



ENERGY STAR® Program Requirements

Product Specification for Lamps:

Run-Up Time

Draft Test Method

Rev. Jan-2013

1 OVERVIEW

This document provides a description of the test method for determining run-up of integrated compact fluorescent lamps (CFLs or lamps) in an ambient air temperature environment.

2 APPLICABILITY

ENERGY STAR test requirements are dependent upon the product, category of the product under evaluation. The following guidelines shall be used to determine the applicability of each section of this document:

- **The run-up time test method applies to all CFLs included in the specification.**
- The test procedures in Section 7 shall be performed on products that are required to undergo the ENERGY STAR Run Up Test.

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions in the ENERGY STAR Eligibility Criteria for Lamps.

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, i.e., t80%, t90%, etc.

4 METHODS OF MEASUREMENT AND REFERENCE DOCUMENTS

4.1 IES Test Methods and Reference Documents

- A) IES LM-66-11: 2011. IES Approved Method for Electrical and Photometric Measurements of Single-Ended 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

5.1 General

- A) Test Setup and Instrumentation: The equipment required for the Run Up Test is as follows:
- 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
 - 4) Photodetector
- B) Lamp 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-66-11. CFLs shall be seasoned and preburned in the position that the lamps will undergo lumen maintenance testing.
- C) Input Power for Run Up Measurements: The power requirements shall be per IES LM-66-11. Note: When selecting a power supply for use with integrated lamps, it is necessary to apply an appropriate power factor when specifying the Volt-Amp rating of the power supply. Many integrated lamps have a power factor in the range of 0.5 to 0.6.
- D) Ambient Temperature: Lamps shall be stored at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for a minimum of 24 hours prior to the test, and testing shall take place in an ambient temperature of $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. Drafts shall be minimized.
- E) Power Meter: Power meters shall be capable of measuring to the appropriate requirements of IES LM-66-11.
- F) Environmental Conditions: The test environment shall be clean and free from large amounts of dust and moisture. CFL samples shall be off for 20 hours \pm 4 hours prior to the test. If the 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.
- G) Orientation: Test samples in orientation(s) as specified by the ENERGY STAR specification or manufacturer specified position if different.
- 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

6.1 Guidance for Implementation Run Up Test Procedure

A) Photometric Measurements:

- 1) For integrating sphere measurements, refer to IES LM-66-11.
- 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 Stabilization, Transfer and Re-stabilizations for CFLs:

- 1) CFLs shall be stored per requirements in the Environmental Conditions section 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. All lamps shall be re-stabilized prior to taking photometric measurements.

7 TEST PROCEDURES FOR ALL PRODUCTS

7.1 General Test Procedures

- 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.

7.2 Test Procedure Method 1 – Relative Method

Method 1 requires the sample to be in the test chamber until it stabilizes. As method 1 is 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.

- A) Place lamp in integrating sphere, cube, dodecahedron, or similar device that eliminates extraneous light.
- B) Apply rated voltage/frequency to the device.
- C) Record light output in no greater than one second intervals until the light output has stabilized.
- D) Record stabilization time.
- E) Determine desired run-up characteristic, i.e., t80%, t90%, etc. from the data.

7.3 Test Procedure Method 2 – Absolute Method

Method 2 requires a short test once the stable lumens are known, but an integrating sphere is required, as an absolute lumen comparison is being made.

- A) Place lamp in an integrating sphere.
- B) Apply rated voltage/frequency to the device.
- C) Record light output in no greater than one second intervals for the time to reach the specified percentage of measured, stable light output, i.e., t80%, t90%, etc.
- D) Determine desired run-up characteristic (i.e., t80%, t90%, etc.) by comparing the data with the measured, stable luminous flux.

8 TEST REPORT FOR ALL PRODUCTS

Run-Up Time Test (RUTT) report data may be included in an overall performance report or a standalone report, and shall include the following test information: Manufacturer's name and product identification

- A) Name and location of testing facility
- B) Test date
- C) Lamp base orientation
- D) Test voltage (V)
- E) Test frequency (Hz)
- F) Percentage of stable light output tested to
- G) Waveform on which the run up time is based
- H) Stabilized light output
- I) Run-up light output
- J) Run-up time (S)