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Standard Terminology Relating to Photovoltaic Solar Energy Conversion[1]

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1. Scope

1.1 This terminology pertains to photovoltaic (radiant-to-electrical energy conversion) device performance measurements and is not a comprehensive list of terminology for photovoltaics in general.

1.2 Additional terms used in this terminology and of interest to solar energy may be found in Terminology E 772.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

E 490 Solar Constant and Air Mass Zero Solar Spectral Irradiance Tables

E 772 Terminology Relating to Solar Energy Conversion

G 173 Tables for Reference Solar Spectral Irradiances: Direct Normal and Hemispherical on 37° Tilted Surface

3. Terminology

3.1 *Definitions:*

absolute spectral response, *n*—R_a (λ), AW^{-1}, *n*—*of a photovoltaic device*, the short-circuit current density per unit irradiance at a given wavelength.

DISCUSSION—Spectral response is normally reported over the wavelength range to which a device responds.

cell temperature, *n*—the temperature of the semiconductor junction of a photovoltaic cell.

efficiency, *n*—of a photovoltaic device, the ratio of the power produced by a photovoltaic device operated at its maximum power point to the incident radiant power.

fill factor, *n*—of a photovoltaic device, the ratio of maximum power to the product of open-circuit voltage and short-circuit current.

global horizontal solar irradiance, *n*—See **global solar irradiance** in Terminology E 772.

global normal solar irradiance, *n*— solar irradiance from a 2π steradian field-of-view incident upon a surface that is perpendicular to the axis of the solid angle defined by the disk of the sun.

irradiance, E, Wm^{-2}, *n*—See **solar irradiance at a point of surface** in Terminology E 772.

maximum power, *n*— *of a photovoltaic device*, the electrical output when operated at a point where the product of current and voltage is maximum.

open-circuit voltage, *n*— *of a photovoltaic device*, the voltage potential across the positive and the negative terminals under irradiation when zero current flows into or out of these terminals.

photovoltaic array, *n*—an assembly of panels or modules, together with support structure and other components (if used), to form a complete dc power-producing unit. .

photovoltaic cell, *n*—the basic device that generates electricity by the photovoltaic effect when exposed to radiant energy such as sunlight.

photovoltaic cell area, *n*—the total frontal area of the cell including the area covered by the grids and contacts.

photovoltaic device, *n*—any photovoltaic cell or collection of cells (module, panel, or array) under consideration.

photovoltaic module, *n*—a single package containing two or more electrically interconnected photovoltaic cells, including a frame or integral mounting points, and means for electrical connection; which make it suitable for field installation without additional modification.

photovoltaic module area, *n*—the rectangular area that touches the extreme outside edges of the module.

photovoltaic panel, *n*—a number of modules which are electrically connected and mechanically integrated, and designed to provide a field-installable unit.

photovoltaic reference cell, *n*—a photovoltaic cell whose short-circuit current is calibrated against the total irradiance of a reference spectral irradiance distribution. See also **reference cell calibration constant.**

primary photovoltaic reference cell, *n*—a photovoltaic reference cell calibrated in sunlight.

rated power, *n*— See **reported power.**

[1] This terminology is under the jurisdiction of ASTM Committee E44 on Solar, Geothermal, and Other Alternative Energy Sources and is the direct responsibility of Subcommittee E44.09 on Photovoltaic Electric Power Conversion.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.