



Approved Method: **Electrical and Photometric Measurement of Fluorescent Lamps**

IES Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps

Publication of this Approved
Method has been approved
by the IES. Suggestions for revision
should be directed to the IES

**Prepared by:
The Subcommittee on Photometry of Light Sources
of the IES Testing Procedures Committee**

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FOREWORD

This Approved Method is a revision of IESNA LM-9-99, *IESNA Approved Method for the Electrical and Photometric Measurement of Fluorescent Lamps*. In addition to linear fluorescent lamps this Method covers all U- and circular-shaped fluorescent lamps. Significant changes have been made to update information, to give clearer guidelines for test requirements and to promote uniformity in measurement procedure.

INTRODUCTION

The fluorescent lamp is an electric discharge source in which light is produced predominantly by fluorescent powders activated by ultraviolet energy generated by a mercury arc. Like most electric discharge lamps, fluorescent lamps must be operated either in series with a current limiting device or from an electronic circuit. This device, commonly called electromagnetic or electronic ballast, limits the arc current to the value for which each lamp type is designed. The ballast in conjunction with the appropriate power source provides the required starting and operating lamp voltages. These methods are applicable to lamps having hot cathodes and to lamps of the cold cathode variety.

For special purposes, it may be desirable to determine the characteristics of lamps when they are operated at other than the standard conditions described in this Approved Method. Where this is done, such results are meaningful only for the particular conditions under which they were obtained and these conditions shall be stated in the test report.

The photometric information usually required is total luminous flux (lumens), luminous intensity (candelas) in one or more directions, and color. For the purpose of this Approved Method, the determination of these data will be considered photometric measurements.

The electrical characteristics usually measured are line voltage, lamp voltage, lamp current, and lamp power. In the case of rapid start lamps, the power measurements may include both the arc watts and the cathode power. Arc watts is the power consumed by the lamp discharge only and is exclusive of any power that may be supplied to the lamp cathodes from a separate voltage source. Total lamp power will be the sum of arc watts and cathode watts. For the purpose of this Approved Method, the determination of these data will be considered electrical measurements.

1.0 SCOPE

This Approved Method describes the procedures to be followed and the precautions to be observed in obtaining uniform and reproducible measurements of the electrical and photometric characteristics of fluorescent lamps under standard conditions in 60 Hz, alternating current circuits and under high frequency conditions (reference high frequency circuits are operated at 25 kHz). Single-ended compact fluorescent lamps are covered in LM-66¹ and are excluded from this procedure.

2.0 NORMATIVE REFERENCES

The most current versions of:

- American National Standards Institute, *American National Standard for Lamp Ballasts – Reference Ballasts for Fluorescent Lamps*, ANSI C82.3. New York, NY: ANSI.
- American National Standards Institute, *American National Standard for Electric Lamps: Fluorescent Lamps – Guide for Electrical Measurements*, ANSI C78.375. New York, NY: ANSI.
- American National Standards Institute, *American National Standard for Electric Lamps, Double-Capped Fluorescent Lamps – Dimensional and Electrical Characteristics*, ANSI C78.81. New York, NY: ANSI.
- Subcommittee on Photometry of Light Sources of the IES testing Procedures Committee, *IESNA Guide to Lamp Seasoning*, LM-54. New York, NY: Illuminating Engineering Society of North America.

3.0 NOMENCLATURE AND DEFINITIONS

The units of electrical measurement used in this approved method are the *volt*, the *ampere*, and the *watt* (see the *IESNA Lighting Handbook*, Ninth Edition²). The units of photometric measurement are the *lumen* and the *candela* (see ANSI/IESNA RP-16-05¹⁸ or the *IESNA Lighting Handbook*²). Color is specified in terms of CIE recommended systems.^{2, 3} The industry-accepted point for making an initial rating of a discharge lamp occurs after the lamp's first 100 hours of operation (ANSI C78.81).

The *cold chamber* or *cold spot* is the location inside a fluorescent lamp with the lowest operating temper-