

TECHNICAL REPORT



Derisking photovoltaic modules – Sequential and combined accelerated stress testing



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Derisking photovoltaic modules – Sequential and combined accelerated stress testing

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CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Framework for sequential and combined stress testing.....	8
5 Sequential and cyclic sequential test methods	9
5.1 Extended damp heat and addition of ultraviolet light	9
5.2 Sequential/combined testing with damp-heat, thermal cycling and ultraviolet light	10
5.3 Consideration of interaction of UV radiation and damp heat	12
5.4 Test-to-failure—A sequential test protocol.....	13
5.5 Sequential test protocol optimized for differentiating backsheets.....	16
5.6 Mechanical stress testing in combination with damp-heat, humidity-freeze, and thermal-cycling tests for examining cell cracking and its effects	20
6 Mechanism-specific multi-factor stress tests	22
6.1 General.....	22
6.2 Testing for delamination.....	22
6.2.1 General	22
6.2.2 Delamination – UV irradiation with high-temperature stress	22
6.2.3 Delamination – UV irradiation with thermal-cycling stress and humidity freeze	23
6.2.4 Delamination – UV irradiation with cyclic dynamic mechanical loading, thermal cycling stress, and humidity freeze.....	24
6.2.5 Delamination – Temperature, humidity, and electric field associated with system voltage	25
6.3 Testing for potential-induced degradation	28
6.3.1 General	28
6.3.2 Testing for potential-induced degradation with humidity, voltage, bias, and light	28
6.3.3 Factor of salt mist.....	29
6.4 Testing in damp heat with current injection and as a function of temperature	30
6.5 Cell cracking and propagation in cyclic loading at various temperatures.....	31
7 Combined-accelerated stress testing	33
7.1 Combined-accelerated stress testing for tropical environments	33
7.2 Combined-accelerated stress testing for multiple environments	36
8 Future directions.....	39
Annex A (informative) Overview of degradation modes and causal stress factors.....	41
Annex B (informative) Failure modes plotted on a failure tree diagram for selected clauses in this document.....	43
Annex C (informative) Summary table of sequential and combined testing: Samples, factors, combination, and stress-test results	44
Bibliography.....	49

Figure 1 – Framework for sequential and combined stress testing, showing three axes of comprehensiveness – testing samples, the number of stress factors of the natural environment, and their sequence or combination of application..... 9

Figure 2 – Fraction power loss of modules though stress testing..... 10

Figure 3 – (a) Combined test sequence, and resulting (b) normalized power loss, (c) short-circuit current (I_{SC}), and (d) fill factor (FF) [1]	11
Figure 4 – Power degradation of modules in 85 °C and 85 % relative humidity as a function of extent of preconditioning under Xe light [9]	13
Figure 5 – (a) Overview of the test-to-failure sequences, and (b) results showing module power normalized to their post-light-soak values for seven module types	14
Figure 6 – Examples of field-relevant degradation modes seen in modules tested in the test-to-failure protocol	15
Figure 7 – Module accelerated sequential tests (MAST)	17
Figure 8 – Degradation modes from MAST and fielded modules	19
Figure 9 – (a) Front-side mini-module exposure in a xenon weathering chamber with water spray; (b) fielded module with six years of service in North America with 30 % power loss [21]	20
Figure 10 – (a) Test-stage description; (b) relative change in standard test condition (STC) module parameters as a function of stage and maximum power determined at STC [23]	21
Figure 11 – (a) Stress testing at 65 °C combined with UV radiation dose of 180 W/m ² in the range of 300–400 nm, 900 h; (b) 75 °C without UV radiation, 1 000 h [28]	23
Figure 12 – Delamination in sequential test	25
Figure 13 – Delamination associated with system voltage	27
Figure 14 – Degradation of three modules with and without UV-A light irradiance in chamber at 60 °C, 85 % RH, and 1 000 V (positive or negative polarity depending on the sample)	29
Figure 15 – Sheet resistance measured on glass surfaces with various soil types, as a function of relative humidity (RH %), at 60 °C [41]	30
Figure 16 – Cyclic unidirectional 4-point bending with loading alternating between 0 N and 500 N at different temperatures as shown, with duration of 4 s at each of the high- and low-pressure dwells, 10 000 to 30 000 cycles with pressure (“Press”) from the front-glass side or backsheet side [49]	32
Figure 17 – Example of 24 h PV module combined accelerated stress-testing protocol modified from ASTM D7869	34
Figure 18 – Shrinkage of polymer C backsheet leading to delamination and cracking	35
Figure 19 – Multiple-environment C-AST sequence	37
Figure 20 – Failure of two mini-modules with a polymer B outer-layer backsheet type undergoing different multiple-environment C-AST sequences	38
Table 1 – Extended damp heat and ultraviolet light	10
Table 2 – Sequential/combined testing with damp-heat thermal cycling and ultraviolet radiation	12
Table 3 – Ultraviolet light and damp-heat interaction	13
Table 4 – Test-to-failure – Sequential test protocol	16
Table 5 – Module accelerated stress test 1 (MAST #1)	18
Table 6 – Module accelerated stress test 2 (MAST #2)	18
Table 7 – Module accelerated stress test 3 (MAST #3)	18
Table 8 – SML-TC-HF sequential test	21
Table 9 – UV irradiation under high-temperature conditions	23
Table 10 – UV irradiation with TC stress	24
Table 11 – UV irradiation with DML-TC-HF sequential test	25

Table 12 – DH – Negative system bias stress sequential test.....	28
Table 13 – UV irradiation – negative system bias stress combined test.....	29
Table 14 – Bending load test at various temperatures.....	33
Table 15 – Partial list of observed degradation modes, attributed mechanisms, and stress factors seen in the first application of the combined accelerated stress-testing protocol based on ASTM D7869.....	35
Table 16 – Combined-accelerated stress test (Tropical 24 h ASTM D7869-based sequence).....	36
Table 17 – Multiple-environment combined-accelerated stress test.....	38
Table A.1 – Degradation modes and potential stress factors that can lead to their manifestation	42
Table C.1 – Table summarizing sequential and combined stress testing	44

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DERISKING PHOTOVOLTAIC MODULES – SEQUENTIAL
AND COMBINED ACCELERATED STRESS TESTING**

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The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
82/1657/DTR	82/1692B/RVDTR

Full information on the voting for the approval of this technical report 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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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DERISKING PHOTOVOLTAIC MODULES – SEQUENTIAL AND COMBINED ACCELERATED STRESS TESTING

1 Scope

This document reviews research into sequential and combined accelerated stress tests that have been devised to determine the potential for degradation modes in PV modules that occur in the field that single-factor and steady-state tests do not show. This document is intended to provide data and theory-based motivation and help visualize the next steps for improved accelerated stress tests that will derisk PV module materials and designs. Any incremental savings as a result of increased reliability and reduced risk translates into lower levelized cost of electricity for PV. Lower costs will result in faster adoption of PV and the associated benefits of renewable energy.

2 Normative references

The following documents are referred 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 60721-2-1, *Classification of environmental conditions – Part 2-1: Environmental conditions appearing in nature – Temperature and humidity*

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

IEC 61215-2:2016, *Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures*

IEC 61730-2:2016, *Photovoltaic (PV) module safety qualification – Part 2: Requirements for testing*

IEC TS 61836, *Solar photovoltaic energy systems – Terms, definitions and symbols*

IEC TS 62782:2016, *Photovoltaic (PV) modules – Cyclic (dynamic) mechanical load testing*

IEC 62788 (all parts), *Measurement procedures for materials used in photovoltaic modules*

IEC TS 62804-1, *Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation – Part 1: Crystalline silicon*

IEC TS 62804-1-1, *Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation – Part 1-1: Crystalline silicon – Delamination*

ASTM D7869-17 *Standard Practice for Xenon Arc Exposure Test with Enhanced Light and Water Exposure for Transportation Coatings*