



# ENERGY STAR® Program Requirements For Lamps and Luminaires

## Run-Up Time Test Method

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### 1 OVERVIEW

The following test method shall be used for determining product compliance with run-up time requirements in the ENERGY STAR Eligibility Criteria for Lamps and the ENERGY STAR Eligibility Criteria for Luminaires.

### 2 APPLICABILITY

This run-up time test method applies to all integrated and externally ballasted compact fluorescent lamps (CFLs) except those in products seeking ENERGY STAR certification as an outdoor luminaire.

### 3 DEFINITIONS

Unless otherwise specified below, all terms used in this document are consistent with the definitions in the Specifications for Lamps and Luminaires.

**Run-Up Time:** The time between the application of power to the device and the time when the light output first reaches a specified percentage of stable light output, e.g., t80%, t90%, etc.

### 4 METHODS OF MEASUREMENT AND REFERENCE DOCUMENTS

- A) IES LM-66-14: 2014. IES Approved Method for Electrical and Photometric Measurements of Single-Based Compact Fluorescent Lamps, Illuminating Engineering Society, New York.
- B) IES LM-54-12: 2012. IES Guide to Lamp Seasoning, Illuminating Engineering Society, New York.

### 5 TEST SETUP

A) Test Setup and Instrumentation:

- 1) Regulated AC or DC power supply (as applicable to the lamp)
- 2) Integrating sphere, cube, or similar device and associated equipment
- 3) Means of recording light output vs. time (i.e., computer sampling or digital recorder) in one second intervals or less such as an oscilloscope or photometer
- 4) Photodetector

- B) Seasoning and Preburning: Prior to the first readings, compact fluorescent lamps (CFL) shall be seasoned for 100 hours in accordance with IES LM-54-12. CFLs shall be preburned in accordance with IES LM-66-14.
- C) Input Power for Run Up Measurements: The power requirements shall be per IES LM-66-14. When selecting a power supply for use with integrated lamps, it is necessary to apply an appropriate power factor when specifying the Volt-Amp capacity of the power supply.
- D) Storage: After seasoning (as applicable), lamps shall be stored at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for a minimum of 16 hours prior to the test. CFL lamp and ballast (if applicable) samples shall be off for 20 hours  $\pm$  4 hours prior to the test. If the CFL lamp and ballast sample has been off more than 24 hours, it shall be operated for 3 hours and then turned off for 20 hours  $\pm$  4 hours prior to testing.
- E) Ambient Temperature: Testing shall take place in an ambient temperature of  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . Drafts shall be minimized.
- F) Power Meter: Power meters shall be capable of measuring to the appropriate requirements of IES LM-66-14.
- G) Environmental Conditions: The test environment shall be clean and free from large amounts of dust and moisture.
- H) Orientation: Test samples in orientation(s) as specified by the ENERGY STAR specification or manufacturer specified position if different.
- I) 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-66-14.
  - 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 Transfer and Stabilizations for CFLs:
  - 1) CFLs and ballasts (if applicable) shall be stored per requirements in section 5D Storage (above) before being transported to the run up testing equipment. Care shall be exercised to maintain lamp orientation and avoid shaking or bumping the lamp during the transfer from seasoning. All lamps shall be stabilized per IES LM-66-14.

## 7 TEST PROCEDURES

For a relative measurement, the test chamber does not need to be an integrating sphere, and may be something less sophisticated such as a cube or other shaped chamber. For an absolute measurement of luminous flux over time, an integrating sphere is required.

- A) Test samples in orientation(s) as specified by the ENERGY STAR specification or manufacturer specified position if different or restricted.
- B) Set power supply to rated voltage and frequency of the device. If a range is specified, test sample at the midpoint of the range.

- C) Randomly select sample from available lamps.
- D) Place lamp in integrating sphere, cube, dodecahedron, or similar device that eliminates extraneous light. The ballast or driver may be external to the test environment, if applicable.
- E) Apply rated voltage/frequency to the device.
- F) Record light output reading in no greater than one second intervals until the light output has stabilized.
- G) Record full stabilization time and value.
- H) Determine desired run-up characteristic, e.g., t80%, t90%, etc. from the data.

## **8 TEST REPORT**

Run-Up Time Test report data may be included in an overall performance report or a standalone report, and shall include the following test information:

- A) Lamp and Ballast (if applicable) manufacturer's name and product identification
- B) Name and location of testing facility
- C) Test date
- D) Lamp base orientation
- E) Test voltage (V)
- F) Test frequency (Hz)
- G) Percentage of stable light output tested to
- H) Waveform on which the run up time is based
- I) Stabilized light output
- J) Stabilization time
- K) Run-up light output
- L) Run-up time (S)