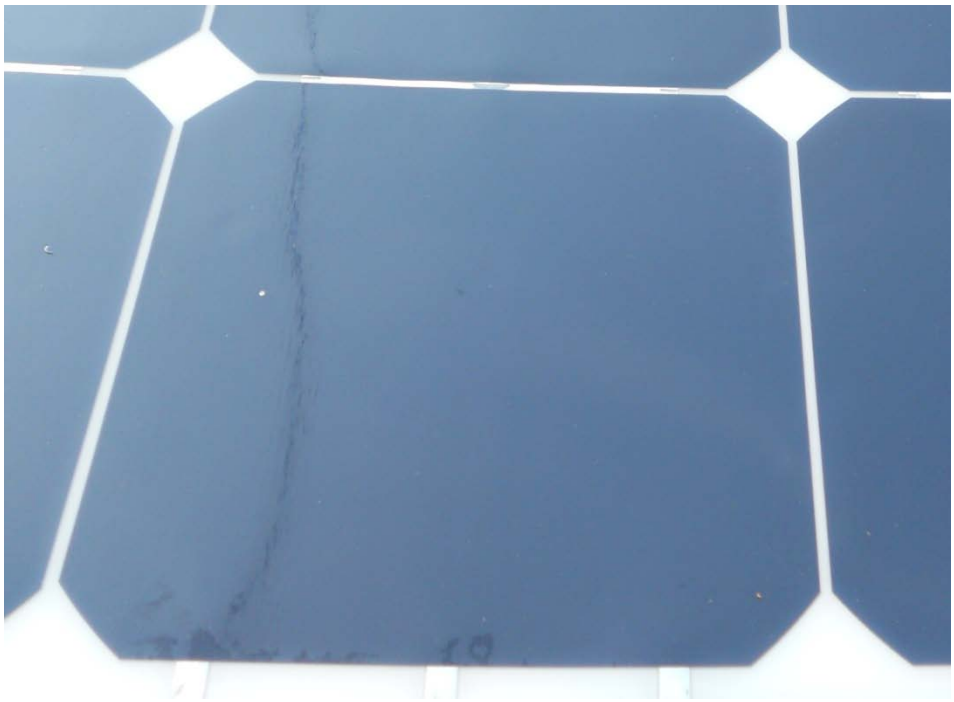
Coastal Climate Control, Inc.
www.CoastalClimateControl.com - info@CoastalClimateControl.com
301-352-5738 - Annapolis MD USA

Standard Monocrystalline or Polycrystalline Silicon Solar Cell (magnified)



Regular silicon solar cells have fingers and bus bars added to the surface of the cell to collect electrical power. These reduce the effective cell area, and can cast shadows on the surface of the cell at low light angles, reducing cell output.

SunPower® Back Contact Monocrystalline Cell



SunPower® back-contact cells have no fingers or bus bars on the surface of the cell. This leaves the entire surface available for photon collection, and eliminates the self-induced shadow problem that affects regular cells.