



Standard Specification for Physical Characteristics of Nonconcentrator Terrestrial Photovoltaic Reference Cells¹

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1. Scope

1.1 This specification describes the physical requirements for primary and secondary terrestrial nonconcentrator photovoltaic reference cells. A reference cell is defined as a device that meets the requirements of this specification and is calibrated in accordance with Method E 1039, Test Method E 1125, or Test Method E 1362.

1.2 Reference cells are used in the determination of the electrical performance of photovoltaic devices, as stated in Test Methods E 948 and Methods E 1036.

1.3 Two reference cell physical specifications are described:

1.3.1 *Small-Cell Package Design*—A small, durable package with a low thermal mass, wide optical field-of-view, and standardized dimensions intended for photovoltaic devices up to 20 by 20 mm, and

1.3.2 *Module-Package Design*—A package intended to simulate the optical and thermal properties of a photovoltaic module design, but electric connections are made to only one photovoltaic cell in order to eliminate problems with calibrating series and parallel connections of cells. Physical dimensions are not standardized.

1.4 These reference cells are intended to be used in applications where a significant fraction of the irradiance has incidence angles less than 30°, with respect to normal as defined in Specification E 927.

1.5 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.6 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

E 772 Terminology Relating to Solar Energy Conversion²
E 927 Specification for Solar Simulation for Terrestrial Photovoltaic Testing²

E 948 Test Methods for Electrical Performance of Nonconcentrator Terrestrial Photovoltaic Cells Using Reference Cells²

E 1036 Test Methods for Electrical Performance of Nonconcentrator Terrestrial Photovoltaic Modules and Arrays Using Reference Cells²

E 1039 Test Method for Calibration and Characterization of Non-Concentrator Terrestrial Photovoltaic Reference Cells Under Global Irradiation²

E 1125 Test Method for Calibration of Primary Non-Concentrator Terrestrial Photovoltaic Reference Cells Using a Tabular Spectrum²

E 1328 Terminology Relating to Photovoltaic Solar Energy Conversion²

E 1362 Test Method for Calibration of Non-Concentrator Photovoltaic Secondary Reference Cells²

2.2 Military Specification Sheet:

MS3106C Connector, Plug, Electric, Straight, Solder Contacts, AN Type³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, see Terminologies E 772 and E 1328.

4. Classification

4.1 Two types of reference cells are used in the evaluation of the electrical performance of photovoltaic terrestrial devices:

4.1.1 *Primary Reference Cells*—Reference cells calibrated directly in sunlight in accordance with Method E 1039 or Test Method E 1125, and

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² *Annual Book of ASTM Standards*, Vol 12.02.

³ Available from Superintendent of Documents, U.S. Government Printing Office, N. Capital and H Streets, NW, Washington, DC 20401.