

SWRES Research

The Southwest Region Experiment Station (SWRES) is a photovoltaic engineering research facility operated by the Southwest Technology Development Institute at New Mexico State University in Las Cruces, New Mexico. The SWRES operates and monitors 10-12 grid-connected and stand-alone PV systems ranging in power from 200 watts to about 5Kw. The facility, under contract to the Department of Energy, monitors six additional systems via telephone-modems throughout the US. Numerous large (2 megawatt) and small (500 watt) systems are tested on an annual basis to determine long term performance. In the last nine years, over 200,000 PV modules have been tested including single crystal, polycrystalline, and amorphous modules. Engineers at SWRES design and build special purpose PV power systems for government and commercial customers. They are currently finishing eleven PV systems that will fly on high altitude research balloons.

The purpose of this newsletter is to disseminate information that would be of interest to the small scale user of photovoltaics. Primary areas to be covered will be: Lessons learned on proper installation techniques for maximum longevity. PV and the National Electric Code-1990 has some new requirements. Sources for some hard-to-find components like approved module interconnect wire. Here are some examples of what you can expect.

Single crystal silicon and polycrystalline silicon modules when used in residential, low voltage (less than 48 volts) systems are extremely reliable and have a less than two in ten thousand failure rate. Life expectancy may exceed 25 years. New production amorphous silicon modules may prove equally reliable, but only time will tell. Wiring and balance of system components are far more prone to failure and careful attention to details in this area is necessary.

The 1990 National Electric Code will require that PV systems mounted on the roofs of dwellings have a Ground Fault Detector and Interrupter to minimize the hazards of fire due to ground faults in the array. At the present time, no device exists to accomplish this function, but SWRES is working on a design which may eventually be produced by industry.

Need approved, single-conductor, stranded, 10 gauge wire for module interconnects? The NEC says use UF cable identified as Sunlight resistant, but nobody makes it anymore and the SWRES experience is that UF insulation isn't tough enough to stand up to daily exposure in direct sunlight. A better solution is to use USE XLP or XLPE which most inspectors know is sunlight resistant and a more durable wire than UF. Here are some sources for 500 foot or larger quantities;

Drew Epstein, Anixter Wire, Albuquerque, NM
1-800-432-6622 or

Bill Gaal, Paige Electric, Union, NJ
1-800-327-2443

These distributors can supply this wire in spools with a card stating the wire is rated as sunlight resistant by Underwriters Laboratories. The price of copper varies from day to day, but expect to pay over \$100 for 500 feet. For smaller quantities, contact Photron Power Systems in Willits, CA at 707-459-3211.

More next issue from John Wiles, SWRES 505-646-6105

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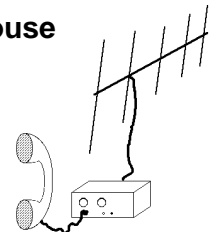
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