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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Calibration Specification for Solar Simulators
(English Translation)**

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Introduction

This specification refers to IEC 60904-9-2007 "Photovoltaic device Part 9. Solar simulator performance requirements" (Photovoltaic devices-Part 9).

Solar simulator performance requirements).

To meet the domestic photovoltaic industry, the key needs of the measurement equipment, the specification based on JJF 1071-2010 "country Metrological Calibration Specification Writing Rules" and JJF 1059.1-2012 "Measurement Uncertainty Assessment and Representation", added to the following.

--- clear the sun simulator three performance indicators of the specific method of calibration (see 7.2);

- an example of the uncertainty of calibration results (see Appendix C);

--- clear the requirements of the calibration result page format (see 8).

This specification is the first release.

Sun simulator calibration specification

1 Scope

This specification applies to solar PV and other related industries with steady-state and transient solar simulator performance calibration.

2 reference file

This specification refers to the following documents.

Photovoltaic device Part 9. Solar simulator performance requirements "(IEC 60904-9.:2007) devices-Part 9. Solar simulator performance requirements) for dated references, only the dated edition applies to this specification; references that are not dated, The latest version (including all modifications) applies to this specification.

3 terms and units of measurement the following terms and definitions apply to this calibration specification.

3.1 AM0 condition AM0 condition Calibration and test space (AM = 0, that is, the Earth's atmosphere, the air quality is 0, not by the atmosphere the reflection and absorption of solar cells are defined by the solar irradiance and spectral irradiance distribution.

3.2 AM1.5G condition AM1.5G condition Calibration and testing of the ground (AM = 1.5, that is, the actual distance between the sunlight and the atmosphere is the vertical thickness of the atmosphere 1.5 times the corresponding zenith angle of about 48 °) solar cells specified by the solar irradiance and spectral irradiance distribution.

3.3 spectral matching degree spectral match the degree of matching of the spectra of the solar simulator light source relative to the standard solar spectral irradiance.

3.4 Irradiation unevenness irradiance non-uniformity in the entire effective working area, the solar simulator's maximum irradiance (E_{max}) and minimum (E_{min}) Between the relative deviation. Irradiance Unevenness = $(E_{max} - E_{min}) / (E_{max} + E_{min}) \times 100\%$.

3.5 Irradiation Intensity of Irradiation irradianceinstability Effective Irradiation In any given position on the surface, the maximum degree of irradiance of the solar simulator over a specified time interval (E_{max}) and the minimum (E_{min}) between the relative deviation.

$$\text{Irradiance Instability} = (E_{max} - E_{min}) / (E_{max} + E_{min}) \times 100\%$$
 Irradiance instability includes short-term instability and long-term instability.

4 Overview

The solar simulator is a light source device that simulates natural solar spectroscopy and irradiance, usually by light and power, light Learn parts and filters, and control the operating system, as shown in Figure 1. According to IEC 60904-9.:2007, the technical indicators of the amount of solar simulator mainly include three aspects. spectral matching characteristics (with AM0 or AM1.5G Solar spectral irradiance distribution for comparison), irradiance unevenness and irradiance instability.