



# ENERGY STAR® Program Requirements for Lamps

## Ambient Temperature Life Test Method

September-2015

---

### 1 OVERVIEW

The following test method shall be used for determining product compliance with the Lumen Maintenance and Rated Life requirements in the ENERGY STAR Eligibility Criteria for Lamps.

### 2 APPLICABILITY

The Ambient Temperature Life Test (ATLT) applies to all decorative solid-state lighting (SSL) lamps, omnidirectional SSL lamps <10 watts (W), all SSL lamps labeled “not for use in recessed fixtures,” and all omnidirectional SSL lamps labeled “not for use in enclosed fixtures”.

### 3 DEFINITIONS

All terms used in this document are consistent with the definitions in the ENERGY STAR Eligibility Criteria for Lamps.

### 4 METHODS OF MEASUREMENT AND REFERENCE DOCUMENTS

#### 4.1 IES Test Methods and Reference Documents

- A) IES LM-65-14. 2014. IES Approved Method for Life Testing of Compact Fluorescent Lamps, Illuminating Engineering Society, New York.
- B) IES LM-79-08. 2008. IES Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products, Illuminating Engineering Society, New York.
- C) IES LM-54-12. 2012. IES Guide to Lamp Seasoning, Illuminating Engineering Society, New York.
- D) IES LM-28-12. 2012. Guide for the Selection, Care, and Use of Electrical Instruments in the Photometric Laboratory, Illuminating Engineering Society, New York.

#### 4.2 CIE Reference Document

- A) CIE-18.2.1983. 1983. The Basis of Physical Photometry, Commission Internationale de l'Eclairage, Bureau Central de la CIE, Vienna.

## 5 TEST SETUP

- A) Test Setup and Instrumentation: Test setup and instrumentation for the lamp operation portions of this procedure shall be in accordance with the requirements of IES LM-65-14, unless otherwise noted in this document. In the event of conflicting requirements, the ENERGY STAR test method shall take precedence.
- B) Lamp Seasoning: LED lamps shall not be seasoned.
- C) Input Power for Photometric Measurements: During the stabilization and photometric testing of products intended to be powered from AC mains, the product shall be connected to a voltage source that meets the requirements in IES LM-79-08.
- D) Input Power During Aging: During the product ON time between photometric measurement points, products intended to be powered from AC mains shall be connected to a voltage source that meets the requirements in IES LM-65-14. When selecting a power supply for use with integrated lamps, it is necessary to apply the appropriate power factor when specifying the volt-amp capacity of the power supply.
- E) Ambient Temperature: Ambient temperature shall be as stated in the specification for the duration of the test. Temperature measurements shall be taken using a temperature measurement device consisting of a thermocouple junction or resistance temperature detector (RTD) probe combined with an appropriate meter. Thermocouples or probes shall be chosen to ensure accuracy within the test temperature range.
- F) Power Meter: Power meters shall be capable of measuring to the appropriate requirements of IES LM-79-08.
- G) Environmental Conditions: The test environment shall be clean and free from large amounts of dust and moisture. During the lamps' ON cycle, drafts shall be minimized.
- H) Sample Selection: Samples shall be representative of the manufacturer's typical product. The samples shall be clean and thoroughly inspected before testing. Any flaws or inconsistencies in the lamp samples shall be noted.

## 6 TEST CONDUCT

- A) Photometric Measurements:
  - 1) For integrating sphere measurements, refer to IES-LM-79-08.
  - 2) For non-integrating sphere measurements, the photodetector used for photometric measurements shall be a silicon detector corrected to closely fit the Commission Internationale de l'Eclairage (CIE) spectral luminous efficiency curve ( $V_{\lambda}$ ).

- B) Lamp Monitoring:

The lamps shall be monitored for continuous operation in accordance with IES LM-65-14, section 6.5.

- C) Operating Cycle:

LED lamps may be operated continuously.

## 7 TEST PROCEDURE

### A) Lamp Installation

Install the lamp in the ambient temperature situation per the test method below.

### B) Initial Measurement:

Conduct measurement of each lamp following the procedures set forth in IES LM-79-08 (hours = 0 for LED lamps). Record the results obtained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

### C) Additional Measurements:

Conduct additional photometric measurements as necessary per the ENERGY STAR requirements for section 10.1 – Lumen Maintenance Requirements in the ENERGY STAR Eligibility Criteria for Lamps.

## 8 AMBIENT TEMPERATURE LIFE TEST

### 8.1 Ambient Conditions

The ambient temperature around the housing shall be maintained at the temperature designated in the Supplemental Testing Guidance for section 10.1 – Lumen Maintenance Requirements in the ENERGY STAR Eligibility Criteria for Lamps during the ON cycle.

### 8.2 Ambient Temperature Housing and Support

- A) The lamps may be burned in open air in the required testing orientation so long as the required ambient temperature is maintained.
- B) The spacing between lampholders shall be such that there is a minimum 2" spacing between lamps.

### 8.3 Temperature Measurement Locations

- A) If burned in open air, the testing area shall be equipped with at least four ambient temperature measurement devices.
- B) These devices shall be placed in at least two locations between 16 and 24 inches measured inwards from the perimeter of the testing area and at least two locations between 16 and 24 inches measured outwards from the center of the testing area.
- C) The operating temperature of the testing area is defined as the average of at least four temperature readings within the testing area.
- D) The measurement point shall be located at the height of the lamps under test.

## 9 TEST REPORT

ATLT report data may be included in an overall performance report or a stand alone report, and shall include the following test information:

- A) Manufacturer's name and product identification
- B) Name and location of testing facility
- C) Name of person(s) performing the test
- D) Test dates

- E) Photometric and electrical measurements at the appropriate intervals
- F) Operating temperature
- G) Lamp operating orientation
- H) Operating duration
- I) As applicable, number of hours of operation before failure or note that the lamp reached rated life
- J) Notes describing any non-lumen maintenance failure (e.g. envelope failure, broken glass, cracking, failed LEDs or excessive discoloration) of any lamp that completes testing.