

Task Group 2: Thermal and Mechanical Fatigue Including Vibration

Christopher Flueckiger



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Scope:

Failures of cell interconnects and solder bonds have been identified as a key cause of long-term failure of PV modules. The primary stresses affecting the failure rates have been shown to be thermal and mechanical. There is evidence that vibration during transportation and/or caused by wind can contribute. This task group will study how to best induce stress and quantify quality.



Task Group 2: Proposed Sequential Test Plan

Visual Inspection and Electrical Characterization



Dynamic Mechanical Load



Visual Inspection and Electrical Characterization



Temperature Cycling



Visual Inspection and Electrical Characterization



Humidity / Freeze Cycling



Visual Inspection and Electrical Characterization



Task Group 2: Proposed Test Parameters

Visual Inspection and Electrical Characterization: Power-Loss, Wet Leakage Current, Electroluminescence, Insulation Resistance

Dynamic Mechanical Load: max: 1,000 Pa, 1,000 cycles, 2 – 3 cycles/min

Temperature Cycling: 50 cycles with no current flow, increased temperature range and rate of change being considered.

Humidity / Freeze Cycling: Same as IEC / UL

Electroluminescence

1. Task Group 2 collaborates with SEMI PV Committee to create EL/IR measurement standards.
2. Task Group 2 creates the rating system for modules using these standards.



PV QA Task Group #2: Current Status

Interim Goals by Apr-12	<u>Thermal Cycling / Dynamic Mechanical Load:</u> 1st Draft (Proposal) Creation for the Rating Standard ->Agreement in Int'l WG2
Interim Action Plan by Apr-12	<u>Thermal Cycling:</u> Discussion for the Upper Level of Temperature / Sequential Testing (e.g.: DH/HF -> TC) <u>Dynamic Mechanical Load / Vibration:</u> Request to SEMI PV Committee for the Establishment of EL/IR Measurement Standards
Mid-term Goals	<u>Thermal Cycling / Dynamic Mechanical Load:</u> Improvement of Rating Standard (Autumn 2012) <u>Vibration:</u> 1st Draft (Proposal) Creation for the Rating Standard ->Agreement in Int'l TG2 (Autumn 2012)
Mid-term Action Plan	<u>Thermal Cycling:</u> Analysis of Accumulated Experimental-Data <u>Dynamic Mechanical Load / Vibration:</u> 1st Draft (Proposal) Completion in SEMI PV Committee (EL/IR Measurement Standards)
Remarks	Last meeting was February 21, 2012. Ongoing monthly teleconferences globally and (hopefully) regionally



THANK YOU.



**Christopher Flueckiger
Underwriters Laboratories
Email: christopher.flueckiger@ul.com**