



the standard in safety

Solar ABCs PV Standards Updates

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Overview

- IEC PV Materials Project Team
- IEC 61730 Update and progress
- UL 61730 new draft to UL1703 STP
- UL1703 Revisions
- UL1703 STP meeting
- PV grounding
- UL1741 Revisions
- PV AFCIs

IEC PV Material Project Team Report

- 88 International members
 - Module, adhesive, backsheet, and encapsulant mfrs, industry experts, certification bodies, and national labs
- Scope
 - Develop IEC requirements for PV material property characterization
- Hazard Based Analysis
 - Used to determine material characterization tests

Material Team Structure

- Steering committee and task groups
 - Steering Committee – Crystal Vanderpan
 - Adhesives and Conductive Adhesives – Howard Creel
 - Backsheet/Frontsheets and test methods – Karlheinz Brust
 - Edge Sealants and Potting Materials - Mike Kempe
 - Encapsulant and test methods - Nichole Nickel
 - Partial Discharge – Jorg Althaus
 - Weathering/accelerated aging - Kurt Scott

Short and Long Term Position

1. Work related to IEC safety, design, and performance standards
 - IEC 61730, IEC 61215, IEC 61646
2. Characterization of safety and performance
3. Review and prioritize test lists based on safety and performance
4. Create retest variation guidelines
5. Compliance criteria based on design and application
6. Preselection guidelines for modules

Meeting schedule

- Material Project Teams
 - Meet twice a year face to face with WG2
 - Next meeting Shanghai, China
- Steering committee
 - Meet in between WG2 meetings via teleconference
 - Task group leads and members
- Task groups
 - Meet in between WG2 meetings via teleconference with Internet meeting (web-meeting) and/or face to face meetings

IEC 61730

- IEC 61730, first edition
 - Technical errors
 - Omissions
 - Incorrect references
- Initial US proposed harmonization document of UL61730 included many national differences in an attempt to correct the first edition
- UL 1703 STP determined that the corrections, revisions and additions needed to be made in the IEC version and **not** in US national differences of UL61730.
- This resulted in work on an amendment and edition of IEC 61730. This work is still ongoing.



IEC 61730 Update and progress

- 61730 -1 and 61730-2 Amendments to address non contentious errors.
 - Incorrect referenced standards
 - Incorrect polymeric ratings
 - Misc house keeping issues
- Completed amendment revisions based upon national committee comments.
- Final stage to address IEC head office formatting issues.



IEC 61730 Update and progress

- Excellent Progress at last meeting in Cologne Germany!
- 2 days of open working group discussions, worked through new IEC 61703-1 draft
 - Agreement on path forward for polymeric materials
 - Seven polymeric task groups
 - Materials Deformation Test - developed between UL and NREL and was based upon UL1703 STP Creep Test proposal and comments

IEC 61730 2nd Edition

- UL presented the new updated 2nd edition draft of the IEC 61730-1. This draft was directly based upon the refined UL 61730 national differences.
- Over 2 days of questions, comments, discussions and revisions, we came away with general working group agreement on the items we were able to address during the meeting and we agreed upon a path forward for items that needed further work



IEC 61730-1 Electrical Spacings and PV Plastics

- UL, VDE and TUV to work together to revise the electrical spacings section and tie it to the PV Plastics requirements.
- We made great progress at this meeting!



UL 61730 Proposal to UL 1703 STP

- Directly following the IEC WG2 meeting in Sept 2010, UL updated the UL 61730 drafts with the most up to date information from the IEC.
- These Drafts will be sent to the UL1703 STP minimum 30 days prior to the UL1703 STP meeting for discussion of comments during the STP meeting.

UL1703 Revisions

- Maintenance and Correct errors
- PV connectors PV wire
- Thin film PV reference to IEC 61646
- Materials Deformation Test in place of Creep proposal
- Grounding
- References to PV Trackers and PV mounting systems UL Subject 2703



UL1703 Standards Technical Panel (STP) Meeting

- STP meeting announcement delivered to UL1703 STP on Sept 30, 2010,
- STP meeting dates 2010-10-9 and 2010-10-10, held at UL head office in Northbrook, IL
- Call for Agenda Items, Due 2010-10-20.
- Detailed agenda will be sent no later than 2010-11-09
 - UL61730 harmonization draft comments
 - UL1703 revisions
 - PV grounding
 - UL Subject 2703
 - Task/Work Groups
 - Other items TBD based on input due by 2010-10-20

PV Grounding and Collaboration of Efforts

- UL467 proposed PV specific revisions Jacob Killinger UL Principal Engineer.
- PV Grounding task group proposal input
- US Subject 2703 Mounting and Grounding
- Collaboration of these groups
- UL R&D PV grounding corrosion project

UL1741 Revision Proposals

- **Present**
 - Transformerless inverters
 - Backfeed current
- **Upcoming**
 - PV module mounted DC / DC converters
 - Combiner box requirements
 - AC module expansion
 - Reference to UL1699B PV AFCI requirements.
 - Short Circuit ratings
 - Smart Grid additions
 - More to come

Nonisolated Transformerless PV Inverter CRD for UL 1741

- General - These requirements address Non-Isolated EPS Interactive PV Inverters with PV array inputs installed per NEC 690.35.
- 27 page CRD document that provides:
 - Definitions,
 - Specific construction requirements
 - Operational requirements and
 - Tests to
- evaluate the operation and functional safety of the protection systems.



PV AFCIs

- 2011 NEC Published 690.11
- Well balanced Ad Hoc Working Group further developing latest 1699B Draft
- PV AVCI Ad Hoc Meeting at UL in 2010-11-30 and 2010-12-01
- Revisions to address PV BOS equipment with PV AVCI functionality.

NEC 90.4 Enforcement

- This Code may require new products, constructions, or materials that may not yet be available at the time the Code is adopted. In such event, the authority having jurisdiction may permit the use of the products, constructions, or materials that comply with the most recent previous edition of this Code adopted by the jurisdiction.

Questions

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