



Designation: ~~E1143–05 (Reapproved 2010)~~ E1143 – 05 (Reapproved 2015)

Standard Test Method for Determining the Linearity of a Photovoltaic Device Parameter with Respect To a Test Parameter¹

This standard is issued under the fixed designation E1143; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method determines the degree of linearity of a photovoltaic device parameter with respect to a test parameter, for example, short-circuit current with respect to irradiance.

1.2 The linearity determined by this test method applies only at the time of testing, and implies no past or future performance level.

1.3 This test method applies only to non-concentrator terrestrial photovoltaic devices.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, 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:*²

[E772 Terminology of Solar Energy Conversion](#)

[E948 Test Method for Electrical Performance of Photovoltaic Cells Using Reference Cells Under Simulated Sunlight](#)

[E1036 Test Methods for Electrical Performance of Nonconcentrator Terrestrial Photovoltaic Modules and Arrays Using Reference Cells](#)

[E1328 Terminology Relating to Photovoltaic Solar Energy Conversion \(Withdrawn 2012\)](#)³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, see Terminologies [E772](#) and [E1328](#).³

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *photovoltaic device parameter*—a characteristic of a photovoltaic device, such as short-circuit current or open-circuit voltage.

3.2.2 *test parameter*—a characteristic of the test conditions to which the photovoltaic device is exposed, such as irradiance or temperature.

3.3 *Symbols:*

| | Meaning | Symbol |
|--|---------------------------------|--------|
| | Test parameter | X |
| | Device parameter | Y |
| | Number of data pairs taken | n |
| | Slope of the linear function | m |
| | Fit to the data | |
| | Estimated variance of the slope | s^2 |

¹ This test method 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.

Current edition approved June 1, 2010; Nov. 1, 2015. Published September 2010; November 2015. Originally approved in 1987. Last previous edition approved in 2005 as [E1143-05\(2010\)](#). DOI: 10.1520/E1143-05R10.10.1520/E1143-05R15.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.