

STANDARD INFORMATION

Standard Number: UL 1703

Standard Name: Flat-Plate Photovoltaic Modules and Panels

Standard Edition and Issue Date: 3rd Edition dated March 15, 2002

Date of Revision: August 22, 2019 and November 25, 2019

Date of Previous Revision of Standard: September 26, 2018

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: All products must be certified to the November 25, 2019 revision of UL 1703 prior to August 31, 2021.

Additionally, any modifications to products after August 31, 2021 will require evaluation to UL 61730-1 and UL 61730-2.

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revise 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requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revise requirements.

Overview of Changes:

- Revisions to the reverse current overload test
- New Fire Type Additions and Revisions to Existing Types in Fire Performance - PV Modules or Panels and Roofs

Specific details of new/revise requirements are found in table below.

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).

Client Action:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revise paragraphs noted in the attached or explain why these new/revise 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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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.



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CLAUSE	VERDICT	COMMENT
		<p>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</p>
		<p>The following changes reflect the August 22, 2019 revision:</p>
28	Info	<p>Reverse Current Overload Test</p> <p>There shall not be flaming or charring of the cheesecloth or tissue paper in contact with a module or panel, or flaming of the module or panel itself for 15 s or more, when a reverse current equal to 135 percent of the module or panel series overcurrent protective device rating current (See 47.10) is caused to flow through the module or panel.</p> <p><u>The maximum external module surface temperature during the test as located by infrared camera and measured by thermocouples shall not exceed 150° C (302° F) and there shall be no flaming of the module or panel itself for 15 s or more, nor charring of the module or underlying support, when a reverse current equal to 135 percent of the module or panel series overcurrent protective device rating current (See 47.10) is caused to flow through the module or panel in accordance with 28.1A. The type of thermocouples is to be appropriate for the maximum permitted temperature (for example types T, K and E per the IEC 60584 standards for thermocouples). The test shall be conducted at ambient air temperature of 20 ±5°C (68 ±9°F) in an environment where the ambient air is still with no forced circulation.</u></p> <p><u>Note: The Technical Specification for Photovoltaic (PV) systems – Requirements for testing, documentation and maintenance – Part 3: Photovoltaic modules and plants – Outdoor infrared thermography, IEC TS 62446-3, provides guidance on the use of IR-cameras.</u></p>
28.1A		<p><i>New clause added</i></p> <p>A reverse current equal to 135 percent of the module or panel series overcurrent protective device rating current is to be applied to the module or panel. After 1 h, the hottest point(s) is to be determined, e.g. by using an infrared camera. The current is to then be switched off, the module or panel cooled down to room temperature and then a thermocouple is to be attached to this point (s) using a means that is compatible with the highest temperature allowed. The module or panel is to be reheated by reapplying a reverse current equal to 135 percent of the module or panel series overcurrent protective device rating current for 2 h (See 28.5). The temperature(s) measured by the thermocouple(s) are to be recorded at the end of the test.</p>



CLAUSE	VERDICT	COMMENT
		<p>To determine whether a module or panel complies with the requirements in 28.1, a module or panel is to be placed on a single layer of white tissue paper over a 3/4 in (19.1 mm) thick pine board and covered with a single layer of cheesecloth. The cheesecloth is to be untreated cotton cloth running 14—15 square yards/lb (26—28 m²/kg) and having what is known to the trade as a count of 32 by 28.</p>
28.2		<p>To determine whether a module or panel complies with the requirements in 28.1, a module or panel shall be mounted with the module sunny side down. The front to underlying surface clearance shall be the clearance specified in the manufacturer's mounting instructions. If the instructions offer more than one option, the option providing the worst-case clearance shall be used. If no indications have been provided for spacing, or if the module manufacturer allows mounting flush to the supporting surface within the product mounting guidelines, the module front shall be mounted in contact on a solid support that has sufficient mechanical strength to avoid warping under temperature influence. The thermal conductivity of the support shall be not higher than 0.5 W/(m·K)</p>
28.4		<p>The test required by 28.1 is to be conducted in an area free of drafts <u>forced air circulation</u>, and at an ambient temperature of 20 ±5°C (68 ±9°F), and the irradiance on the module or panel is to be less than 5 mW/cm².</p>
The following changes reflect the November 25, 2019 revision:		
16	Info	<p>Fire Performance – PV Modules or Panels and Roofs</p> <p><i>New clause added:</i></p> <p>A Type 16, 17, or 18 module or panel meets the following requirements:</p> <p>a) Construction: Glass superstrate of 0.14 ±0.03 in (3.6 ±0.8 mm); a polymeric encapsulant between the superstrate and cells with a pre-lamination thickness of 0.020 ±0.012 in (0.5 ±0.3 mm); a polymeric encapsulant between the cells and substrate with a prelamination thickness of 0.020 ±0.012 in (0.5 ±0.3 mm) and a glass substrate of 0.14 ±0.03 in (3.6 ±0.8 mm); and metallic framing protecting the edge of the laminate.</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 16, the allowable spread of flame of 6 feet (1.82 m) or less in 10 minutes. For Type 17, the allowable spread of flame is 13 feet (3.96 m) or less in 4 minutes. For Type 18, 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 using a C Brand. For Type 16, 17, and 18, passing results using a C Brand shall be demonstrated.</p>



CLAUSE	VERDICT	COMMENT
16.4.6		<p><i>New clause added;</i></p> <p>A Type 28, 29 or 30 module or panel meets the following requirements:</p> <p>a) Construction: Glass superstrate of 0.105 ± 0.030 in (2.67 ± 0.76 mm); a polymeric encapsulant between the superstrate and cells with a pre-lamination thickness of 0.020 ± 0.012 in (0.5 ± 0.3 mm); a polymeric encapsulant between the cells and substrate with a pre-lamination thickness of 0.020 ± 0.012 in (0.5 ± 0.3 mm) and a glass substrate of 0.105 ± 0.030 in (2.67 ± 0.76 mm); and without metallic frame (Type 28) or with metallic framing (Type 29 or 30).</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 28, 29 and 30, the allowable spread of flame of 6 feet (1.82 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 28 and 29, passing results using a C Brand shall be demonstrated. For Type 30, passing results using an A Brand shall be demonstrated.</p>
16.4.7		<p><i>New clause added;</i></p> <p>A Type 31, 32, 33 module or panel meets the following requirements:</p> <p>a) Construction: Glass superstrate of 0.09 ± 0.02 in (2.4 ± 0.4 mm); a polymeric encapsulant between the superstrate and cells with a pre-lamination thickness of 0.02 ± 0.012 in (0.5 ± 0.3 mm); either a polymeric encapsulant between the cells and substrate with a pre-lamination thickness of 0.02 ± 0.012 in (0.5 ± 0.3 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 pre-lamination total thickness equal to an encapsulant thickness of 0.02 ± 0.012 in (0.5 ± 0.3 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.</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 31, the allowable spread of flame of 6 feet (1.82 m) or less in 10 minutes. For Type 32, the allowable spread of flame is 13 feet (3.96 m) or less in 4 minutes. For Type 33, 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 using a C Brand. For Type 31, 32, and 33, passing results using a C Brand shall be demonstrated.</p>



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Table 16.1		Construction and fire performance for PV module types Table 16.1 has been greatly modified (see standard for details).
		CUSTOMERS PLEASE NOTE: 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.