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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Extended thermal cycling of PV modules – Test procedure

Cycle thermique étendu de modules PV – Procédure d'essai

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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EXTENDED THERMAL CYCLING OF PV MODULES – TEST PROCEDURE

FOREWORD

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The text of this International Standard is based on the following documents:

FDIS	Report on voting
82/1537/FDIS	82/1560/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

The IEC 61215 series defines test requirements for the design qualification of flat-plate PV modules for long-term operation in general open-air climates. IEC TS 62941 provides technical guidance in application of the type-approval testing.

This document, IEC 62892, supplements IEC 61215 by providing an extended thermal cycling test intended to differentiate PV modules with improved durability to thermal cycling and evaluate modules for deployment in locations most susceptible to thermal cycling type stress.

EXTENDED THERMAL CYCLING OF PV MODULES – TEST PROCEDURE

1 Scope

This document defines a test sequence that extends the thermal cycling test of IEC 61215-2. It is intended to differentiate PV modules with improved durability to thermal cycling and evaluate modules for deployment in locations most susceptible to thermal cycling type stress[1]. This document is based on the ability for 95 % of the modules represented by the samples submitted for this test to pass an equivalency of 500 thermal cycles, as defined in IEC 61215-2:2016, 4.11.3, with a maximum power degradation of less than 5 %. Provisions are also provided to reduce overall test time by increasing the maximum cycle temperature and/or the number of modules submitted for test.

The test procedure in this document was developed based on analysis of the stress on tin-lead solder bonds on crystalline silicon solar cells in a glass superstrate type package. Changes to lead-free solder have an effect on the acceleration factors but not enough to change the overall results of this test. Monolithic type modules with integral cell interconnection do not suffer from this specific type of stress but there are still electrical connections within the module, for example between the integrated cell circuit and the module bus bars, that may be subject to wear out from thermal cycling. Flexible modules (without glass) are not stressed in the same way as those with glass superstrates or substrates, therefore use of the equivalency factor employed in this document may not be applicable to these modules.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61215-1:2016, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements*

IEC 61215-1-1, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-1: Special requirements for testing of crystalline silicon terrestrial photovoltaic (PV) modules*

IEC 61215-1-2, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-2: Special requirements for testing of thin-film Cadmium Telluride (CdTe) based photovoltaic (PV) modules*

IEC 61215-1-3, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-3: Special requirements for testing of thin-film amorphous silicon based photovoltaic (PV) modules*

IEC 61215-1-4, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,GA)(S,Se)$_2$ based photovoltaic (PV) modules*

[1] Guidance is provided in Annex B to assess if this test is warranted for the targeted deployment location.