SLOVENSKI STANDARD
SIST EN 60081:1999/A5:2014

01-januar-2014

Fluorescenčne sijalke z dvema vznožkoma - Zahteve glede tehničnih lastnosti - Dopolnilo A5

Double-capped fluorescent lamps - Performance specifications

Zweiseitig gesockelte Leuchtstofflampen - Anforderungen an die Arbeitsweise

Lampes à fluorescence à deux culots - Prescriptions de performance

Ta slovenski standard je istoveten z: **EN 60081:1998/A5:2013**

ICS:

29.140.30	Fluorescenčne sijalke. Sijalke	Fluorescent lamps. Discharge lamps

SIST EN 60081:1999/A5:2014 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60081/A5

October 2013

ICS 29.140.30

English version

Double-capped fluorescent lamps - Performance specifications
(IEC 60081:1997/A5:2013)

Lampes à fluorescence à deux culots - Spécifications de performance (CEI 60081:1997/A5:2013)

Zweiseitig gesockelte Leuchtstofflampen - Anforderungen an die Arbeitsweise (IEC 60081:1997/A5:2013)

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CENELEC

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60081:1998/A5:2013 E

Foreword

The text of document 34A/1602/CDV, future IEC 60081:1997/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 60081:1998/A5:2013.

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)	2014-05-23
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-08-23

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IEC 60081

Edition 5.0 2013-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 5
AMENDEMENT 5

The sheets contained in this amendment are to be inserted in IEC 60081
Les feuilles de cet amendement sont à insérer dans la CEI 60081

Double-capped fluorescent lamps – Performance specifications

Lampes à fluorescence à deux culots – Prescriptions de performance

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX XC

ICS 29.140.30

ISBN 978-2-8322-0920-2

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:

CDV	Report on voting
34A/1602/CDV	34A/1644/RVC

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.

INSTRUCTIONS POUR L'INSERTION DES NOUVELLES PAGES ET FEUILLES DE CARACTÉRISTIQUES DANS LA PUBLICATION 60081

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2. Remplacer les feuilles de caractéristiques :

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INSTRUCTIONS FOR THE INSERTION OF NEW PAGES AND DATA SHEETS IN PUBLICATION 60081

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1. Remove existing title page, pages I-4, I-8, I-10, B10, B12 and insert in their places the new title page, pages I-4, I-8, I-10, B10, B12.

2. Replace the lamp data sheets :

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with 7520-2 (pages 1/2)

IEC 60061-1:1969, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60155:1993, *Glow-starters for fluorescent lamps*

IEC 60598 (all parts), *Luminaires*

IEC 60921:1988, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 60927:1996, *Auxiliaries for lamps – Starting devices (other than glow starters) – Performance requirements*

IEC 60929:1990, *A.C. supplied electronic ballasts for tubular fluorescent lamps – Performance requirements*

IEC 61049:1991, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – Performance requirements*

IEC 61195:1993, *Double-capped fluorescent lamps – Safety specifications*

IEC 61231:1993, *International lamp coding system (ILCOS)*

IEC/TR 62750:2012, *Unified fluorescent lamp dimming standard calculations*

1.4 Definitions

For the purpose of this International Standard, the definitions of IEC 60050(845) and 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 [IEV 845-07-26, modified]

1.4.2
double-capped fluorescent lamp
fluorescent lamp having two separate caps and mostly of tubular form and linear shape

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

1.5.2 Caps

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

For lamps with G5 or G13 caps, both pins (excluding flanges) of the two caps of a finished lamp shall pass simultaneously, freely without binding, through parallel slots, suitably spaced longitudinally to receive the lamp. The slots shall each be 2,87 mm wide for G5 caps, and 3,05 mm wide for G13 caps.

For lamps with R17d caps, both cap bosses of a finished lamp shall pass simultaneously, freely without binding, through parallel slots, suitably spaced longitudinally to receive the lamp with the bottom of the slots against the boss ends. The slots shall each be 6,35 mm deep and 9,22 mm wide.

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

Lamps shall comply with the following requirements:

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.

c) The combined resistance of the lead wires connected to an individual cathode for a lamp without internal starter shall not be higher than 0,3 Ω.

d) 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.

e) 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. These resistance values include lead wire resistance.

   In addition, the average value of the resistance ratio Rh/Rc of the coils of 10 cathodes shall be in the range 4,75 ± 0,5. Rh is the resistance of the cathode when heated with the specified test current. Rc is the resistance of the cathode at a temperature of 25 °C ± 1 °C. Both resistance values shall exclude lead wire resistance.

Conditions and method of test are given in Annex B.

1.5.6 Photometric characteristics

Lamps shall comply with the following requirements:

a) The initial reading of the luminous flux of a lamp shall be not less than 92 % of the rated value.

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

NOTE See also Annex D on chromaticity co-ordinates.

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 shall be not less than 92 % (under consideration) of the rated lumen maintenance value at any time in its life.

Conditions and method of test are given in Annex C.

1.5.8 Marking

A lamp shall be marked with an identification which defines, with the aid of information made available by the manufacturer or responsible vendor, the electrical and photometric characteristics of the lamp.

1.6 Information for ballast and starter design

Refer to the relevant lamp data sheet and to Annex E for information for ballast and starter design.

1.7 Information for luminaire design

Refer to Annex F for information for luminaire design.

B.3.3 Lamps for operation on high frequency

The current flowing through the cathode shall be adjusted to the value of the test current given on the relevant lamp data sheet, and the voltage drop over the cathode shall be measured. From these, the cathode resistance shall be calculated.

To determine the resistance of the lead wires, take 5 lamps of the type to be measured. Crack off the end of the tubes carefully. Using a shorting link, short out the coil by clipping to the coil clamps. Drive a current of 100 mA through the leads. Measure the voltage at the normally used measurement point and calculate the lead resistance. The resulting value of the mean lead resistance may be used for any further measurements with lamps of the same mount construction.

B.4 Measurement procedure for the determination of the maximum luminous flux of 16 mm tube diameter lamps for operation on high frequency

B.4.1 General

This procedure applies when a requirement is given on the lamp data sheet concerning maximum luminous flux at ambient temperatures other than 25 °C. The tolerance of the ambient temperature at which the maximum luminous flux shall be obtained is given on the relevant lamp data sheet.

B.4.2 Conditioning of the lamp

The lamp shall be aged for 100 h in a vertical position. During ageing, the cold chamber shall be at the lowest point. The position of the cold chamber shall be indicated by the manufacturer.

Measurements shall be made after a sufficient period of stabilization of the lamp. After stabilization, any lamp movement shall be carried out carefully with no vibration or shock and with the cold chamber always at the lowest point.

B.4.3 Absolute measurement

Apart from the conditioning procedure, the rated luminous flux measurement is performed as described in Clause B.1.

B.4.4 Relative measurement

The maximum luminous flux measurement is based on a relative measurement of either luminous flux or of illuminance versus ambient temperature.

B.4.4.1 Equipment for relative measurement and operating position

A thermally insulated container of suitable shape (for example a rectangular box) and size shall be used.

Alternative: an un-insulated container, located inside a temperature-controlled chamber, i.e. “double-layer” (which allows air to circulate around the container without the presence of a draught on the lamp).

The internal temperature of the container shall be controllable within the temperature range of 20 °C to 45 °C, so that the temperature at which maximum luminous flux occurs is included.

The inner surface of the container shall be coated with a suitable material dependent upon the applied detection method.

The lamp shall be mounted in the centre of the container in a horizontal position. The distance between the lamp and the walls of the container shall be at least 200 mm in all directions. If it can be shown that distances less than 200 mm give the same result, then smaller distances may be used.

Electrical connection to the lamp pins shall be made using a method which minimizes heat sinking of the lamp (for example using lamp holders with low thermal capacitance or connecting directly to the lamp pins).

The temperature within the container shall be measured at a position which is level with the centre of the lamp in the vertical plane, equidistant between the lamp ends in the horizontal plane and equidistant between the lamp and container wall. In practice, an additional measurement point at the control point of the lamp is advised (in the vicinity of the cold chamber which determines the mercury vapour pressure).

A suitable light detector (thermally insulated and/or stabilized) shall be mounted outside the container or inside the container if its temperature dependence is known. For luminous flux measurements, the light detector shall receive light via reflection only with the direct light being blocked by a baffle. For illuminance measurements, the light detector shall receive light directly from the lamp.

The recorded signal from the detector shall be proportional to the luminous flux or the illuminance in the temperature range of measurement.

B.4.4.2 Execution of relative measurements

The lamp shall be tested in the appropriate circuit given in Figure B.3. The reference ballast shall be positioned outside the container. After starting, the supply voltage of the reference ballast shall be held constant throughout the measurement.

There shall be no artificial air movement in the container. However, air ventilation is needed in order to obtain an isotropic temperature distribution.

The measurement shall start at the lowest temperature of interest. It is recommended that the rate of temperature rise in the range of 20 °C to 45 °C be less than 5 K/h.

NOTE This is required in order to achieve reproducible results with minimum measurement uncertainties.

Measurements of the luminous flux or illuminance and the ambient temperature shall be made in suitable temperature/time intervals throughout the period of measurement.

B.4.5 Translation into absolute values

Combining the absolute measurement with the relative measurements will provide a complete luminous flux versus ambient temperature profile for the lamp.

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FD-4-E-G5-16/150

Nominal power W	Circuit	Cathode	Cap	Nominal dimensions mm
4	With starter	Preheated	G5	16 × 150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
135,9	140,6	143,0	150,1	16,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110/120	103,5	30
60	110/120	103,5	30

Electrical characteristics						
Frequency	Rated power	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	4,5	29	24	34	0,170	0,205
60	4,5	29	24	34	0,170	0,205

Chromaticity co-ordinates: See Clause D.2.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,110	80	60	100

NOTE In Japan, the rated resistance of each cathode is 90 Ω and maximum is 120 Ω.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-4-E-G5-16/150

Reference ballast characteristics					
Frequency Hz	Nominal power W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,144	0,144
		Max.	0,275	0,275
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	140	140
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 3

ILCOS: FD-4-E-G5-16/150

Information for high frequency ballast design

Typical lamp characteristics			
Frequency kHz	Lamp power W	Lamp voltage V	Lamp current A
≥20	3,6	24	0,15

Frequency					kHz	≥ 20
Normal operation						
Lamp operating current	I_D	A		Min.		0,090
				Max.		0,180
Current in any lead to cathodes		A		Max.		0,190
Dimming operation						
Lamp operating current	I_D	A		Min.		0,015
				Max.		0,090
Minimum sum of squares lead currents	$I_{LH}^2 + I_{LL}^2 = X_1 - Y_1 I_D$	A^2		X_1	A^2	0,022
Target sum of squares lead currents	$I_{LH}^2 + I_{LL}^2 = X_1 - 0,3\ Y_1 I_D$	A^2		Y_1	A	0,205
Maximum sum of squares lead currents	$I_{LH}^2 + I_{LL}^2 = X_2 - Y_2 I_D$	A^2		X_2	A^2	0,030
				Y_2	A	-0,050
Current in any lead to cathodes	I_{LH}	A		Max.		0,190
	I_{LL}	A		Max.		0,120
Substitution resistor for each cathode for testing dimming requirements				R_{Test1}	Ω	80
				R_{Test2}	Ω	90
Lamp substitution resistor at *n* % of the test current	*n* = 10 %	R_{10}	Ω	Min.		1 500
				Max.		1 800
	n = 30 %	R_{30}	Ω	Nominal		510
	n = 60 %	R_{60}	Ω	Nominal		240
Starting requirements with cathode preheating, for starting times 0,4 s < t_s < 3,0 s						
Minimum cathode preheat energy	$E_{min} = Q_{min} + P_{min}\ t_s$	J		Q_{min} (J)		1,0
				P_{min} (W)		0,7
Voltage across each cathode for $E(t) < E_{min}$		V		Max.(r.m.s.)		11
Substitution resistor for each cathode, for testing minimum cathode preheat requirements					Ω	50
Maximum cathode preheat energy	$E_{max} = Q_{max} + P_{max}\ t_s$	J		Q_{max} (J)		1,5
				P_{max} (W)		1,1
Substitution resistor for each cathode, for testing maximum cathode preheat requirements					Ω	65
Open circuit voltage across lamp (with starting aid)	V	Non-ignition voltage	$t \le t_s$	Max.(r.m.s.)		90
		Ignition voltage	$t > t_s$ (+10 °C)	Min.(r.m.s.)		160
			$t > t_s$ (-15 °C)	Min.(r.m.s.)		220
Substitution resistor range for each cathode, for testing open circuit voltage requirements					Ω	50……150