

# **Update on Research Plan for PV Fire Ratings and Test Procedures**

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In response to the increasing number of California wild fires there are considerations for and concerns against increasing the minimum fire class rating for California roof mounted PV.



# Present Situation

- PV modules today are evaluated, tested and Listed for compliance with UL790, Standard Test Methods for Fire Tests of Roof Coverings.
- PV modules are tested the same way as roofing materials.

- **Good Class C**
- **Better Class B**
- **Best Class A**

Note: Most of urban California require Class A roofing materials and Class C PV modules.

- Modules not fire rated are marked,  
**“Not Fire Rated”**

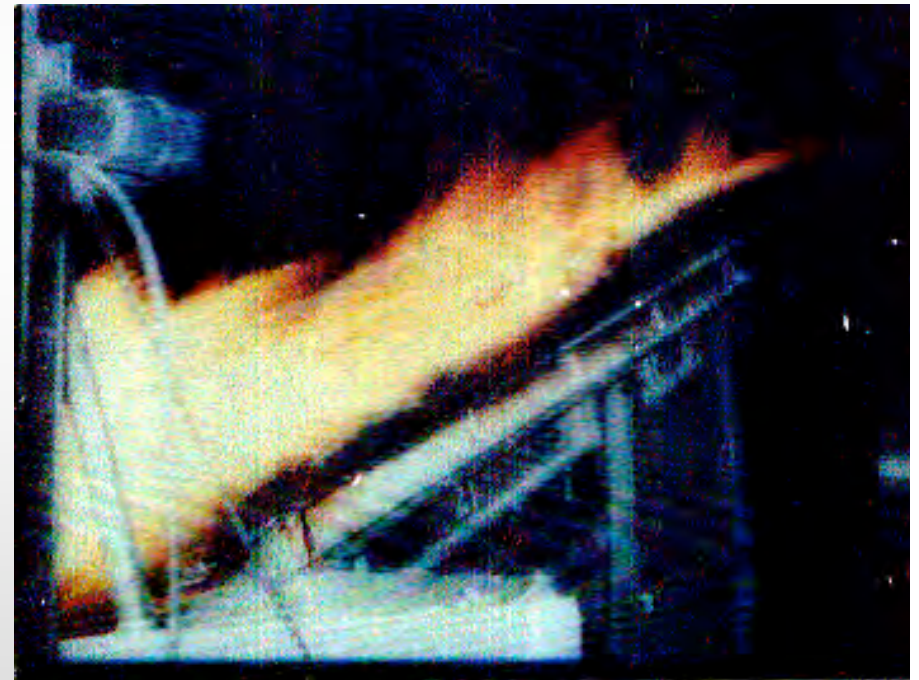


# UL790 Fire Class Rating Testing

Burning Brand Test



Spread of Flame Test



# US Present Situation

- *Installation of modules on or integral to a building's roof system may or may not adversely affect the roof-covering materials' resistance to external fire exposure if the module has a lesser or no fire-resistance rating. Roof-covering materials will not be adversely affected when the modules have an equal or greater fire-resistance rating than the roof-covering material.*



# SAI Revised Priorities

- PV Fire Test and flame ratings became a new high priority deliverable, based upon industry feedback through the Solar ABCs Product Safety Panel.
- This deliverable is now a R&D project that will be run at our UL Northbrook Fire Test facility.



# PV Fire R&D Project

- This proposed research-testing program is intended to better define how PV modules of various flame class rating affect roofing materials of various flame class ratings when installed in typical PV installations.



# Proposed Test Program

- 1) Fire resistance testing and fire class testing of rack mounted PV modules over a roofing system when:
  - a) mounted at various rated installation angles
  - b) mounted on roofs with various levels of fire resistance performance within a specific fire class rating.
  - c) mounted on different rated fire class roofs,





# Proposed Test Program

- 2) New PV specific test method where flames can contact both the front and back of a PV module at the same time;
- 3) Affect of installation height of PV modules above roof material;
- 4) Potential affect of a lower fire class rated module on a higher fire class rated roof;
- 5) Affect of how an arcing/burning PV module may or may not affect a fire class rated roof; (This is to simulate an arcing fault that will introduce additional energy beyond the combustion of the PV module materials)



# Proposed Test Program

- 6) Potential of a PV module's polymeric materials as a fuel source propagating traditional roofing materials tendency to burn; (Is there enough fuel in a PV module to be an issue?)
- 7) Potential of PV modules to mitigate traditional roof materials tendency to burn; (Will a PV module improve a roof materials fire rating?)
- 8) Verify similarly rated fire class PV modules and roofing materials will not have adverse affects on each other; (Do they play nice?)



# Examples of Test Combinations

- Investigates existing Class A PV with marginal performing 3 tab shingles;
- Investigates existing Class A PV with marginal performing Class A membrane roofing system;
- Investigates existing Class C PV with good performing Class A shingle;
- Investigates existing Class C PV with good performing Class C shingle;



# Industry Input

- This is a proposed test program.
- We would appreciate industry input into this test program.
- The present plan includes 70 tests.
- We would **GREATLY** appreciate module donations for this testing. They need not be functioning modules but should be physically complete.



# Questions?

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