

SEMI D47-0307

TEST METHOD FOR MEASUREMENT OF BENT COLD CATHODE FLUORESCENT LAMPS

This standard was technically approved by the global Flat Panel Display Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on November 21, 2006. It was available at www.semi.org in February 2007 and on CD-ROM in March 2007.

1 Purpose

1.1 The purpose of this document is to standardize the method for measurement of electrical and optical characteristics of bent cold cathode fluorescent lamp (CCFL).

2 Scope

2.1 This method is to be used by CCFL suppliers and users to evaluate quality of products as well as items under development.

2.2 This method shall be used in general for CCFL to measure the initial characteristics of CCFL (single item) and its reliability after tests, and to carry out quality inspection for incoming and outgoing CCFLs.

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents

3.1 SEMI Standard

SEMI D35 — Test Method for Measurement of Cold Cathode Fluorescent Lamp (CCFL) Characteristics

3.2 JIS Standard¹

JIS Z 8113 — Lighting vocabulary

3.3 IEC Standards²

IEC 60050 (845) — Lighting, Section (1: Radiation, Quantities and Units, 3: Colorimetry)

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Terminology

4.1 Abbreviations and Acronyms

4.1.1 CCFL — Cold Cathode Fluorescent Lamp

4.2 Definitions

4.2.1 *L-shaped lamp* — a CCFL which has two sides bent at one point to an angle of 90°.

4.2.2 *flat type U-shaped lamp* — a CCFL which has three sides bent at two points to an angle of 90°, of which two sides face each other.

4.2.3 *R type U-shaped lamp* — a CCFL which has a round part at the middle and two sides face each other.

5 Summary of Method

5.1 Warm up the measuring equipment for a specified period of time to stabilize (according to the instruction manual of measuring equipment).

5.2 Keep the lamp wall temperature of a CCFL and the ambient temperature in equilibrium. The ambient temperature shall be stable.

5.3 Set the CCFL on the measuring equipment.

5.4 Adjust the point of measurement (viewing angle), focus and distance.

1 Japanese Standards Association, 1-24, Akasaka 4 Chome, Minato-Ku, Tokyo, 107-8840 Japan. Telephone: 81.3.3583.8000; Website: <http://www.jsa.or.jp>

2 International Electrotechnical Commission, 3, rue de Varembé, Case Postale 131, CH-1211 Geneva 20, Switzerland. Telephone: 41.22.919.02.11; Fax: 41.22.919.03.00; Website: <http://www.iec.ch>

- 5.5 Measure the stable discharge voltage.
- 5.6 Turn on the CCFL by applying a rated current and measure the lamp current when it is stable.
- 5.7 Measure the lamp voltage when the rated lamp current is stable.
- 5.8 Measure the luminance and chromaticity when the rated lamp current is stable.
- 5.9 Turn off the CCFL and remove it from the measuring equipment.
- 5.10 Refer to SEMI D35 regarding the measurement of the effective emission area and luminance stabilization time.

6 Apparatus

- 6.1 *Bent CCFL Measurement* — See Figure 1 for Diagram for Measurement of Optical Characteristics.
- 6.2 Others should be pursuant to SEMI D35.

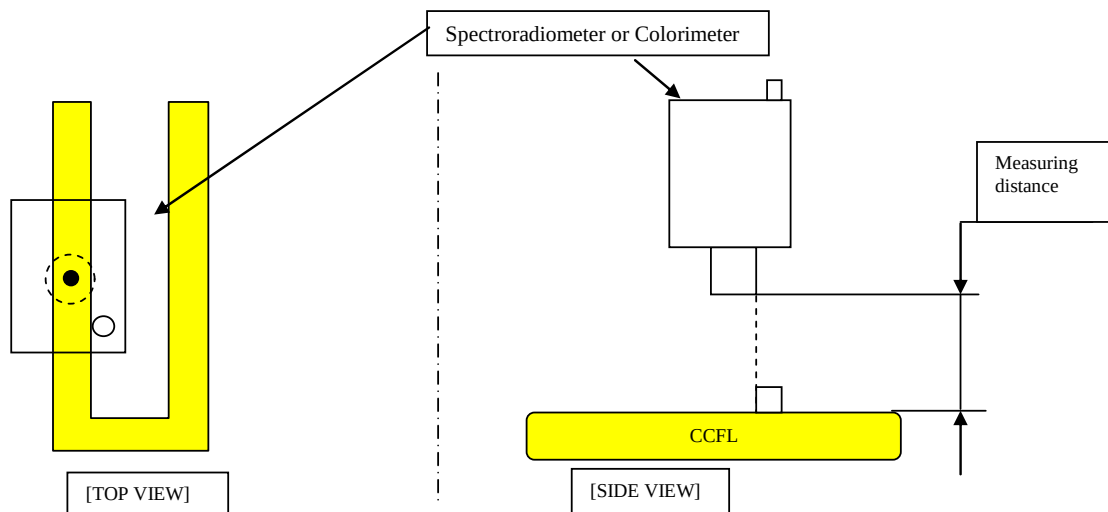


Figure 1
Diagram for Measurement of Optical Characteristics (Example: Flat Type U-shaped Lamp)

7 Measurement Conditions

7.1 To eliminate measurement error due to uneven temperature distribution, bent CCFL should be horizontally placed, and, a spectroradiometer or colorimeter should be placed above the CCFL to measure it from the top (see Figure 1).

8 Specimen

8.1 Pursuant to SEMI D35.

9 Measurement Procedure

9.1 *Measurement Point* — The point is the side surface of a bent CCFL, which is within the range of viewing angle (black circle) of a measuring instrument. Locations to be measured are two points, center of each side, for L-shaped lamp; three points, center of each side, for flat type U-shaped lamp; and two points, center of each side, for R type U-shaped lamp (see Figure 2). The point of measurement shall be so small relative to the inner diameter of the lamp that the dislocation of the point may not vary the luminance and chromaticity. The point of measurement is a cylindrical surface but it could be regarded as a plain surface due to the smallness (see SEMI D35). The dispersion due to dislocation of a point of measurement is smaller within the range that is less than or equal to 50% of the inner diameter. The luminance decreases in the other range. Others should be pursuant to SEMI D35.