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

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Extended thermal cycling of PV modules - Test procedure

光伏组件扩展热循环 试验程序

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document adopts IEC 62892:2019 "Extended thermal cycling test procedure for photovoltaic modules".

The following minimal editorial changes have been made to this document.

---The non-range-related descriptions in the scope have been deleted and moved to the introduction section.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Ministry of Industry and Information Technology of the

People's Republic of China.

This document is under the jurisdiction of the National Technical Committee on Standardization of Solar Photovoltaic Energy Systems (SAC/TC90).

Introduction

The IEC 61215 series defines the test requirements for the design qualification of flat-panel photovoltaic modules operating under normal outdoor climatic conditions for extended periods.

IEC TS62941 provides technical guidance for the application of type approval testing.

This document, as a supplement to IEC 61215, provides extended thermal cycling tests designed to differentiate photovoltaic modules with higher thermal cycling durability.

The components, and the performance of components installed in areas susceptible to thermal cycling stress, were evaluated.

This document is based on 95% of the component test samples passing the equivalent stress test of 500 thermal cycles (IEC 61215-2:2016, 4.11.3).

After the definition, the maximum power attenuation shall be less than 5%.

This test procedure was developed based on the analysis of the solder ribbon connection stress of crystalline silicon photovoltaic modules with glass-encapsulated front panels.

Although replacing the solder with lead-free solder will affect the acceleration factor, the overall test results will not change. Components with integrated cell interconnects.

It will not be affected by this specific type of stress, but electrical connections existing within the component, such as those between battery cells and the component bus, will be affected.

The connection may be damaged due to thermal cycling.

Extended thermal cycling test procedure for photovoltaic modules

1 Scope

This document defines an extended test sequence based on the IEC 61215-2 thermal cycling test, which is used to differentiate thermal cycling resistance.

More durable photovoltaic modules, and evaluation of the performance of modules installed in areas susceptible to thermal cycling stress 1). This document also specifies...

The practice of reducing total test time by increasing the maximum cycle temperature and/or increasing the number of test components.

This document applies to crystalline silicon photovoltaic modules with a glass-encapsulated

front panel. Flexible modules without glass encapsulation experience stress in a different manner than those with glass encapsulation.

Because the components are different, the equivalent coefficients used in this document may not be applicable to this type of component.

1) Appendix B provides guidance on assessing whether the test is necessary at the target deployment site.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

IEC 61215-1:2016 Design qualification and type approval of terrestrial photovoltaic modules - Part 1: Test requirements IEC 61215-1-1 Ground-mounted photovoltaic modules - Design qualification and type approval - Part 1-1.Particular requirements for testing crystalline silicon photovoltaic modules [Ter-IEC 61215-1-2 Ground-mounted photovoltaic modules - Design qualification and type approval - Part 1-2.Particular requirements for testing cadmium telluride thin-film modules [Ter-IEC 61215-1-3 Ground-mounted photovoltaic modules - Design qualification and type approval - Part 1-3.Particular requirements for testing of amorphous silicon thin-film modules [Ter-IEC 61215-1-4 Ground-mounted photovoltaic modules - Design qualification and type approval - Parts 1-4.Particular requirements for testing copper indium gallium selenide (CIGS) thin-film modules IEC 61215-2:2016 Design qualification and type approval of terrestrial photovoltaic modules - Part 2: Test procedures Note. GB/T 20047.1-2025 Safety qualification of photovoltaic modules - Part 1: Structural requirements (IEC 61730-1:2023, IDT) Note. GB/T 20047.2-2025 Photovoltaic Module Safety Qualification Part 2: Test Requirements (IEC 61730-2:2023, IDT)