



Approved Method: **Life Testing of
Incandescent
Filament Lamps**

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**IES Approved Method
For Life Testing of
Incandescent Filament Lamps**

Publication of this Committee
report has been approved by IES.
Suggestions for revision should
be directed to IES.

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

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**Prepared by the Subcommittee on Photometry of Light Sources of the
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FOREWORD

This approved method is one of a continuing series of IES Approved Methods, which are written to further greater uniformity in testing among various laboratories. It addresses life testing of incandescent lamps. This document is an update to IESNA LM-49-01.

INTRODUCTION

This guide describes the procedures by which incandescent lamps can be operated under controlled conditions to obtain optimally comparable data on individual lamp life, changes in light output, and other parameters that vary during the life of the lamp.

This document covers general service incandescent lamps, tungsten halogen and series airport markers and street lighting lamps. Not included are automotive, miniature and sub-miniature, photo-optic lamps, and other special types. This approved method covers life testing of incandescent lamps at rated voltage or rated current.

Incandescent 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 envelope. Some lamps contain halogens that are employed to maintain a clean bulb wall. They may also employ thin coatings that redirect infrared radiation back to the filament to improve efficacy or that filter visible 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 vaporization is dependent on the local filament temperature, plus gas density and pressure.

It is often important to know the light output, efficacy, and lamp lumen maintenance along with the life of these lamps. **Annex A** to this document discusses this issue. For information on the photometry of incandescent lamps, see reference 1.

1.0 SCOPE

This approved method describes the procedures to be followed and the precautions to be observed in obtaining uniform and reproducible measurements during life testing of incandescent filament lamps under standard conditions.

2.0 NORMATIVE REFERENCES

No Normative References

3.0 NOMENCLATURE AND DEFINITIONS

Refer to ANSI/IES RP 16-10, *Nomenclature and Definitions for Illuminating Engineering*

- a) The units of electrical measurement used in this approved method are the volt, the ampere, and the watt.
- b) Life of a test lamp refers to the actual operating time of the lamp until failure, expressed in hours, and shall not include any off time.
- c) Lamp failure refers to the point where a lamp stops operating. Other lamp failures, such as manufacturing defects are reported but not included in the calculation of lamp life.
- d) Regulation refers to the constancy of the voltage or current applied to the lamp under test.
- e) Seasoning refers to initial operation of the test lamp. Photometric data obtained immediately after seasoning are referred to as initial or rated data.
- f) Life test rack refers to a suitable framework or supporting mediums where a multitude of lamp testing positions or lamp holders are located.
- g) Rated lamp life is the life value assigned to a particular type lamp. This is commonly a statistically determined estimate of the median life. For life rating, the applicable definition of median is the total operating time at which under normal operating conditions, 50 percent of any large group of initially installed lamps is expected to be still operating. See reference 2.