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FOREWORD

This approved method is a revision of IESNA LM-45-00, IESNA Approved Method for the Electrical and Photometric Measurements of General Service Incandescent filament Lamps. Changes have been made to update information, to give clearer guidelines for requirements and to promote uniformity in measurement procedure. Measurement of incandescent reflector lamps is not included in this approved method.

INTRODUCTION

Incandescent filament lamps produce radiant power as a result of electric current passing through a tungsten filament, which is surrounded by an inert atmosphere or vacuum within a glass or quartz envelope. Some lamps contain halogens that are employed to maintain a clean bulb wall. Such lamps may also employ bulb coatings that redirect infrared energy back to the filament for improved efficacy or to filter radiation for color control.

As long as the filament remains intact, current will flow, heating the filament to incandescence. Since the desired incandescence occurs at high filament temperatures, the surface of the tungsten filament is continually vaporized during lamp operation. As a result, the filament wire diameter is non-uniformly decreased along its length until, at some point, the high current density causes excessive local heating and vaporization, which causes the filament to fail. The rate of evaporation is dependent on the local filament temperature, plus gas density and pressure.

Incandescent filament lamps are typically affected by variables such as operating cycle, conditions imposed by the fixture, orientation and vibration. In general, the test conditions should not diverge widely from conditions of service. Practical considerations require that any test conditions and programs be designed to give comparable results when used by various laboratories. The recommendations of this IES Approved Method have been made with these objectives in mind.

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. All such non-standard operating 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 purposes of this approved method, the determination of these data will be considered photometric measurements.

The electrical characteristics usually measured are lamp current, lamp voltage, and lamp power. Incandescent filament lamps are usually measured on DC and the power can be calculated from voltage and current. 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 performing uniform and reproducible measurements of the electrical and photometric characteristics of general service incandescent filament lamps under standard conditions.

2.0 NORMATIVE REFERENCES

Most current versions of:

- LM-54, Subcommittee on Photometry of Light Sources of the IES Testing Procedures Committee, *IESNA Guide to Lamp Seasoning*. New York: Illuminating Engineering Society of North America.

- LM-78, Subcommittee on Photometry of Light Sources of the IES testing Procedures Committee, *IESNA Approved Method for Total Luminous Flux Measurement of Lamps Using an Integrating Sphere Photometer*, New York: 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. The units of photometric measurement are the lumen and the candela.[1] Color is specified in terms of CIE recommended systems.[2,3,1]