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SIST EN 60901:2001/A5:2012

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60901/A5**

May 2012

ICS 29.140.30

English version

**Single-capped fluorescent lamps -  
Performance specifications  
(IEC 60901:1996/A5:2011)**

Lampes à fluorescence à culot unique -  
Prescriptions de performances  
(CEI 60901:1996/A5:2011)

Einseitig gesockelte Leuchtstofflampen -  
Anforderungen an die Arbeitsweise  
(IEC 60901:1996/A5:2011)

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**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 34A/1506/FDIS, future edition 2 of IEC 60901:1996/A5, prepared by SC 34A, "Lamps", of IEC/TC 34, "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60901:1996/A5:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-11-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-12-28

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IEC 60901

Edition 2.0 2011-11

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

AMENDMENT 5  
AMENDEMENT 5

Single-capped fluorescent lamps – Performance specifications

Lampes à fluorescence à culot unique – Prescriptions de performances

[SIST EN 60901:2001/A5:2012](https://standards.iteh.ai/catalog/standards/sist/114ef683-5e1e-4f94-883f-c51fccbcb43a/sist-en-60901-2001-a5-2012)

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## FOREWORD

This amendment has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

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

FDIS	Report on voting
34A/1506/FDIS	34A/1514/RVD

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

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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**INSTRUCTIONS POUR L'INSERTION DES  
NOUVELLES PAGES ET FEUILLES  
DE CARACTÉRISTIQUES DANS LA  
PUBLICATION 60901**

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1. Retirer la page I-7 et insérer la nouvelle page I-7.
2. Retirer la page II-3a et insérer la nouvelle page II-3a.
3. Retirer la page II-5a et insérer la nouvelle page II-5a.
4. Retirer la page B-1 and insérer les nouvelles pages B-1 and B-1a.
5. Retirer la page C-1 and insérer la nouvelle page C-1.
6. Retirer la page D-1 and insérer la nouvelle page D-1.
7. Remplacer les feuilles de caractéristiques :  
1016-1 (page 2) avec 1016-2 (page 2)  
1028-1 (page 2) avec 1028-2 (page 2)  
3010-1 (page 2) avec 3010-2 (page 2)  
3016-1 (page 1) avec 3016-2 (page 1)  
3016-1 (page 2) avec 3016-2 (page 2)  
3021-1 (page 1) avec 3021-2 (page 1)  
3021-1 (page 2) avec 3021-2 (page 2)  
3028-1 (page 1) avec 3028-2 (page 1)  
3028-1 (page 2) avec 3028-2 (page 2)  
3038-1 (page 1) avec 3038-2 (page 1)  
3038-1 (page 2) avec 3038-2 (page 2)  
5010-1 (page 2) avec 5010-2 (page 2)  
5016-1 (page 2) avec 5016-2 (page 2)  
5021-1 (page 2) avec 5021-2 (page 2)  
5028-1 (page 2) avec 5028-2 (page 2)  
5038-1 (page 2) avec 5038-2 (page 2)
8. Insérer les nouvelles feuilles de caractéristiques:  
3016-1 (page 3)  
3021-1 (page 3)  
3028-1 (page 3)  
3038-1 (page 3)  
6014-1 (pages 1 & 2)  
6017-1 (pages 1 & 2)
9. Retirer la page B020-1 et insérer la nouvelle page B020-2.
10. Retirer la page B030-1 et insérer la nouvelle page B030-2.

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**INSTRUCTIONS FOR THE  
INSERTION OF NEW PAGES  
AND DATA SHEETS  
IN PUBLICATION 60901**

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1. Remove page I-8 and insert new page I-8.
2. Remove page II-4a and insert new page II-4a.
3. Remove page II-6a and insert new page II-6a.
4. Remove page B-2 and insert new pages B-2 and B-2a.
5. Remove page C-2 and insert new page C-2.
6. Remove page D-2 and insert new page D-2.
7. Replace the lamp data sheets :  
1016-1 (page 2) with 1016-2 (page 2)  
1028-1 (page 2) with 1028-2 (page 2)  
3010-1 (page 2) with 3010-2 (page 2)  
3016-1 (page 1) with 3016-2 (page 1)  
3016-1 (page 2) with 3016-2 (page 2)  
3021-1 (page 1) with 3021-2 (page 1)  
3021-1 (page 2) with 3021-2 (page 2)  
3028-1 (page 1) with 3028-2 (page 1)  
3028-1 (page 2) with 3028-2 (page 2)  
3038-1 (page 1) with 3038-2 (page 1)  
3038-1 (page 2) with 3038-2 (page 2)  
5010-1 (page 2) with 5010-2 (page 2)  
5016-1 (page 2) with 5016-2 (page 2)  
5021-1 (page 2) with 5021-2 (page 2)  
5028-1 (page 2) with 5028-2 (page 2)  
5038-1 (page 2) with 5038-2 (page 2)
8. Insert new lamp data sheets :  
3016-1 (page 3)  
3021-1 (page 3)  
3028-1 (page 3)  
3038-1 (page 3)  
6014-1 (pages 1 & 2)  
6017-1 (pages 1 & 2)
9. Remove page B020-1 and insert new page B020-2.
10. Remove page B030-1 and insert new page B030-2.

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The requirements and information given apply to 95 % of production.

NOTE The requirements and tolerances permitted by this standard correspond to the testing of a type test sample, submitted by the manufacturer for that purpose. In principle, this type test sample should consist of units having characteristics typical of the manufacturer's production and being as close to the production centre point values as possible.

It may be expected with the tolerances given in the standard that products manufactured in accordance with the type test sample will comply with the standard for the majority of production. Due to the production spread however, it is inevitable that there will sometimes be products outside the specified tolerances. For guidance on sampling plans and procedures for inspection by attributes, see IEC 60410.

### 1.5.2 Caps

The dimensions of the cap on a finished lamp shall be in accordance with IEC 60061-1.

### 1.5.3 Dimensions

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

### 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 characteristics

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

NOTE 1 It may be expected that over the declared lifetime of the lamp, the lamp voltage may rise typically by 5 V to 10 V.

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

Conditions and method of test are given in Annex B.

### 1.5.6 Cathode characteristics

- a) The lead wire resistance of a lamp without internal starter shall not be higher than 1  $\Omega$ .
- b) 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. These resistance values include lead wire resistance.
- c) For a lamp having preheated cathodes for operation on high frequency or additionally operating on high frequency, the initial reading of the resistance of each cathode, when heated with the specified test current, shall comply with the values specified on the relevant lamp data sheet. These resistance values include lead wire resistance.

In addition, the average value of the resistance ratio  $R_h/R_c$  of the coils of 10 cathodes shall be in the range  $4,75 \pm 0,5$ .  $R_h$  is the resistance of the cathode when heated with the specified test current.  $R_c$  is the resistance of the cathode at a temperature of  $25 \text{ }^\circ\text{C} \pm 1 \text{ }^\circ\text{C}$ .

Both resistance values shall exclude lead wire resistance.

Conditions and method of test are given in Annex B.



## Annex B (normative)

### Method of test for electrical, photometric and cathode characteristics

#### B.1 Electrical and photometric characteristics

##### B.1.1 General

Photometric characteristics shall be measured in accordance with the relevant recommendations of the CIE (Commission Internationale de l'Eclairage).

Before the lamps are measured for the first time, they shall be aged for a period of 100 h of normal operation.

Lamps shall be tested in a draught-free atmosphere at an ambient temperature of 25 °C ± 1 °C, unless otherwise specified on the relevant lamp data sheet.

Lamps shall be tested in the position as specified on the relevant lamp data sheet. For lamps with external means of starting, the connections of the lamp contacts, with reference to the terminations of the ballast, shall not be changed for the whole course of the tests.

Measurements shall be made after a sufficient period of stabilization of the lamp. An appropriate stabilization time is 15 min, after the conditioning period as declared by the manufacturer or responsible vendor.

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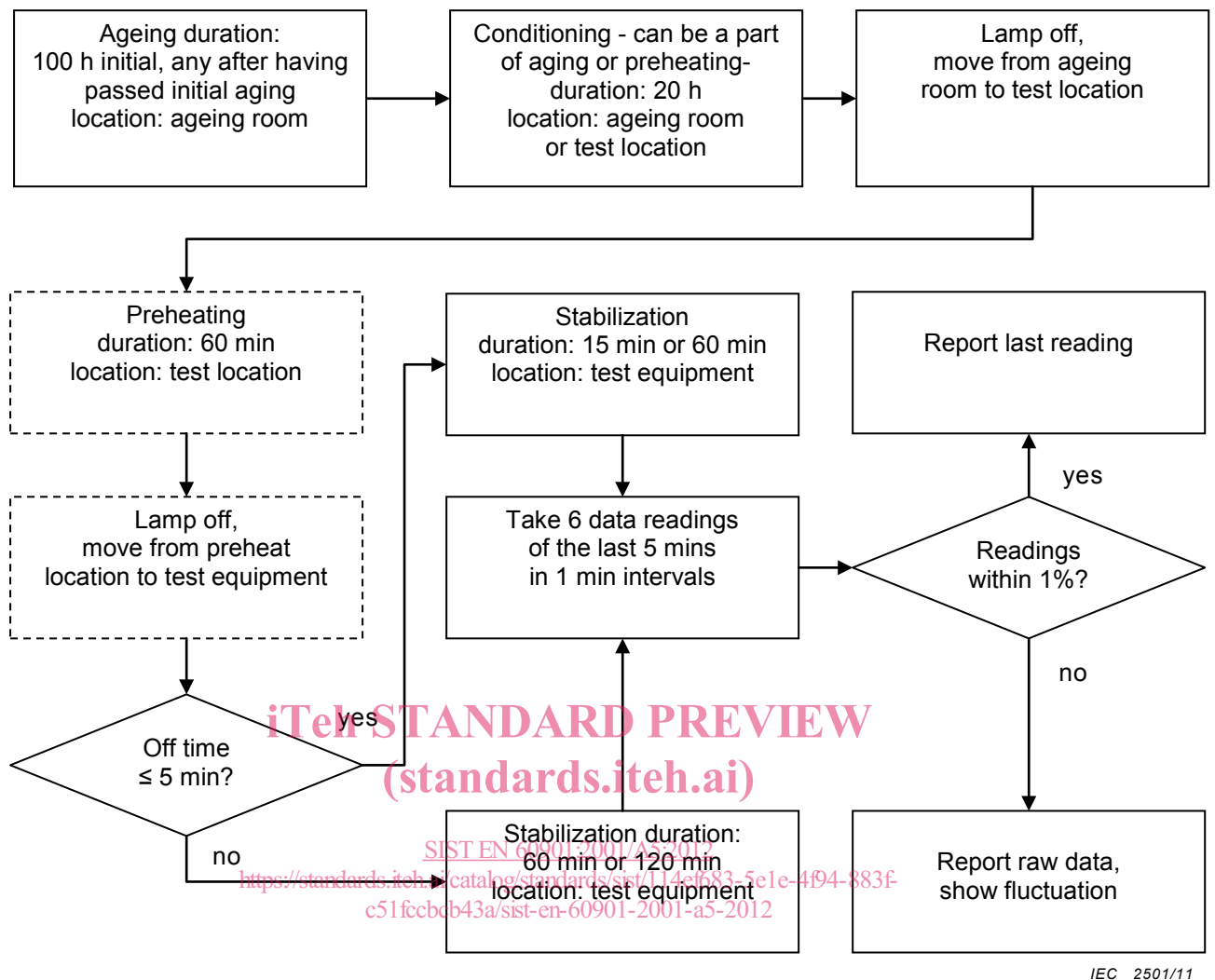
NOTE During shipping and normal handling of the lamps, e.g. rotating of the lamp, any excess amount of mercury may be distributed in small droplets within the discharge tube. Proper conditioning is reached when all the excess mercury has been collected at the coldest spot in the tube. Experience has shown that initially, this process of lamp conditioning may take up to 24 h. A lamp is ready for measurement when it has passed the conditioning period.

For conditioning and pre-warming, the lamp may be operated in a location distant to the test location. Before moving an amalgam lamp to the test location, the lamp shall cool down for 1 min in the burning position to allow the amalgam to solidify. When moving to the test location, provided that the lamp has been kept in the same position and not subjected to vibration or shock and no warm glass parts are touched (i.e. creating a parasitic cold spot), a stabilisation period of 15 min to 120 min (see Table B.1) is necessary in the test location. To avoid cooling down of warm glass parts during moving the lamp to test location, thermally insulating gloves or similar technique shall be used. The interruption of the lamp supply should be as short as possible. If deviating from the values in Table B.1, the relevant specification of the manufacturer should be observed.

Measurement of light output and lamp operating voltage must be taken at least once per minute. During the final 5 min of stabilisation time, the difference of maximum and minimum readings of light output and lamp operating voltage shall be less than 1% of the average of the readings. If this is not feasible, the real fluctuation shall be stated.

**Table B.1 – Stabilisation time versus off time**

Conditioning (can be part of aging)	h	20	
Off time (transport to test location)	min	≤ 5	> 5
Stabilisation time – non-amalgam lamps	min	15	60
Stabilisation time – amalgam lamps	min	60	120



**Figure B.1a – Typical flowchart of photometry test**

### B.1.2 Test circuit

Lamps shall be tested in the circuits shown in:

- Figure B.1 for lamps with internal means of starting;
- Figure B.2 for lamps with external means of starting;
- Figure B.3 for lamps for operation on high frequency.

In the test circuit for lamps for operation on high frequency, given in Figure B.3, connections shall be as short and straight as possible to avoid parasitic capacitance. The parasitic capacitance parallel to the lamp shall be less than 1 nF.

## Annex C (normative)

### Method of test for lumen maintenance and life

#### C.1 General

The luminous flux at a given time in the life of a lamp shall be measured as specified in Annex B.

During the life testing, lamps shall be operated as follows.

Lamps shall be operated at an ambient temperature of between 15 °C and 50 °C. Excessive draughts shall be avoided and the lamps shall not be subject to extreme vibration and shock.

Lamps shall be operated in the test position as specified on the relevant lamp data sheet.

For lamps with external means of starting, the connections of the lamp contacts, with reference to the terminations of the ballast, shall not be changed for the whole course of the tests.

Lamps shall be operated in the circuit for which they are intended by the manufacturer.

Lamps shall be switched off for 15 min after each 2 h 45 min of operation.

NOTE 1 In North America, a cycle of 3 h on, 20 min off is used.

NOTE 2 If a cycle deviating from the 3 h cycle is requested, a 12 h cycle (11 h on, 1 h off) should be used.

#### C.2 Lamps for operation on a.c. mains frequencies

The ballast used shall comply with the requirements of IEC 60921.

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.

NOTE The choice of the type of ballasts for these tests is left open, but the type used may have an influence on the results of the test. It is recommended that the type of ballast employed should be stated. In case of doubt, the use of an inductive type of ballast is recommended, because such a type has the smallest number of parameters capable of affecting the results.

For lamps operated with an internal or external starter, the preheating current, at rated supply voltage, shall not differ by more than 10 % from the rated value specified on the relevant lamp data sheet.

## Annex D (informative)

### Information for ballast and starter design

#### D.1 General

In order to safeguard proper functioning of the lamp, the relevant information, given on the lamp data sheet and in this annex, should be taken into account when designing ballasts and starters.

#### D.2 Lamps operated with an internal means of starting

Lamps with an internal starter should not be operated on high frequency circuits.

#### D.3 Prestarting conditions for high frequency operated lamps

For lamps operated at high frequency with an external means of starting, and having preheated cathodes, the requirements for proper preheating are specified on the relevant lamp data sheet. An explanation of these requirements is given in Annex D of IEC 60929 and in Annex B of IEC 60927.

#### D.4 Frequency to be used for high frequency operated lamps

For lamps designed for operation at high frequency, a frequency range is prescribed for the reference ballast and for the testing of lamps (starting, electrical and photometric characteristics). This frequency range has been chosen for ease of reproducing test results and is not intended to restrict the design of high frequency ballasts, where for practical reasons a higher frequency may be appropriate.

#### D.5 Tolerable DC-offset during preheat

The peak-peak value of the open-circuit voltage shall be less than or equal to 2,8 times the maximum r.m.s. value of the open circuit voltage for  $t \leq t_s$ . Narrow voltage peaks during the first half period of the mains voltage after switching on preheat shall be disregarded when testing the control gear against this subclause.

The DC-offset (mean value) of the open-circuit voltage shall not exceed the r.m.s. open circuit voltage for  $t \leq t_s$  as specified on the relevant lamp data sheet. In cases where the r.m.s. open circuit voltage for  $t \leq t_s$  is specified to less than 200 V, the DC-offset of the open-circuit voltage shall be less than or equal to 200 V.

Sheet No. 60901-IEC-	Nominal wattage W	Frequency Hz	Shape	Cap	Means of starting	Circuit		Cathode type
						AC mains	High frequency	
6014	14	≥20 k	Multilimbed-6	GR14q-1	External	-	Starterless	Preheated
6017	17	≥20 k	Multilimbed-6	GR14q-1	External	-	Starterless	Preheated
6240	40	≥20 k	Dual	2G11	External	-	Starterless	Preheated
6255	55	≥20 k	Dual	2G11	External	-	Starterless	Preheated
6280	80	≥20 k	Dual	2G11	External	-	Starterless	Preheated
6722	22	≥20 k	Circular	2GX13	External	-	Starterless	Preheated
6740	40	≥20 k	Circular	2GX13	External	-	Starterless	Preheated
6755	55	≥20 k	Circular	2GX13	External	-	Starterless	Preheated
6760	60	≥20 k	Circular	2GX13	External	-	Starterless	Preheated
6820	20	≥20 k	Circular	GZ10q	External	-	Starterless	Preheated
6827	27	≥20 k	Circular	GZ10q	External	-	Starterless	Preheated
6834	34	≥20 k	Circular	GZ10q	External	-	Starterless	Preheated
6841	41	≥20 k	Circular	GZ10q	External	-	Starterless	Preheated
6941	41	≥20 k	Circular	GU10q	External	-	Starterless	Preheated
6968	68	≥20 k	Circular	GU10q	External	-	Starterless	Preheated
6997	97	≥20 k	Circular	GU10q	External	-	Starterless	Preheated
7432	32	≥20 k	Multilimbed	GX24q-3	External	-	Starterless	Preheated
7442	42	≥20 k	Multilimbed	GX24q-4	External	-	Starterless	Preheated
7456	57	≥20 k	Multilimbed-6	GX24q-5	External	-	Starterless	Preheated
7457	57	≥20 k	Multilimbed-8	GX24q-5	External	-	Starterless	Preheated
7469	70	≥20 k	Multilimbed-6	GX24q-6	External	-	Starterless	Preheated
7470	70	≥20 k	Multilimbed-8	GX24q-6	External	-	Starterless	Preheated
7660	60	≥20 k	Multilimbed-6	2G8-1	External	-	Starterless	Preheated
7685	85	≥20 k	Multilimbed-6	2G8-1	External	-	Starterless	Preheated
7719	120	≥20 k	Multilimbed-6	2G8-1	External	-	Starterless	Preheated
7720	120	≥20 k	Multilimbed-8	2G8-1	External	-	Starterless	Preheated
7862	62	≥20 k	Multilimbed-8	2G8-2	External	-	Starterless	Preheated
7882	82	≥20 k	Multilimbed-8	2G8-2	External	-	Starterless	Preheated

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