SLOVENSKI STANDARD
SIST EN 60901:2001

01-marec-2001

Nadomeġļa:
SIST EN 60901:1995

Single-capped fluorescent lamps - Performance specifications

Single-capped fluorescent lamps - Performance specifications

Einseitig gesockelte Leuchtstofflampen - Anforderungen an die Arbeitsweise

Lampes à fluorescence à culot unique - Prescriptions de performances

Ta slovenski standard je istoveten z: **EN 60901:1996**

ICS:

29.140.30 Fluorescenļne sijalke. Sijalke Fluorescent lamps. Discharge lamps

SIST EN 60901:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60901

April 1996

ICS 29.140.30

Supersedes EN 60901:1990 and its amendments

Descriptors: Lighting equipment, fluorescent lamp, lamp cap, safety, requirement

English version

Single-capped fluorescent lamps Performance specifications (IEC 901:1996)

Lampes à fluorescence à culot unique
Prescriptions de performances
(CEI 901:1996)

Einseitig gesockelte Leuchtstofflampen
Anforderungen an die Arbeitsweise
(IEC 901:1996)

This European Standard was approved by CENELEC on 1996-03-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 34A/588/FDIS, future edition 2 of IEC 901, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60901 on 1996-03-05.

This European Standard supersedes EN 60901:1990 and its amendments A1:1990 and A2:1993.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A, B, C and ZA are normative and annexes D and E are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 901:1996 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 50(845)	1987	International electrotechnical vocabulary (IEV) Chapter 845: Lighting	-	-
IEC 61-1 + supplements (mod)	1969	Lamp caps and holders together with gauges for the control of interchangeability and safety Part 1: Lamp caps	EN 60061-1 + amendments	1993
IEC 81	1984	Tubular fluorescent lamps for general lighting service	EN 60081[1]	1989
IEC 155	1993	Glow-starters for fluorescent lamps	EN 60155	1995
IEC 598-1 (mod)	1992	Luminaires Part 1: General requirements and tests	EN 60598-1	1993
IEC 921 (mod)	1988	Ballasts for tubular fluorescent lamps Performance requirements	EN 60921	1991
IEC 927	1988	Starting devices (other than glow starters) Performance requirements	EN 60927[2]	1990
IEC 929	1990	A.C. supplied electronic ballasts for tubular fluorescent lamps - Performance requirements	EN 60929[3]	1992
IEC 1199	1993	Single-capped fluorescent lamps Safety specifications	EN 61199	1994
IEC 1231	1993	International lamp coding system (ILCOS)	-	-

1) EN 60081 includes A1:1987 + A2:1988 to IEC 81.

2) EN 60927 includes the corrigendum December 1989 to IEC 927.

3) EN 60929 includes the corrigendum June 1991 to IEC 929.

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
901

Deuxième édition
Second edition
1996-02

Lampes à fluorescence à culot unique

Prescriptions de performances

Single-capped fluorescent lamps

Performance specifications

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE XJ

Pour prix, voir catalogue en vigueur
For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SINGLE-CAPPED FLUORESCENT LAMPS – PERFORMANCE SPECIFICATIONS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

International Standard IEC 901 has been prepared by sub-committee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
34A/588/FDIS	34A/634/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annexes A, B and C form an integral part of this standard.

Annexes D and E are for information only.

This second edition of IEC 901 cancels and replaces the first edition, published in 1987, amendment 1 (1989) and amendment 2 (1992). The main changes relate to:

- the removal of safety related items;
- the abandonment of the division into three sections;
- the introduction of new terminology;
- a new numbering of the lamp data sheets;
- the introduction of new lamp data sheets.

SINGLE-CAPPED FLUORESCENT LAMPS – PERFORMANCE SPECIFICATIONS

Section 1: General

1.1 Scope

This International Standard specifies the performance requirements for single-capped fluorescent lamps for general lighting service.

The requirements of this standard relate only to type testing. Conditions of compliance, including methods of statistical assessment, are under consideration.

The following lamp types and modes of operation with external ballasts are included:

a) lamps operated with an internal means of starting, having preheated cathodes, for operation on a.c. mains frequencies;

b) lamps operated with an external means of starting, having preheated cathodes, for operation on a.c. mains frequencies with the use of a starter, and additionally operating on high frequency;

c) lamps operated with an external means of starting, having preheated cathodes, for operation on a.c. mains frequencies without the use of a starter (starterless), and additionally operating on high frequency;

d) lamps operated with an external means of starting, having preheated cathodes, for operation on high frequency;

e) lamps operated with an external means of starting, having non-preheated cathodes, for operation on high frequency.

1.2 General statement

It may be expected that lamps which comply with this standard will start and operate satisfactorily at voltages between 92 % and 106 % of rated supply voltage and at an ambient air temperature of between 10 °C and 50 °C, when operated with a ballast complying with IEC 921 or IEC 929, where relevant with a starter complying with IEC 155 or IEC 927, and in a luminaire complying with IEC 598.

NOTE – For some lamps, additional information for high-frequency ballast design is given for proper starting at an ambient air temperature of –15 °C.

1.3 Normative references

The following normative documents contain provisions, which through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid normative documents.

IEC 50(845): 1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

IEC 61-1: 1969, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 81: 1984, *Tubular fluorescent lamps for general lighting service*

IEC 155: 1993, *Glow starters for fluorescent lamps*

IEC 598-1: 1992, *Luminaires – Part 1: General requirements and tests*

IEC 921: 1988, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 927: 1988, *Starting devices (other than glow starters) – Performance requirements*

IEC 929: 1990, *A.C. supplied electronic ballasts for tubular fluorescent lamps – Performance requirements*

IEC 1199: 1993, *Single-capped fluorescent lamps – Safety specifications*

IEC 1231: 1993, *International lamp coding system (ILCOS)*

1.4 Definitions

For definitions related to lighting, see IEC 50(845).

For the purpose of this International Standard, the following definitions apply.

1.4.1 **fluorescent lamp:** Discharge lamp of the low pressure mercury type, in which most of the light is emitted by one or several layers of phosphors excited by the ultra-violet radiation from the discharge.

1.4.2 **single-capped fluorescent lamp:** Fluorescent lamp having a single cap, for operation on external circuits with either an internal or an external means of starting.

1.4.3 **nominal value:** Approximate quantity value used to designate or identify a lamp.

1.4.4 **rated value:** Quantity value for a characteristic of a lamp for specified operating conditions. The value and the conditions are specified in this standard, or assigned by the manufacturer or responsible vendor.

1.4.5 **lumen maintenance:** Ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specified conditions. This ratio is generally expressed as a percentage.

1.4.6 **initial readings:** Starting characteristics of a lamp, measured before ageing, and the electrical, photometric and cathode characteristics of a lamp, measured at the end of the 100 h ageing period.

1.4.7 **conditioning period:** Time required after switching on a lamp to reach stabilization of the vapour pressure within the discharge tube.

1.4.8 **starting aid:** Conductive strip affixed to the outer surface of a lamp, or a conductive plate which is spaced within an appropriate distance from the lamp. A starting aid is usually connected to earth potential, and can only be effective when it has an adequate potential difference from one end of the lamp.

1.4.9 **reference ballast:** Special ballast, either inductive for lamps for operation on a.c. mains frequencies, or resistive for lamps for operation on high frequency. It is designed for the purpose of providing comparison standards for use in testing ballasts, for the selection of reference lamps and for testing regular production lamps under standardized conditions. It is essentially characterized by the fact that at its rated frequency, it has a stable voltage/current ratio which is relatively uninfluenced by variations in current, temperature and magnetic surroundings, as outlined in the relevant ballast standard.

1.4.10 **calibration current of a reference ballast:** Value of the current on which the calibration and control of the reference ballast are based.

1.4.11 **type test:** Test or a series of tests made on a type test sample for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard.

1.4.12 **type test sample:** Sample consisting of one or more similar units, submitted by the manufacturer or responsible vendor for the purpose of a type test.

1.5 Lamp requirements

1.5.1 *General*

A lamp, on which compliance with this standard is claimed, shall comply with the requirements of IEC 1199.

A lamp shall be so designed that its performance is reliable in normal and accepted use. In general, this can be achieved by satisfying the requirements of the following subclauses.

1.5.2 *Caps*

The dimensions of the cap on a finished lamp shall be in accordance with IEC 61-1.

1.5.3 *Dimensions*

The dimensions of a lamp shall comply with the values specified on the relevant lamp data sheet.

1.5.4 *Starting characteristics*

A lamp shall start fully within the time specified on the relevant lamp data sheet and remain alight.

Conditions and method of test are given in annex A.

1.5.5 *Electrical and cathode characteristics*

a) The initial reading of the voltage at the lamp terminals shall comply with the values specified on the relevant lamp data sheet.

b) The initial reading of the power dissipated by a lamp shall not exceed the rated wattage, specified on the relevant lamp data sheet, by more than 5 % + 0,5 W.

NOTE – Cathode watts due to supplementary heating are not included in the rated lamp wattage unless otherwise stated on the lamp data sheet.

c) For a lamp having preheated cathodes for operation on a.c. mains frequencies starterless circuits, the initial reading of the resistance of each cathode shall be not less than the minimum value specified on the relevant lamp data sheet.

d) For a lamp having preheated cathodes for operation on high frequency, the initial reading of the resistance of each cathode shall comply with the values specified on the relevant lamp data sheet.

Conditions and method of test are given in annex B.

1.5.6 *Photometric characteristics*

a) The initial reading of the luminous flux of a lamp shall be not less than 90 % of the rated value.

b) The initial reading of the chromaticity co-ordinates x and y of a lamp shall be within 5 SDCM (standard deviation of colour matching) from the rated values.

NOTE – See also the relevant annex on rated colour characteristics in IEC 81.

c) The initial reading of the general colour rendering index Ra of a lamp shall be not less than the rated value decreased by three.

Conditions and method of test are given in annex B.

1.5.7 *Lumen maintenance*

The lumen maintenance of a lamp, at any time in its life, shall be not less than 90 % (under consideration) of the rated value.

Conditions and method of test are given in annex C.

1.5.8 *Radio interference suppression (RIS)*

A lamp with an internal starter shall contain means to aid in the suppression of radio interference, the effect of which shall be equivalent to that of the RIS capacitor prescribed in IEC 155.

1.5.9 *Marking*

The following information shall be marked on a lamp:

a) the nominal wattage

NOTE – If necessary for proper identification, additional information should be added (for example the nominal tube diameter in millimetres).

b) a further identification which defines, with the aid of information made available by the manufacturer or responsible vendor, the electrical and photometric characteristics of a lamp.

1.6 Information for ballast and starter design

Refer to the relevant lamp data sheet and to annex D for information for ballast and starter design.

1.7 Information for luminaire design

Refer to the relevant lamp data sheet and to annex E for information for luminaire design.

Annex A
(normative)

Method of test for starting characteristics

A.1 General

Tests shall be made in a draught-free atmosphere at an ambient temperature of between 20 °C and 27 °C and a relative humidity of 65 % maximum.

Metallic parts and wires in the vicinity of the lamp, except starting aids when required, shall be avoided as far as possible.

Immediately prior to the starting test the lamps shall be kept inoperative and in an ambient temperature of between 20 °C and 27 °C and a relative humidity of 65 % maximum for a period of at least 24 h.

A.2 Lamps having preheated cathodes for operation on a.c. mains frequencies with an internal or external starter

A.2.1 *Test circuit*

Lamps shall be tested with a 50 Hz or 60 Hz supply in the circuits shown in:

- figure A.1 for lamps with internal starter;
- figure A.2 for lamps with external starter.

A.2.2 *Ballast*

The ballast used shall comply with the requirements of IEC 921. It shall be rated as specified on the relevant lamp data sheet.

When the ballast, at its rated voltage, is associated with a test lamp, the lamp shall dissipate a power which does not differ from its rated value by more than 4 %. A test lamp is a lamp whose voltage at lamp terminals does not deviate by more than 2 % from its rated value, when operated with its reference ballast.

The preheating current, when measured at 90 % of rated ballast voltage, shall be between 1,1 and 1,2 times the rated lamp current. To obtain a value of the preheating current within this range, it may be necessary either to make a special selection from among commercial ballasts, or else to design and manufacture a ballast for this specific purpose. In some cases, it may be possible to bring the preheating current down to be within this range by adding resistance in series with the starter.

NOTE – In some cases, the ballast may include an autotransformer to increase (or reduce) the voltage to the proper value for the starting and operation of the lamp. Ballasts incorporating step-up transformers are particularly likely to be used in countries where 120 V or 100 V power systems predominate.