INTERNATIONAL STANDARD

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2005-05

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Tungsten filament lamps for domestic and similar general lighting purposes – Performance requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND SIMILAR GENERAL LIGHTING PURPOSES – PERFORMANCE REQUIREMENTS

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International Standard IEC 60064 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

This consolidated version of IEC 60064 consists of the sixth edition (1993) and its amendments 1(2000), 2(2002) et 3(2005).

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 6.3.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This edition of International Standard IEC 60064 introduces major technical and formatting changes. However, it maintains the basic requirements and compliance conditions.

The new technical coverage involves specifications for lamps with E26 caps and some lamp life ratings other than 1 000 h. General lighting service lamps with white finish are introduced, because they are becoming large factors in the Japanese and North American markets.

An editorial objective of this work has been to improve the groupings of certain types of information. An example is that all the requirements have been put into one section of the text, and moved toward the front due to their high importance. Similarly, all test procedures have been drawn together and put in an annex. Particular lamp specifications are now shown on specific lamp data sheets.

There are no changes in the guiding principles of whole production appraisal, nor in the separation of performance and safety requirements. Utilization of past experience, manufacturers' test data and reduced market samples for whole production appraisal were introduced in the fourth edition. The fifth edition introduced coverage of performance requirements only.

TUNGSTEN FILAMENT LAMPS FOR DOMESTIC AND SIMILAR GENERAL LIGHTING PURPOSES – PERFORMANCE REQUIREMENTS

Section 1: General

1.1 Scope

This International Standard applies to tungsten filament incandescent lamps for general lighting service (GLS) which comply with the safety requirements in IEC 60432-1 and having:

– rated wattage of 25 W to 200 W, inclusive;

– rated voltage 100 V to 250 V, including marked voltage range not exceeding ±2,5 % of the mean voltage[1)];

– bulbs of the A or PS shapes;

– bulbs with clear, frosted or equivalently coated finishes, or white finishes;

– caps B22d, E26 or E27.

Specific lamp types are covered in section 8.

This standard states the performance requirements for lamps, including test methods and means of confirming compliance with the requirements. Whole production appraisal methods regarding a lamp manufacturer's test record on finished products are defined. This method can be applied for certification purposes. Details of a batch test procedure, which can be used to make an assessment of specific batches, are included, but it is not suitable for certification purposes.

For some of the requirements given in this standard reference is made to "the relevant data sheet". For some lamps these data sheets are contained in this standard. For other lamps, falling under the scope of this standard, the relevant data are supplied by the lamp manufacturer or responsible vendor.

NOTE 1 A lamp used in China having a rated wattage 15 W and rated voltage 220 V is included.

NOTE 2 Separate references are made to E26/24 caps used in North America and E26/25 caps used in Japan. The two are not compatible.

1.2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

1) In countries in the process of changing from 220 V to 230 V nominal supply voltage, a range of ±3,5 % will apply temporarily.

IEC 60038:1983, *IEC standard voltages*

IEC 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders*

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3: Gauges*

IEC 60432-1:1993, *Safety requirements for incandescent lamps – Part 1: Tungsten filament lamps for domestic and similar general lighting purposes*

IEC 60630:1979, *Maximum lamp outlines for general lighting lamps*

IEC 60887:1988, *Glass bulb designation system for lamps*

1.3 General format

This standard is divided into several sections with self-descriptive titles. These sections are:

Section 1: General
Section 2: Lamp characteristics and specifications
Section 3: General, dimensional, electrical, photometric, and life requirements
Section 4: Conditions of compliance
Section 5: Sampling
Section 6: Principles of dimensioning
Section 7: Annexes
Section 8: Lamp data sheets

1.4 Bulb shape

Nomenclature for bulbs used as envelopes for lamps specified in this standard can be found in IEC Technical Report 60887: *Glass bulb designation system for lamps.*

1.5 Definitions

For the purpose of this International Standard the following definitions apply:

1.5.1 **type:** Lamps which, independent of type of cap, are identical in photometric and electrical characteristics.

1.5.2 **group:** Lamps of the same rated wattage, from the same lamp data sheet (normal or high luminous flux), whose rated voltage falls within the same voltage range (e.g. 100 V - 150 V; 200 V - 250 V).

1.5.3 **white finish:** A low-loss white bulb finish, usually applied internally, that provides diffused light.

1.5.4 **manufacturer:** An organization making lamps within the scope of this standard at one or more nominated factories, not necessarily in the same country, but having a common quality management.

1.5.5 **production:** The number of lamps, within the scope of this standard, manufactured in a factory within a 12-month period.

1.5.6 **total production:** The number of lamps, within the scope of this standard, manufactured in all the nominated factories of a single manufacturer within a 12-month period.

1.5.7 **whole production:** The production of all types of lamps within the scope of this standard manufactured during a period of 12 months and nominated in a list by the manufacturer for inclusion in any certificate provided by a certification authority.

1.5.8 **batch:** All the lamps of one type put forward at one time for test and for checking compliance.

1.5.9 **light centre length:** In the sense of this standard and where specified on a lamp data sheet, light centre length is the distance from the geometrical centre of the filament to the contact plate of the cap, including solder.

NOTE - This definition applies regardless of the type of cap used. A light centre length specification applies only to lamps with a clear finish.

1.5.10 **inspection test quantity (ITQ):** The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as to dimensional requirements.

1.5.11 **rating test quantity (RTQ):** The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as related to initial readings.

1.5.12 **life test quantity (LTQ):** The number of lamps to be tested with the intention of determining acceptability, either of the whole production or of the batch, as related to life.

1.5.13 **initial readings:** The photometric and electrical measurements made at the end of the ageing period.

1.5.14 **rated voltage:** Voltage or voltage range specified in the relevant lamp standard or assigned by the manufacturer or responsible vendor.

NOTE - If lamps are marked with a voltage range, it shall be interpreted that they are appropriate for use on any line voltage within that range.

1.5.15 **test voltage:** The rated voltage unless otherwise specified. If lamps are marked with a voltage range, the test voltage shall be taken as the mean of the voltage range unless otherwise specified.

1.5.16 **rated wattage:** Wattage specified in the relevant lamp standard or assigned by the manufacturer or responsible vendor.

1.5.17 **rated luminous flux (unit: lumen [lm]):** The lumen value declared by the manufacturer.

1.5.18 **lumen maintenance:** The ratio of luminous flux at 75 % of rated life to the initial luminous flux, expressed as a percentage.

1.5.19 **life:** The total time for which a lamp has been operated before it becomes useless, or to any other criterion of life performance laid down in this standard.

1.5.20 **rated life:** The life value specified on a lamp data sheet. Within the context of the life testing method of this standard, it represents the mean value of the truncated life distribution.

NOTE - Since the specified life test method of this standard is a truncated life test, all the lamps that may have been commercially rated relative to the arithmetic mean of full duration life tests must be rerated. The correction from arithmetic mean life to truncated mean life is based on statistical factors of the normal distribution. Considering the lower limit on individual lamp life of sub-clause 3.6.2 the statistical concepts of annex E and sensoring at 125 % of the truncated life rating, the truncated life rating is approximately 90 % of the arithmetic life rating. As an example, the E26 capped, 60 W HE lamp of data sheet 60064-IEC-1050 is a USA design with a commercial life rating of 1 000 h; its truncated life rating becomes 900 h.

1.5.21 **normal life test:** A life test wherein the lamps are operated at their rated voltage.

1.5.22 **accelerated life test:** A life test wherein the lamps are intentionally operated at a voltage above the rated voltage with results converted to equivalent life at rated voltage.

1.5.23 **truncated life test:** A censored life test wherein the test is terminated at a fixed point, 125 % of rated life.

Section 2: Lamp characteristics and specifications

2.1 Lamp characteristics and specifications

2.1.1 Lamp characteristics and specific performance limits are listed on the individual lamp data sheets. These data sheets are filed in section 8.

2.1.2 Each lamp data sheet defines a particular lamp "group" by listing the characteristics and limiting values that apply. The technical specifications on each sheet are: dimensions, minimum rated luminous flux, lumen maintenance, rated life, and information for luminaire design.

2.1.3 The sequence of the data sheets in section 8 is by wattage within the following subdivisions.

Category	Data sheet numbers
Lamps with E26 caps, rated life varying with rated wattage	1000 – 1999
Lamps with E26 caps, rated life 1 000 h	2000 – 2999
Reserve	3000 – 3999
Lamps with B22 caps, rated life 1 000 h	4000 – 4999
Lamps with E27 caps, rated life 1 000 h	5000 – 5999
Reserve	6000 – 6999

2.1.4 Numbering system for lamp data sheets

A lamp data sheet number is made up of four parts as follows:

– the first number represents the number of this publication (IEC 60064);
– the second part is the letter grouping "IEC";
– the third part is the basic data sheet number from the series in sub-clause 2.1.3;
– the fourth part is a number indicating the edition of the sheet.

NOTE – When amendments are made to data sheets, the affected pages are issued with an updated edition number. For example, if data sheet 60064-IEC-1050-1 were amended, the new issue would be numbered 60064-IEC-1050-2.

Section 3: General, dimensional, electrical, photometric, and life requirements

3.1 General

3.1.1 The lamps on which compliance with this standard is claimed shall comply with the requirements of IEC 60432-1.

3.1.2 Lamps shall be so designed that their performance is reliable in normal and accepted use. In general, this can be achieved by satisfying the requirements of this section (section 3).

3.1.3 Lamps shall be tested under the procedures of annex A, Test procedure.

3.2 Marking

Information identifying the finish of white lamps shall be either marked on the lamp or on the packaging.

3.3 Lamp dimensions

3.3.1 Lamps shall comply with the dimensional requirements specified on the appropriate lamp data sheet.

3.3.2 Lamps with E27 caps shall comply with the gauge for testing contact-making, sheet 7006-50 of IEC 60061-3

3.3.3 Lamps with E26 caps shall comply with the gauge for testing contact-making, sheet 7006-29 of IEC 60061-3.

3.4 Characteristics and tolerances of initial readings

3.4.1 Wattage

The initial wattage of individual lamps shall not exceed 104 % of the rated wattage specified on the relevant lamp data sheet plus 0,5 W.

3.4.2 Luminous flux initial

3.4.2.1 Rated luminous flux of the lamps shall not be less than the values shown on the relevant lamp data sheet.

3.4.2.2 The initial luminous flux readings of individual frosted, frosted equivalently coated or clear lamps shall not be less than 93 % of the rated luminous flux.

3.4.2.3 The initial luminous flux readings of individual white-coated lamps shall not be less than 90 % of the rated luminous flux.

3.5 Lumen maintenance

The lumen maintenance of individual lamps at 75 % of rated life shall be not less than the minimum value specified on the relevant lamp data sheet.

NOTES

1 For the compliance conditions of subclauses 4.1.2.6, 4.1.3.3 and 4.2.3, lamps that do not satisfy this requirement are treated as life failures.

2 In some countries, particularly North America, manufacturers' records may yield data at 70 % of rated life rather than the defined 75 % of rated life. This is due to long-established domestic and regulatory practices. Such data will have to be linearly extrapolated to the 75 % point.

3.6 Life test requirements

3.6.1 The truncated average life of a normal life test or the equivalent truncated average life of an accelerated life test, calculated by the method of subclause B.1.1 of annex B, shall be equal to or greater than the limits in subclause B.1.2, as related to rated life and the LTQ.

3.6.2 Individual lamps shall have a life of not less than 70 % of rated life.

Section 4: Conditions of compliance

4.1 Whole production of a manufacturer

Compliance is proven by satisfying the requirements of section 3 (general, dimensional, electrical, photometric, and life requirements) assessed on the following basis.

4.1.1 Pre-compliance testing for certification purposes

NOTE - For certification purposes a recommended pre-compliance test is given in annex C. Such a test provides temporary recognition of a supplier as explained in C.1.

4.1.2 Compliance of manufacturer's test data

4.1.2.1 The assessment shall be based on the test data in the manufacturer's records from all nominated factories under the common quality management, grouped together, meeting the requirements of subclause 4.1.2.3. For certification purposes, one certificate may cover all the nominated factories, but the Certification Authority shall have the right to visit each site, examine the local records and quality control procedures in respect of finished products.

4.1.2.2 For certification purposes, the manufacturer shall declare a list of lamp types and marks of origin which are to be within the scope of this standard, and this shall be taken to include all lamps so listed made by the manufacturer. Notifications of additions or deletions may be made at any time.

4.1.2.3 The whole production of a manufacturer shall be considered as satisfying the requirements of this standard if the conditions of subclauses 4.1.2.4, 4.1.2.5 and 4.1.2.6 are fulfilled for at least 75 % (rounded to the nearest whole number) of the total number of types, as selected in subclause 5.2.2, for which test data has been submitted.

4.1.2.4 Dimensions

A type from the whole production of a manufacturer shall be considered to comply if, for that type, the number of lamps in the manufacturer's records failing the dimensional requirements of clause 3.3 does not exceed the qualifying limit shown in table D.2, annex D. (This number of lamps is established from data supplied by the manufacturer.)

4.1.2.5 Initial readings

A type from the whole production of a manufacturer shall be considered to comply with the initial reading requirements, if for that type:

1) the number of lamps in the manufacturer's records whose wattage is above the limitation of subclause 3.4.1 does not exceed the value given in table D.3, annex D;

2) the number of lamps in the manufacturer's records having luminous flux values below the limitation of subclauses 3.4.2.2 or 3.4.2.3, does not exceed the value given in table D.3, annex D.