Photovoltaic Wire

Photovoltaic wire, also know as PV wire, is a single-conductor wire used to connect the panels of a photovoltaic electric energy system. Photovoltaic systems, often called solar panels, are electric-power production systems that capture sunlight in order to produce electricity through an energy conversion process. Because the electricity is produced at the panel, wiring is needed to convey the electrical energy back to a collection point or piece of equipment. Photovoltaic wire is a specific kind of wire for such an application.

What is a PV wire?

In the U.S. National Electric Code (NFPA 70), PV wire is recognized also as PV cable, photovoltaic wire or photovoltaic cable. PV wire is a single-conductor product that must meet the requirements of UL Subject 4703[1] in order to be marked as a Type PV wire. This subject is undergoing frequent updates and changes. The current construction requirements outlined by UL 4703 are shown here:

- Conductor: stranded 18 AWG through 4/0 AWG (bare or tinned)
- Insulation: similar to Type UF and USE-2
- Product is often multirated as a Type RHW
- Versions from 600 V to 2,000 V
- Sunlight resistant
- Optional direct burial rating
- Optional multirated products

What differentiates one PV wire from another?

Even though PV wire is available in a number of multirated constructions and voltages, there are two primary tiers of PV wire available in the market today. The first is a single-pass product, which has a single layer of insulation that also acts as the physical protection for the conductor. There is also a dual-pass construction, which has a separate insulation layer and a rugged outer-jacket material that provides added sunlight, mechanical and chemical protection. The reference to the number of passes is based on the method used to construct the products. Other names for the two types are single layer for the single-pass product and dual layer and jacketed for the dual-pass product.

For obvious manufacturing reasons, the dual-layer PV wires are typically more costly than their comparable single-layer counterparts. However, the higher cost may be warranted by some users who are looking for the longest life possible from their PV wire. It's important to note that according to the 2008 NEC, PV wire is one of only three approved wiring methods for ungrounded photovoltaic sources. However, now that PV wire is becoming more available, it is rare that an alternative is needed.

Where is PV wire headed?

As the solar industry evolves, the applications and resulting wiring requirements are expected to change as well. Recent changes to the UL Subject have included the optional addition of a direct burial listing for the wires. Previous changes included an increase in conductor size from a 2 AWG to the current 4/0 AWG. With new players seemingly added to the PV wire market every

[1] http://www.ulstandards.com , "Subject 4703, Outline for Investigation for Photovoltaic Wire"

day, products are meeting more and more standards and multirated products seem to be the most common direction. The ultimate product is likely one that will satisfy domestic and international standards while being easy to work with and competitively priced.

With regard to the standards, staying up to date on the latest developments can be difficult. Anixter is actively involved in voting on many standards and tracks high-profile developments on UL 4703. Check the Anixter website[2] for the latest information about such wire and cable industry developments.

[2] http://www.anixter.com/AXECOM/US.NSF/HomePage?OpenForm&Division=DivTab5