

Low pressure sodium vapour lamps — Performance specification

The European Standard EN 60192:2001 has the status of a
British Standard

ICS 29.140.20

National foreword

This British Standard is the official English language version of EN 60192:2001. It is identical with IEC 60192:2001. It supersedes BS EN 60192:1993 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/1, Electric lamps, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

From 1 January 1997, all IEC publications have the number 60000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 60027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 25 September 2001

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 14, lamp data sheets, the annex ZA page and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 25 September 2001

ISBN 0 580 38483 7

EUROPEAN STANDARD

EN 60192

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2001

ICS 29.140.30

Supersedes EN 60192:1993 + A4:1995 + A5:1995

English version

**Low pressure sodium vapour lamps –
Performance specifications
(IEC 60192:2001)**

Lampes à vapeur de sodium à basse
pression –
Prescriptions de performance
(CEI 60192:2001)

Natriumdampf-Niederdrucklampen -
Anforderungen an die Arbeitsweise
(IEC 60192:2001)

This European Standard was approved by CENELEC on 2001-07-01. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

© 2001 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Foreword

The text of document 34A/953/FDIS, future edition 3 of IEC 60192, 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 60192 on 2001-07-01.

This European Standard supersedes EN 60192:1993 + A4:1995 + A5:1995.

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) 2002-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-07-01

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 and ZA are normative and annex C is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60192:2001 was approved by CENELEC as a European Standard without any modification.

CONTENTS

1	General.....	4
1.1	Scope	4
1.2	Normative references.....	4
1.3	Definitions	5
1.4	Lamp requirements	6
1.4.1	General.....	6
1.4.2	Dimensions	6
1.4.3	Caps.....	6
1.4.4	Starting characteristics.....	6
1.4.5	Electrical characteristics.....	6
1.4.6	Photometric characteristics	6
1.5	Information for luminaire design	6
	Annex A (normative) Method of measuring starting characteristics.....	7
	Annex B (normative) Method of measuring electrical and photometric characteristics.....	8
	Annex C (informative) Information for luminaire design	10
	Bibliography	11
2	Data Sheets	13
2.1	General principles of numbering sheets.....	13
2.2	Lists of data sheets.....	13
2.2.1	List of lamp data sheets	13
2.2.2	List of maximum lamp outline sheets.....	13

LOW-PRESSURE SODIUM VAPOUR LAMPS – PERFORMANCE SPECIFICATIONS

1 General

1.1 Scope

This standard specifies the performance requirements for low-pressure sodium vapour lamps for general lighting purposes.

For some of the requirements given in this standard, reference is made to “the relevant lamp 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.

The requirements of this standard relate only to type testing.

NOTE The requirements and tolerances permitted by this standard correspond to 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.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, 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. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(845), *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

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

IEC 60923, *Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – Performance requirements*

IEC 62035, *Discharge lamps (excluding fluorescent lamps) – Safety specifications*

1.3 Definitions

For the purposes of this International Standard, the following terms and definitions, as well as others given in IEC 60050(845), apply:

1.3.1

low pressure sodium (vapour) lamp

discharge lamp in which the light is produced by radiation from sodium vapour operating at a partial pressure of 0,1 to 1,5 pascal

[IEV 845-07-24]

1.3.2

nominal value

approximate quantity value used to designate or identify a lamp

1.3.3

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

1.3.4

lamp designation: type E

Code, indicating economy, to designate a type of low-pressure sodium vapour lamp with improved luminous efficacy

NOTE As these lamps may be operated on various ballasts with slightly different wattages, it is not satisfactory to designate them with a nominal wattage. A lamp designation has been chosen consisting of the letter E and a number approximately numerically equal to their rated wattage. The number in the designation is different from that of the rated wattage, in order to avoid confusion with the existing lamps designated with their nominal wattage.

1.3.5

lamp starting voltage

r.m.s. voltage at lamp terminals at which the lamp starts

1.3.6

initial readings

starting characteristics of a lamp, measured before ageing, and the electrical and photometric characteristics of a lamp, measured at the end of the ageing period

1.3.7

reference ballast

special inductive type ballast, 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 standardised 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

1.3.8

calibration current of a reference ballast

value of the current on which the calibration and control of the reference ballast are based

1.3.9**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

1.3.10**type test sample**

sample consisting of one or more similar units submitted by the manufacturer or the responsible vendor for the purpose of a type test

1.4 Lamp requirements**1.4.1 General**

A lamp, on which compliance with this standard is claimed, shall comply with the requirements of IEC 62035.

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.

The requirements given apply to 95 % of production.

1.4.2 Dimensions

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

1.4.3 Caps

The cap on a finished lamp shall comply with IEC 60061-1.

1.4.4 Starting characteristics

A lamp shall start within the starting time specified on the relevant lamp data sheet and remain alight for at least 1 min.

The test shall be made before ageing, using the measuring method given in annex A.

1.4.5 Electrical characteristics

The initial readings of the voltage at lamp terminals and of the power dissipated by a lamp shall not exceed the maximum values specified on the relevant lamp data sheet, using the measuring method given in annex B.

1.4.6 Photometric characteristics

The initial reading of the luminous flux of a lamp shall be not less than 90 % of the rated value, using the measuring method given in annex B.

1.5 Information for luminaire design

Refer to annex C for information for luminaire design.

Annex A (normative)

Method of measuring starting characteristics

A.1 General

Lamps shall not be operated during the 5 h immediately prior to making this test.

Lamps shall be tested in a circuit as shown in figure A.1, at an ambient temperature between 20 °C and 30 °C, using a nominal 50 Hz or 60 Hz supply as appropriate.

The ballast used shall satisfy the requirements of IEC 60923.

During the test, lamps shall be at a sufficient distance from any earthed metal or starting aid.

A.2 Measurement

With switch S_1 closed and switch S_2 open, the voltage measured by voltmeter V_1 shall be set to the starting voltage given on the relevant lamp data sheet, and then switch S_2 shall be closed.

After the test, switch S_1 shall be opened before switching off the lamp.

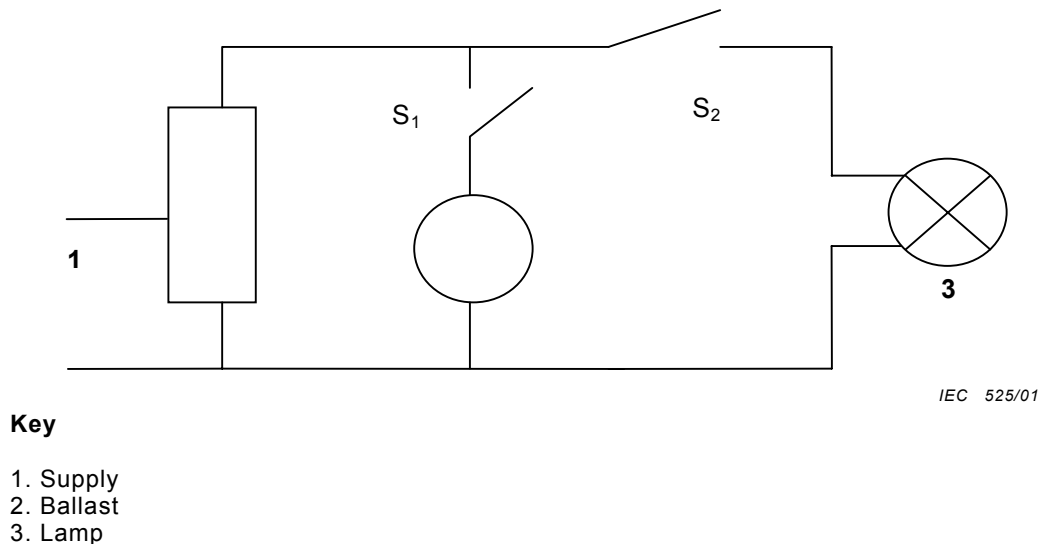


Figure A.1 – Circuit diagram for starting test

Annex B (normative)

Method of measuring electrical and photometric characteristics

B.1 General

Lamps shall be tested in a circuit as shown in figure B.1, at an ambient temperature of between 20 °C and 30 °C, using a nominal 50 Hz or 60 Hz supply as appropriate.

Ballasts used for these measurements shall be reference ballasts having a voltage-to-current ratio and power factor as specified on the relevant lamp data sheets and meeting the general requirements for reference ballasts given in IEC 60923.

Before initial readings are taken, the lamp shall be aged for 100 h on a ballast that satisfies the requirements of IEC 60923, at the rated voltage and frequency of the ballast. The supply voltage shall not vary by more than $\pm 10\%$ and the frequency by not more than ± 1 Hz.

NOTE The allowed tolerances are chosen to avoid the necessity of having a stabilized voltage and to permit the use of a normal mains supply.

Lamps shall operate within $\pm 5^\circ$ of the horizontal position

B.2 Supply

The supply voltage and frequency shall be equal to the rated values of the reference ballast, with a tolerance of $\pm 0,5\%$.

The wave shape of the supply voltage shall be a sine wave. The total harmonic content shall not exceed 3 % of the fundamental. The total harmonic content is defined as the root-mean-square (r.m.s.) summation of the individual harmonic components, using the fundamental as 100 %.

NOTE This implies that the source of supply should have sufficient power and that the supply circuit should have a sufficiently low impedance compared with the ballast impedance and care should be taken that this applies under all conditions that occur during the measurement.

During the period of stabilisation, the supply voltage and frequency shall be stable within $\pm 0,5\%$, this tolerance being reduced to $\pm 0,2\%$ at the moment of measurement.

B.3 Instruments

Instruments shall be of the true r.m.s. type, essentially free from waveform errors and of a precision appropriate to the requirements.

Voltage measuring circuits of instruments connected across a lamp shall take not more than 3 % of the rated lamp current.

Instruments connected in series with the lamp shall have sufficiently low impedance such that the voltage drop shall not exceed 2 % of the rated lamp voltage.

B.4 Measurement

When measuring lamp voltage, the wattmeter voltage measuring circuit shall be open and the wattmeter current measuring circuit shall be short-circuited, if necessary.

When measuring the lamp power, the lamp voltmeter circuit shall be open and the ammeter shall be short-circuited, if necessary. No correction shall be made for the power consumed by the wattmeter as the circuit connection is made on the lamp side of the current measuring circuit.

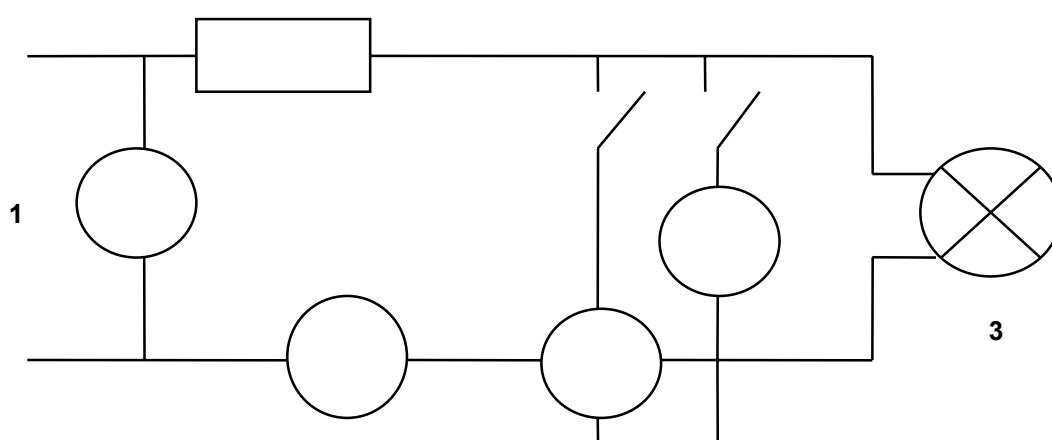
When measuring the luminous flux, the lamp voltmeter circuit and the voltage measuring circuit of the wattmeter shall be open and the ammeter and wattmeter current measuring circuit shall be short-circuited, if necessary.

NOTE The reference above to the absence of a correction of the consumption of the voltage circuit of the wattmeter arises from an empirical observation which shows that in most cases, at the same supply voltage, the said consumption compensates approximately for the reduction of the power consumption of the lamp caused by the parallel connection of the voltage circuit of the wattmeter.

In cases of doubt, it is possible to evaluate the compensation error by repeating the measurements with other values of the load in parallel with the lamp.

This is done by adding resistances in parallel with the lamp and by reading each time the power measured by the wattmeter. It is then possible to extrapolate the results obtained in order to determine the true power in the absence of any parallel load.

The lamp shall be operated until the electrical characteristics are stable before any readings on the lamp are taken.



IEC 526/01

Key

- 1. Supply
- 2. Reference ballast
- 3. Lamp

Figure B.1 – Circuit diagram for measurement of lamp characteristics

Annex C (informative)

Information for luminaire design

C.1 Maximum lamp outlines

Maximum lamp outlines, given in 2.2.2, are provided for the guidance of designers of luminaires.

For mechanical acceptance of lamps complying with this standard, a free space should be provided in the luminaire based on these maximum outlines.

Bibliography

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC/TS 61231:1999, *International lamp coding system (ILCOS)*

