

## Standard Information

**Standard Number:** UL 1703

**Standard Name:** Flat-Plate Photovoltaic Modules and Panels

**Standard Edition and Issue Date:** 3<sup>rd</sup> Edition Dated March 15, 2002

**Date of Revision:** October 25, 2013 and May 20, 2014

**Date of Previous Revision to Standard:** 3<sup>rd</sup> Edition Revised May 8, 2012

## Effective Date of New/Revised Requirements

Effective Date (see Schedule below): **October 25, 2016**

## Impact, Overview, Fees and Action Required

**Impact Statement:** A review of all Listing Reports is necessary to determine which products comply with new/revised requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

**Overview of Changes** (specific details of new/revised requirements are found in table below):

- Revisions to Fire Rating Tests for PV Modules and Panels.
- Creation of Section 42A "Performance Requirements for Cemented Joints"

**Schedule:** So that shipping of products with Listing Marks will not be interrupted, an **approximate** schedule has been established to ensure Listing Reports are found compliant by Effective Date:

- February 22, 2016 = 8 Month Report Review – Intertek will review all Reports. Update if compliance is verified or issue Findings Letter/Quote for any re-evaluations needed
- April 25, 2016 = 6 Month Quote Cut-off – Quotes returned for necessary re-evaluations
- September 23, 2016 = 30 Day Warning – Client advised of all non-compliant Reports to be Suspended
- **October 25, 2016** = Effective Date – ATM Suspended for all non-compliant Reports

**Fees:** An initial review of Listing Report (s) will be covered by a direct billing project and will be invoiced at not more than \$1000 per report.

### Client Action Required:

**Information** – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised requirements do not apply to your product (s).

**Current Listings Not Active?** – *Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.*

## Description of New/Revised Technical Requirements

Clause	Verdict	Comment
<b>The revisions dated October 25, 2013 were issued to incorporate the following:</b>		
16		<b>Fire Resistance Performance - PV Modules or Panels and Roofs</b> <i>Change from module to system fire test. Allowance for module typing for fire performance (details below);</i>
16.1		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown <del>lined out</del> below.</i>  <del>A module or panel intended for stand-off, rack, or direct mounting in combination with a specified roof, or intended for integral mounting shall comply with the fire resistance requirements for a Class A, B, or C roof covering when the module or panel is indicated or implied as being fire rated. For a combination construction, the rating shall be coincident with, or at a lower level than, the rating of the basic roof covering material. The fire resistance shall be determined in accordance with the Standard for the Standard Test Methods for Fire Tests of Roof Coverings, UL 790, as modified by Fire Tests, Section 31.</del>  <u>A photovoltaic module or panel intended to be mounted or installed on a roof shall be evaluated for fire performance in accordance with 16.2 or 16.3, whichever applies. System Fire Class Ratings A, B, or C are only relevant for PV modules or panels with mounting systems in combination with a fire rated roof covering. Mounting systems evaluated in accordance with 16.3 may be tested with specific "types" of modules as characterized in accordance with 16.4.1.</u>
16.2		<i>New clause added;</i>  Modules or panels intended for installation integral with or forming a part of the building's roof structure are referred to in this standard as building-integrated photovoltaics (BIPVs) and shall be evaluated in accordance with the Standard for the Standard Test Methods for Fire Tests of Roof Coverings, UL 790, as a Class A, B, or C roof covering material or roof covering system.
16.3		<i>New clause added;</i>  Modules or panels that are not BIPVs and are intended for stand-off or rack mounting in combination with a roof covering shall be evaluated in accordance with the tests described in Fire Tests, Section 31, and as shown by Table 31.2 with respect to the fire performance requirements for Class A, B, or C when the module or panel is marked as being fire rated as specified in 47.11. The module or panel with its mounting system is to be evaluated for Class A, B, or C so that the appropriate System Fire Class Rating can be used for building code compliance purposes.
16.4		<i>New clause added;</i>  The specimens selected for testing are to be representative of the construction series being investigated with regard to components and design. A module or panel intended for mounting on a roof may be represented by type in accordance with 16.4.1 to simplify the evaluation of module or panel types, roof-mounting configurations, and mounting systems.

# Standards Update Notice (SUN)

Issued: October 30, 2015

Clause	Verdict	Comment
16.4.1		<p><i>Note: this clause was revised again for clarity in the later revisions of May 20, 2014 and October 12, 2015, the content below reflects these clarification updates.</i></p> <p>The use of module or panel types in this Section is optional. A module or panel intended for mounting on a roof (but not BIPVs) can be classified according to type based on its construction and the results of the fire tests detailed in Section 31.1.2, Spread of Flame on Top Surface, and Section 31.1.3, Burning Brand on Top Surface. Module or panel construction types shall be evaluated based on the following characteristics of PV module and panel construction: (1) the superstrate material; (2) the encapsulant material; (3) the substrate material; and, (4) the frame type and geometry (if any). The following types are representative of common module and panel constructions and their associated fire characteristics:</p> <p>A Type 1, 4, or 7 module or panel meets the following requirements:</p> <ol style="list-style-type: none"> <li>Construction: Glass superstrate of <math>0.14 \pm 0.03</math> in (<math>3.6 \pm 0.76</math> mm); a polymeric encapsulant between the superstrate and cells with a pre-lamination thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm); either a polymeric encapsulant between the cells and substrate with a pre-lamination thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm) and a polymeric substrate with nominal thickness no less than 0.012 in (0.30 mm) and no more than 0.025 in (0.64 mm) thickness or a combined substrate and encapsulant that meets the pre-lamination total thickness equal to an encapsulant thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm) and a polymeric substrate with nominal thickness no less than 0.012 in (0.30 mm) and no more than 0.025 in thickness (0.64 mm); and metallic framing protecting the edge of the laminate.</li> <li>Spread of Flame Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.2. For Type 1, the allowable spread of flame of 6 feet (1.82 m) or less in 10 minutes. For Type 4, the allowable spread of flame is 13 feet (3.96 m) or less in 4 minutes. For Type 7, the allowable spread of flame is 8 feet (2.4 m) or less in 10 minutes.</li> <li>Burning Brand Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.3 using a C Brand. For Type 1, 4, and 7, passing results using a C Brand shall be demonstrated.</li> </ol> <p>A Type 2, 5, or 8 module or panel meets the following requirements:</p> <ol style="list-style-type: none"> <li>Construction: Glass superstrate of <math>0.14 \pm 0.03</math> in (<math>3.6 \pm 0.76</math> mm); a polymeric encapsulant between the superstrate and cells with a pre-lamination thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm); either a polymeric encapsulant between the cells and substrate with a pre-lamination thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm) and a polymeric substrate with nominal thickness between 0.001 in (0.025 mm) and 0.012 in thickness (0.30 mm) or a combined substrate and encapsulant that meets the prelamination total thickness equal to an encapsulant thickness of <math>0.018 \pm 0.008</math> in (<math>0.45 \pm 0.2</math> mm) and a polymeric substrate with nominal thickness between 0.001 in (0.025 mm) and 0.012 in thickness (0.30 mm); and metallic framing protecting the edge of the laminate.</li> <li>Spread of Flame Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.2. For Type 2, the allowable spread of flame of 6 feet (1.82 m) or less in 10 minutes. For Type 5, the allowable spread of flame is 13 feet (3.96 m) or less in 4 minutes. For Type 8, the allowable spread of flame is 8 feet (2.4 m) or less in 10 minutes.</li> </ol>

# Standards Update Notice (SUN)

Issued: October 30, 2015

Clause	Verdict	Comment
		<p>c) Burning Brand Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.3 using a C Brand. For Type 2, 5, and 8, passing results using a C Brand shall be demonstrated.</p> <p>A Type 3, 6, or a 9-15 module or panel meets the following requirements:</p> <p>a) Construction: Glass superstrate of <math>0.105 \pm 0.030</math> in (<math>2.67 \pm 0.76</math> mm); polymeric encapsulant with a total pre-lamination thickness of <math>0.035 \pm 0.02</math> in (<math>0.9 \pm 0.5</math> mm); glass substrate of <math>0.105 \pm 0.030</math> in (<math>2.67 \pm 0.76</math> mm) without framing.</p> <p>b) Spread of Flame Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.2. For Type 3, 10 and 13, the allowable spread of flame of 6 feet (1.82 m) or less in 10 minutes. For Type 6, 11, and 14, the allowable spread of flame is 13 feet (3.96 m) or less in 4 minutes. For Type 9, 12, and 15, the allowable spread of flame is 8 feet (2.4 m) or less in 10 minutes.</p> <p>c) Burning Brand Test on Top Surface: The test shall be conducted using the procedure given in Section 31.1.3. For Type 3, 6, and 9, passing results using a C Brand shall be demonstrated. For Type 10, 11, and 12, passing results using a B Brand shall be demonstrated. For Type 13, 14, and 15, passing results using an A Brand shall be demonstrated.</p> <p>New types of PV modules with other constructions and fire performance can be defined as needed. Table 16.1 lists the types of PV modules based on construction and fire performance. The fire performance of these other constructions shall be tested in accordance with 31.1.2 and 31.1.3.</p>
Section 31		<p><b>Fire Tests</b></p> <p><i>New test methods for non-BIPV modules now incorporating racking systems and roofing materials as a system.</i></p>
Section 32	Info	<i>Section Deleted.</i>
47	Info	<p><b>MARKING</b></p> <p><i>Addition of module type markings (details below);</i></p>
47.11		<p><i>Additions to existing requirements are <u>underlined</u> and deletions are shown <del>lined out</del> below.</i></p> <p><del>A module or panel shall be marked relative to its fire resistance rating as a roof covering. A module or panel shall be marked "Not Fire Rated," unless it complies with the requirements for fire rating. If a module or panel is fire rated and if its use is so intended by the manufacturer, it shall be marked accordingly, for example, "Modules mounted freestanding 6 in above a Class B roof constitute a Class C roof."</del></p> <p><u>A module or panel marking shall include the following: "System Fire Class Rating: See Installation Instructions for Installation Requirements to Achieve a Specified System Fire Class Rating with this Product"</u></p>
47.11.1		<p><i>New sub-clause added;</i></p> <p>The module or panel may be marked with its type as defined in 16.4.1, for example: "Module Fire Performance: Type 1".</p>

# Standards Update Notice (SUN)

Issued: October 30, 2015

Clause	Verdict	Comment
48	Info	<b>Installation and Assembly Instructions</b> <i>Changes related to above requirements</i> <i>Additions to existing requirements are <u>underlined</u> and deletions are shown <del>lined-out</del> below.</i>
48.1.2		<p>The mechanical installation instructions for roof mounting shall include:</p> <p>a) A statement indicating the minimum mechanical means to be used for securement of the module or panel to the roof,</p> <p>b) <u>For a non-integral module or panel (See Figure 41.1), a statement that the assembly is to be mounted over a fire-resistant roof covering rated for the application, and The System Fire Class Rating of the module or panel in a mounting system in combination with a roof covering complete with requirements to achieve the specified System Fire Class Rating for a non-BIPV module or panel (See Figure 41.1), and</u></p> <p>c) <del>Indication of any slope less than 5 in/ft (127 mm/305 mm) required to maintain a fire Class rating.</del> <u>Indication of any module or panel mounting system limitations on inclination required to maintain a specific System Fire Class Rating.</u></p>
<b>The revisions dated May 20, 2014 were issued to incorporate the following:</b>		
42A		<p><i>New section added;</i></p> <p><b>Cemented Joints</b></p> <p>This new section includes new construction requirements, material testing, and UV weather resistance requirements for Cemented Joints (see standard for section details).</p>
		<p><b>CUSTOMERS PLEASE NOTE:</b> This Table and column "Verdict" can be used in determining how your current or future production is or will be in compliance with new/revised requirements.</p>