

High-pressure mercury vapour lamps — Performance specifications

The European Standard EN 60188:2001 has the status of a British Standard

ICS 29.140.30

National foreword

This British Standard is the official English language version of EN 60188:2001. It is identical with IEC 60188:2001. Together with BS EN 62035:2000 supersedes BS 3677:1989 which is withdrawn.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, Electrical lamps, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible 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.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 17, a blank page, the Data sheets (consisting of 20 sheets) and a back cover.

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

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 28 November 2001

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 28 November 2001

ISBN 0 580 38707 0

English version

**High-pressure mercury vapour lamps –
Performance specifications
(IEC 60188:2001)**

Lampes à vapeur de mercure à haute
pression –
Prescriptions de performance
(CEI 60188:2001)

Quecksilberdampf-Hochdrucklampen -
Anforderungen an die Arbeitsweise
(IEC 60188:2001)

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

Foreword

The text of document 34A/952/FDIS, future edition 3 of IEC 60188, 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 60188 on 2001-07-01.

This European Standard supersedes EN 60188:1988 + A1:1990 + A5:1993.

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) 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, C and ZA are normative and annex D is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60188:2001 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 and warm-up characteristics	6
	1.4.5 Electrical characteristics	7
	1.4.6 Photometric characteristics	7
	1.4.7 Red ratio (fluorescent coated lamps only)	7
	1.4.8 Lamp stability with rapidly reduced supply voltage	7
	1.5 Information for luminaire design	7
	 Annex A (normative) Method of measuring starting and warm-up characteristics	 8
	Annex B (normative) Method of measuring electrical and photometric characteristics	9
	Annex C (normative) Method of measuring the red ratio.....	11
	Annex D (informative) Information for luminaire design	13
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	14
	 Bibliography	 15
2	Data Sheets	16
	2.1 General principles of numbering sheets	16
	2.2 Lists of data sheets	16
	2.2.1 List of lamp data sheets	16
	2.2.2 List of maximum lamp outline sheets	17

HIGH-PRESSURE MERCURY VAPOUR LAMPS – PERFORMANCE SPECIFICATIONS

1 General

1.1 Scope

This standard specifies the performance requirements for high-pressure mercury vapour lamps for general lighting purposes, with or without a red correcting fluorescent coating.

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, 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 edition of the normative document 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

high pressure mercury (vapour) lamp

high intensity discharge lamp in which the major portion of the light is produced, directly or indirectly, by radiation from mercury operating at a partial pressure in excess of 100 kilo-pascals

NOTE This term covers clear, phosphor coated (mercury fluorescent) and blended lamps. In a fluorescent mercury discharge lamp, the light is produced partly by the mercury vapour and partly by a layer of phosphors excited by the ultraviolet radiation of the discharge.

[IEV 845-07-20]

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 starting voltage

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

1.3.5

minimum open circuit voltage for stable operation

minimum open circuit voltage to be provided by an inductive ballast for stable operation of the lamp

1.3.6

initial readings

starting and warm-up 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

red ratio

ratio of the luminous flux emitted by the lamp in the red portion of the visible spectrum to the total luminous flux of the lamp. For the purposes of this standard, the red portion is defined by the part of the visible spectrum comprising the wavelengths above 600 nm

1.3.8

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

1.3.9**calibration current of a reference ballast**

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

1.3.10**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

1.3.11**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.

For the purposes of this standard, the following designations are used as a classification according to the rated voltage at lamp terminals:

- Lamp voltage range 70 V – 180 V Designation: HV
- Lamp voltage range >180 V Designation: EHV

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 and warm-up characteristics

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

A lamp shall achieve the warm-up voltage at lamp terminals within the warm-up time specified on the relevant lamp data sheet

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

NOTE Normally it should be expected that at 100 % of the rated supply voltage, lamps will start satisfactorily at temperatures down to –18 °C.

1.4.5 Electrical characteristics

The initial reading of the voltage at lamp terminals shall be within the limits specified on the relevant lamp data sheet, using the measuring method given in annex B.

The initial reading of the power dissipated by a lamp shall not exceed the maximum wattage 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.

1.4.7 Red ratio (fluorescent coated lamps only)

The initial reading of the red ratio of a lamp shall be not less than XX % (value under consideration), using the measuring method given in annexes B and C.

1.4.8 Lamp stability with rapidly reduced supply voltage

A lamp shall not extinguish if the supply voltage falls from 100 % to 90 % of the rated supply voltage in not more than 0,5 s and remains at that value for at least 5 s.

1.5 Information for luminaire design

Refer to annex D for information for luminaire design.

Annex A (normative)

Method of measuring starting and warm-up characteristics

A.1 General

Lamps shall not be operated during the 5 h immediately prior to making these tests.

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 be of the inductive type and shall satisfy the requirements of IEC 60923.

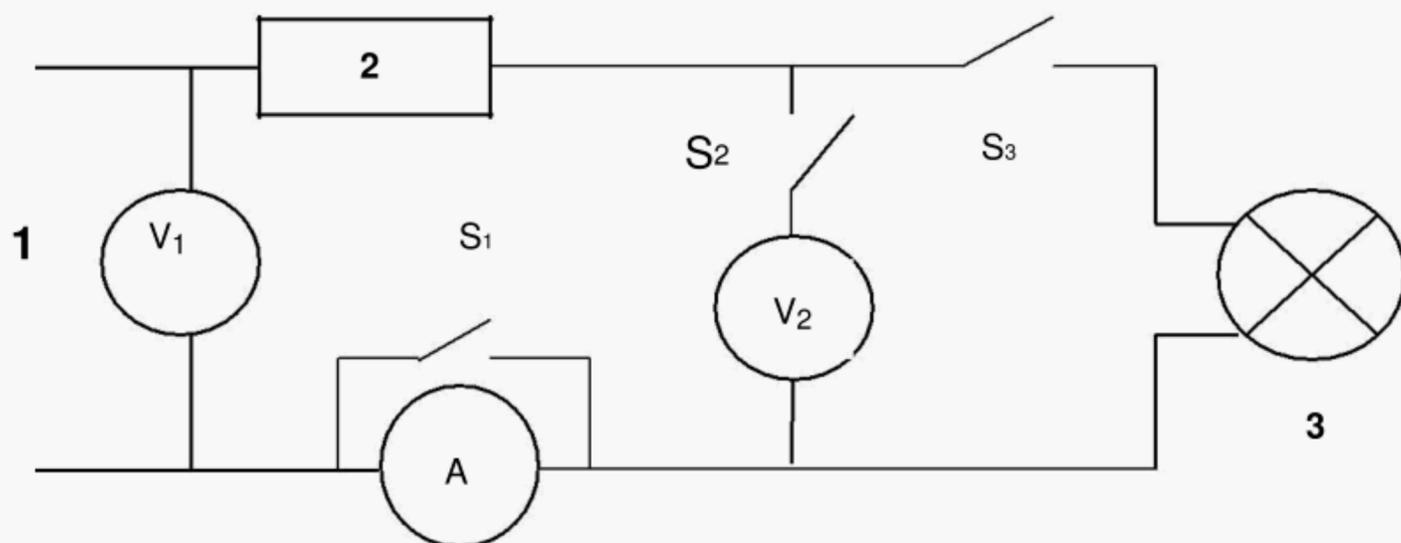
Lamps shall operate in a vertical cap-up position.

A.2 Measurements

The ammeter shall be short-circuited using switch S_1 and the voltmeter V_2 shall be open-circuited using switch S_2 . 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_3 shall be closed.

Immediately after starting, switch S_1 shall be opened and switch S_2 shall be closed. The supply voltage shall be adjusted to reach a lamp current equal to the warm-up current specified on the relevant lamp data sheet, and shall be varied during the warm-up time to maintain this current constant.

NOTE In Japan, the supply voltage is kept constant at the rated ballast voltage during the lamp warm-up test.



IEC 493/01

Key

1. Supply
2. Ballast
3. Lamp

Figure A.1 – Circuit diagram for measurement of starting and warm-up characteristics

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 in a vertical cap-up 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.

The measurement of the red ratio is detailed in annex C.

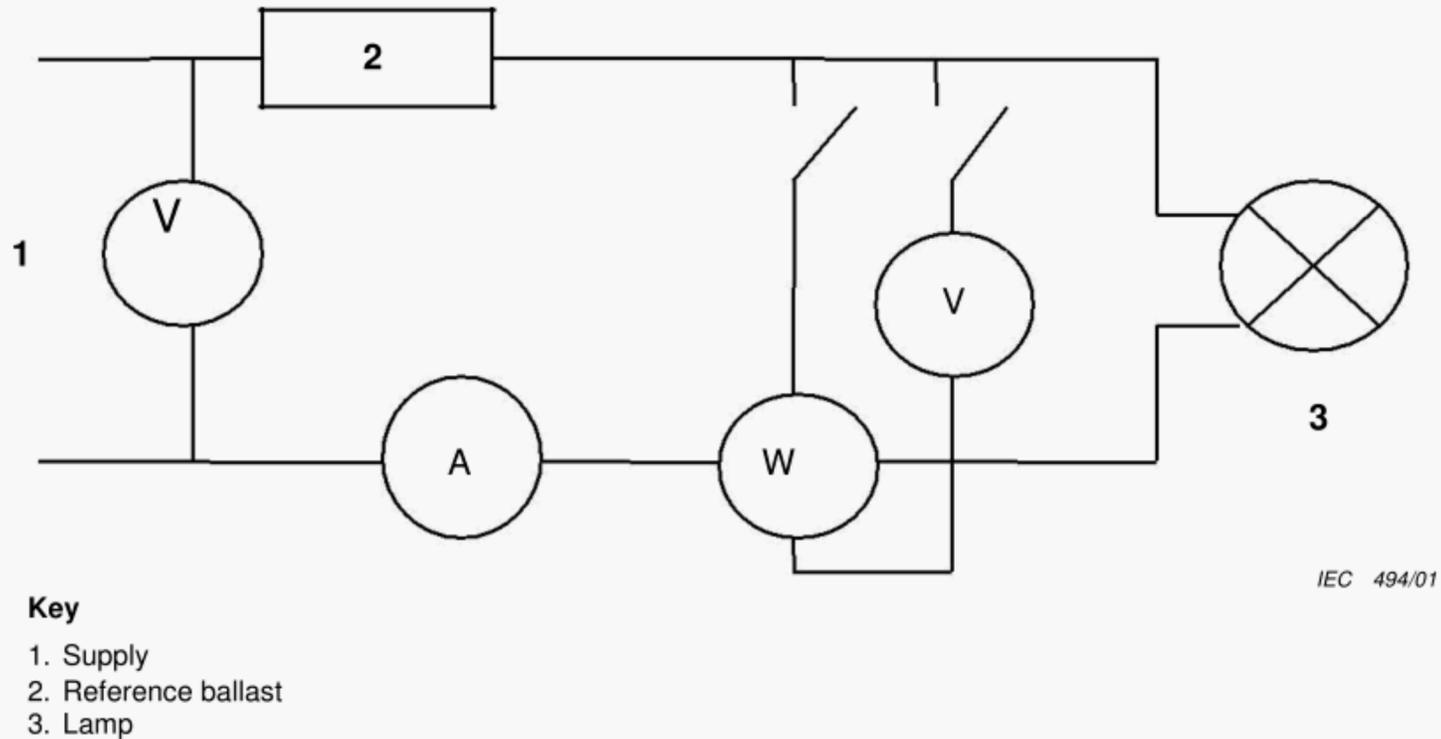


Figure B.1 – Circuit diagram for measurement of lamp characteristics

Annex C (normative)

Method of measuring the red ratio

C.1 Lamp and filter requirements

The method described makes use of:

- a) A high-pressure mercury vapour lamp with fluorescent coating of known spectral distribution.

Let such a lamp be identified by N and let E_{IN} be the relative spectral distribution of the lamp's radiant energy (it will necessarily comprise concentrated energies at the spectral lines). The fluorescent coating of this standard lamp N should emit light of a similar spectral distribution to that of the unknown lamp to be compared with it. This is particularly necessary when the coatings emit principally in the red/orange region (around 610-625 nm).

NOTE Some manufacturers will supply lamps together with the spectral analysis of their radiation. There are also specialised laboratories which undertake such measurements.

- b) A red filter

The exact type is not specified, but the filter shall comply with the following requirements for its spectral transmittance:

- a value of less than 0,1 % at 580 nm;
- a fairly high and substantially uniform value above 615-620 nm.

NOTE 1 The value at 580 nm is based on the need to have no appreciable transmission for the yellow doublet (577-579 nm) of the mercury spectrum.

NOTE 2 Even though catalogue data for a given type of filter may indicate it to be satisfactory, there is very often a spread of the spectral characteristics between filters bearing the same type number but coming from different batches. For this reason, the filter should always be selected to ensure compliance with the requirements listed above.

C.2 Method of measurement

The light of the lamp X to be tested shall be successively measured without and with interposition of the red filter. The ratio of the second measurement to the first one yields an uncorrected measurement r_{uX} of the red ratio.

Lamp N shall then be used to correct this measurement according to the following method:

The light of the lamp N shall be similarly measured without and with the filter and the ratio of these measurements gives a value r_{uN} . The knowledge of the spectral distribution of the lamp then allows its red ratio (r_N) to be computed.

The red ratio, as defined in 1.3.7, is the ratio of two integrals of the form $\int E_l V(l) dl$ over the red band and over the whole of the visible spectrum.

The ratio $c = r_N / r_{uN}$ gives the correction factor required for obtaining the red ratio for lamp X.

This red ratio is given by $r_X = c \cdot r_{uX}$.

The factor c corrects for both of the following:

- the relationship between a measurement made with a filter and the value of the red ratio as defined by the two integrals, which is inherent in the principle of the method;
- an allowance for the fact that the photo-receiver used for the measurement will not be, in general, ideally adapted to the spectral luminous efficiency $V(\lambda)$.

The method assumes that the ratio between the red ratio according to the definition and its uncorrected measurement with the filter is the same for both lamps X and N.

It is this assumption which, as mentioned above, necessitates that the coatings of both lamps N and X emit light of similar spectral distributions.

NOTE 1 The manufacturers of a lamp will generally be able to state whether that type of lamp may or may not be measured with a Type N as reference.

The method also assumes that the spectral characteristic of the filter remains exactly the same when measuring both lamps N and X. Several types of red filters are very sensitive to temperature so that the slope of their spectral transmittance relative to wavelengths shifts as the temperature varies. This phenomenon directly affects any response located within this region of the curve. This fact is of primary importance when considering the more recent types of coatings used. In such cases it is absolutely necessary to keep the filter at the same temperature when making measurements to be compared. Any significant heating should be avoided: for instance, by keeping the filter/photo-receiver assembly at sufficient distance from the light sources.

Also, if the filter is placed too near to the photo-receiver, inter-reflections may occur. These however, will not result in any additional error provided that they remain the same for both comparative measurements. Consequently, since the filter is constantly being removed and inserted, it is necessary to make sure that it is always kept in the same position relative to the photo-receiver.

NOTE 2 The method does not require any determination of the spectral sensitivity of the photo-receiver. It is only necessary to check that the prescribed characteristics of the filter are obtained.

The method may be used either with an integrating (or Ulbricht) sphere or with the directional measurements in a dark-room. In the latter case, a single measurement is sufficient if the fluorescent coating is homogeneous; otherwise, several measurements should be taken in different directions and the mean of the intensities used.

If an integrating sphere is used, a slight selectivity of its internal surface finish is immaterial as this is equivalent to an alteration of the spectral sensitivity of the photo-receiver.

NOTE 3 It is recommended that a spectrophotometric check of the lamp(s) N should be made after a few hundred hours of operation in order to ascertain whether the spectral distribution is affected by ageing.

Annex D
(informative)

Information for luminaire design

D.1 Maximum lamp outlines

Maximum lamp outlines, given in 2.2.2, are provided for the guidance of designers of luminaires and are based on a maximum sized lamp inclusive of bulb to cap displacement.

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

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-845	- 1)	International Electrotechnical Vocabulary (IEV) Chapter 845: Lighting	-	-
IEC 60061-1 (mod)	- 1)	Lamp caps and holders together with gauges for the control of interchangeability and safety Part 1: Lamp caps	EN 60061-1	1993 ²⁾
IEC 60923	- 1)	Auxiliaries for lamps - Ballasts for discharge lamps (excluding tubular fluorescent lamps) - Performance requirements	EN 60923	1996 ²⁾
IEC 62035 (mod)	- 1)	Discharge lamps (excluding fluorescent lamps) - Safety specifications	EN 62035	2000 ²⁾

1) undated reference.

2) valid edition at date of issue.

Bibliography

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

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

2 Data sheets

2.1 General principles of numbering sheets

The first number represents the number of this standard: 60188, followed by the letters "IEC".

The second number represents the data sheet number.

The third number represents the edition of the page of the data sheet. In cases where a data sheet has more than one page, it is possible for the pages to have different edition numbers, with the data sheet number remaining the same.

2.2 Lists of data sheets

2.2.1 List of lamp data sheets

The location of lamp dimensions is given on diagrammatic data sheet 60188-IEC-01.

Sheet number	Nominal wattage W	Cap
60188-IEC-110	50 HV	E27
60188-IEC-120	80 HV	E27
60188-IEC-130	125 HV	E27
60188-IEC-140	250 HV	E40
60188-IEC-150	400 HV	E40
60188-IEC-160	700 HV	E40
60188-IEC-161	700 EHV	E40
60188-IEC-170	1 000 HV	E40
60188-IEC-171	1 000 EHV	E40
60188-IEC-181	2 000 EHV	E40
60188-IEC-210	50 HV	E26
60188-IEC-235	175 HV	E39
60188-IEC-240	250 HV	E39
60188-IEC-250	400 HV	E39
60188-IEC-261	700 EHV	E39
60188-IEC-270	1 000 HV	E39
60188-IEC-271	1 000 EHV	E39

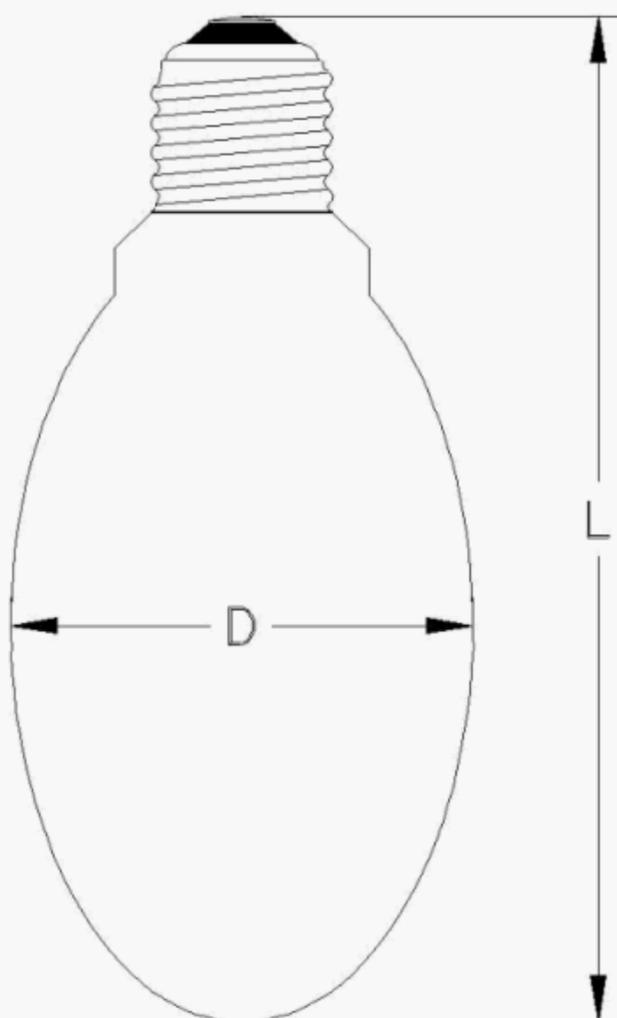
2.2.2 List of maximum lamp outline sheets

Sheet number	Nominal wattage W	Cap
60188-IEC-1000	50 HV	E27
60188-IEC-1000	80 HV	E27
60188-IEC-1000	125 HV	E27
60188-IEC-1000	250 HV	E40
60188-IEC-1000	400 HV	E40
60188-IEC-1000	700 HV & EHV	E40
60188-IEC-1000	1 000 HV & EHV	E40
60188-IEC-1000	2 000 EHV	E40
60188-IEC-2000	50 HV	E26
60188-IEC-2000	175 HV	E39
60188-IEC-2000	250 HV	E39
60188-IEC-2000	400 HV	E39
60188-IEC-2000	700 EHV	E39
60188-IEC-2000	1 000 HV & EHV	E39

blank

HIGH-PRESSURE MERCURY VAPOUR LAMP
LOCATION OF LAMP DIMENSIONS

This drawing is intended only to indicate dimensions to be controlled and is to be used in conjunction with the relevant lamp data sheet



IEC 495/01

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
50 W HV	E27	QE-50-H-E27-56/130

Dimensions (mm)	
L (max.)	D (max.)
130	56

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	0,58	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	72	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	50	–	53
Voltage (r.m.s.) at lamp terminals	V	95	85	105
Current	A	0,61	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	0,62	$297 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
1,22	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
80 W HV	E27	QE-80-H-E27-71/166

Dimensions (mm)	
L (max.)	D (max.)
166	71

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	0,72	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	85	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	80	–	84
Voltage (r.m.s.) at lamp terminals	V	115	100	130
Current	A	0,80	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	0,80	206 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
1,60	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
125 W HV	E27	QE-125-H-E27-76/178

Dimensions (mm)	
L (max.)	D (max.)
178	76

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	1,04	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	93	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	125	–	132
Voltage (r.m.s.) at lamp terminals	V	125	110	140
Current	A	1,15	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	1,15	134 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
2,30	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
250 W HV	E40	QE-250-H-E40-91/228

Dimensions (mm)	
L (max.)	D (max.)
228	91

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	1,94	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	98	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	250	–	263
Voltage (r.m.s.) at lamp terminals	V	130	115	145
Current	A	2,13	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	2,15	$71 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
4,26	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
400 W HV	E40	QE-400-H-E40-122/292

Dimensions (mm)	
L (max.)	D (max.)
292	122

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	2,93	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	102	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	400	–	420
Voltage (r.m.s.) at lamp terminals	V	135	120	150
Current	A	3,25	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	3,25	$45 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
6,83	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
700 W HV	E40	QE-700-H-E40-152/357

Dimensions (mm)	
L (max.)	D (max.)
357	152

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	4,90	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	106	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	700	–	735
Voltage (r.m.s.) at lamp terminals	V	140	125	155
Current	A	5,40	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	5,45	$26,7 \pm 0,5 \%$	$0,040 \pm 0,002$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
11,34	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
700 W EHV	E40	QE-700-E-E40-152/357

Dimensions (mm)	
L (max.)	D (max.)
357	152

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	-	-	290
Starting time	s	-	-	10
Warm-up current	A	2,52	-	-
Warm-up voltage (r.m.s.) at lamp terminals	V	-	204	-
Warm-up time	min	-	-	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	700	-	735
Voltage (r.m.s.) at lamp terminals	V	265	240	290
Current	A	2,80	-	-

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	460	2,80	112 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
5,88	342

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
1 000 W HV	E40	QE-1000-H-E40-167/411

Dimensions (mm)	
L (max.)	D (max.)
411	167

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	6,75	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	110	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	1 000	–	1 050
Voltage (r.m.s.) at lamp terminals	V	145	130	160
Current	A	7,50	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	220	7,50	$18,5 \pm 0,5 \%$	$0,040 \pm 0,002$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
15,75	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
1 000 W EHV	E40	QE-1000-E-E40-167/411

Dimensions (mm)	
L (max.)	D (max.)
411	167

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	290
Starting time	s	–	–	10
Warm-up current	A	3,60	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	204	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	1 000	–	1 050
Voltage (r.m.s.) at lamp terminals	V	265	240	290
Current	A	4,00	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	380	4,00	$52 \pm 0,5 \%$	$0,040 \pm 0,002$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
8,40	342

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
2 000 W EHV	E40	QE-2000-E-E40-187/446

Dimensions (mm)	
L (max.)	D (max.)
446	187

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	-	-	310
Starting time	s	-	-	10
Warm-up current	A	7,20	-	-
Warm-up voltage (r.m.s.) at lamp terminals	V	-	208	-
Warm-up time	min	-	-	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	2 000	-	2 100
Voltage (r.m.s.) at lamp terminals	V	270	245	295
Current	A	8,00	-	-

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
50	380	8,00	$28 \pm 0,5 \%$	$0,040 \pm 0,002$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
16,80	342

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
50 W HV	E26	QE-50-H-E26-56/130

Dimensions (mm)	
L (max.)	D (max.)
130	56

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	0,58	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	72	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	50	–	53
Voltage (r.m.s.) at lamp terminals	V	95	85	105
Current	A	0,61	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	220	0,62	$297 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
1,22	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
175 W HV	E39	QE-175-H-E39-91/211

Dimensions (mm)	
L (max.)	D (max.)
211	91

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	190
Starting time	s	–	–	10
Warm-up current	A	1,35	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	98	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	175	–	184
Voltage (r.m.s.) at lamp terminals	V	130	115	145
Current	A	1,50	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	220	1,50	99,5 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
3,00	210

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
250 W HV	E39	QE-250-H-E39-91/211

Dimensions (mm)	
L (max.)	D (max.)
211	91

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	1,94	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	98	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	250	–	263
Voltage (r.m.s.) at lamp terminals	V	130	115	145
Current	A	2,13	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	220	2,15	$71 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
4,26	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
400 W HV	E39	QE-400-H-E39-122/292

Dimensions (mm)	
L (max.)	D (max.)
292	122

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	2,93	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	102	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	400	–	420
Voltage (r.m.s.) at lamp terminals	V	135	120	150
Current	A	3,25	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	220	3,25	45 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
6,83	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
700 W EHV	E39	QE-700-E-E39-150/369

Dimensions (mm)	
L (max.)	D (max.)
369	150

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	-	-	290
Starting time	s	-	-	10
Warm-up current	A	2,52	-	-
Warm-up voltage (r.m.s.) at lamp terminals	V	-	204	-
Warm-up time	min	-	-	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	700	-	735
Voltage (r.m.s.) at lamp terminals	V	265	240	290
Current	A	2,80	-	-

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	460	2,80	112 ± 0,5 %	0,075 ± 0,005

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
5,88	375

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
1 000 W HV	E39	QE-1000-H-E39-182/391

Dimensions (mm)	
L (max.)	D (max.)
391	182

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	180
Starting time	s	–	–	10
Warm-up current	A	7,20	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	102	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	1 000	–	1 050
Voltage (r.m.s.) at lamp terminals	V	135	120	150
Current	A	8,00	–	–

Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	220	8,00	$18,2 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
16,80	198

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
DATA SHEET**

Nominal wattage	Cap	ILCOS
1 000 W EHV	E39	QE-1000-E-E39-182/391

Dimensions (mm)	
L (max.)	D (max.)
391	182

Starting and warm-up characteristics				
		Rated	Minimum	Maximum
Starting voltage (r.m.s.)	V	–	–	290
Starting time	s	–	–	10
Warm-up current	A	3,60	–	–
Warm-up voltage (r.m.s.) at lamp terminals	V	–	204	–
Warm-up time	min	–	–	12

Electrical characteristics				
		Rated	Minimum	Maximum
Wattage	W	1 000	–	1 050
Voltage (r.m.s.) at lamp terminals	V	265	240	290
Current	A	4,00	–	–

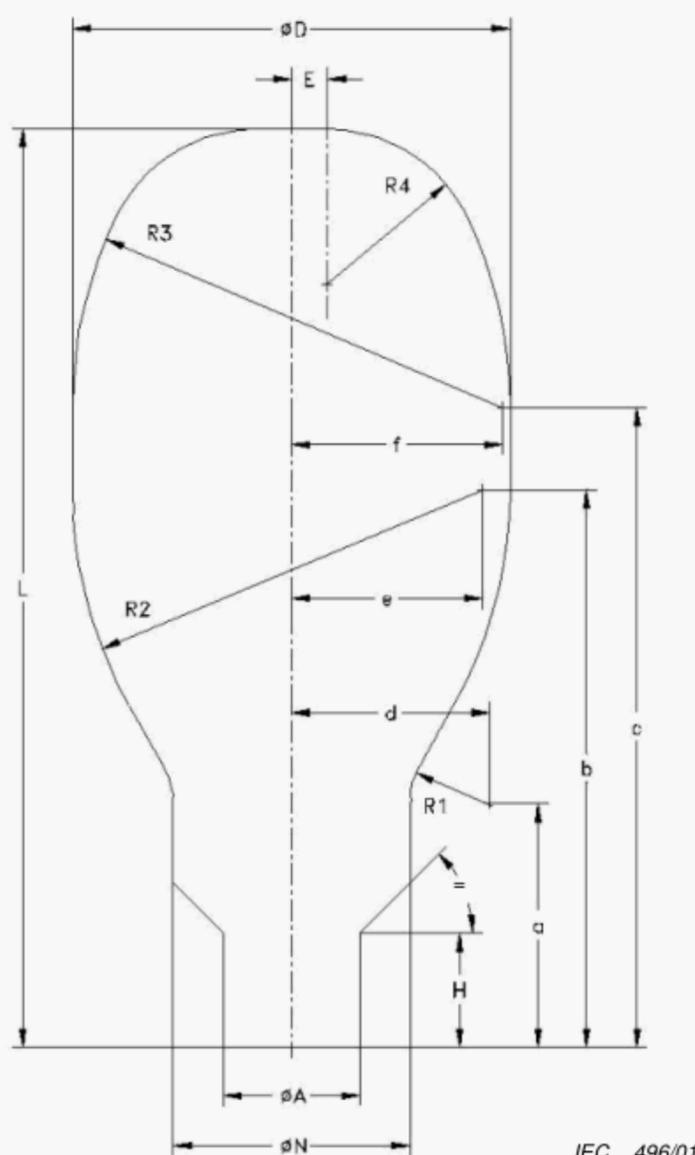
Reference ballast characteristics				
Frequency	Rated voltage	Calibration current	Voltage/current ratio	Power factor
Hz	V	A	W	
60	460	4,00	$80 \pm 0,5 \%$	$0,075 \pm 0,005$

Information for ballast design	
Maximum short-circuit current	Minimum open-circuit voltage (r.m.s.)
A	V
8,40	375

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
MAXIMUM LAMP OUTLINES**

Dimensions in millimetres



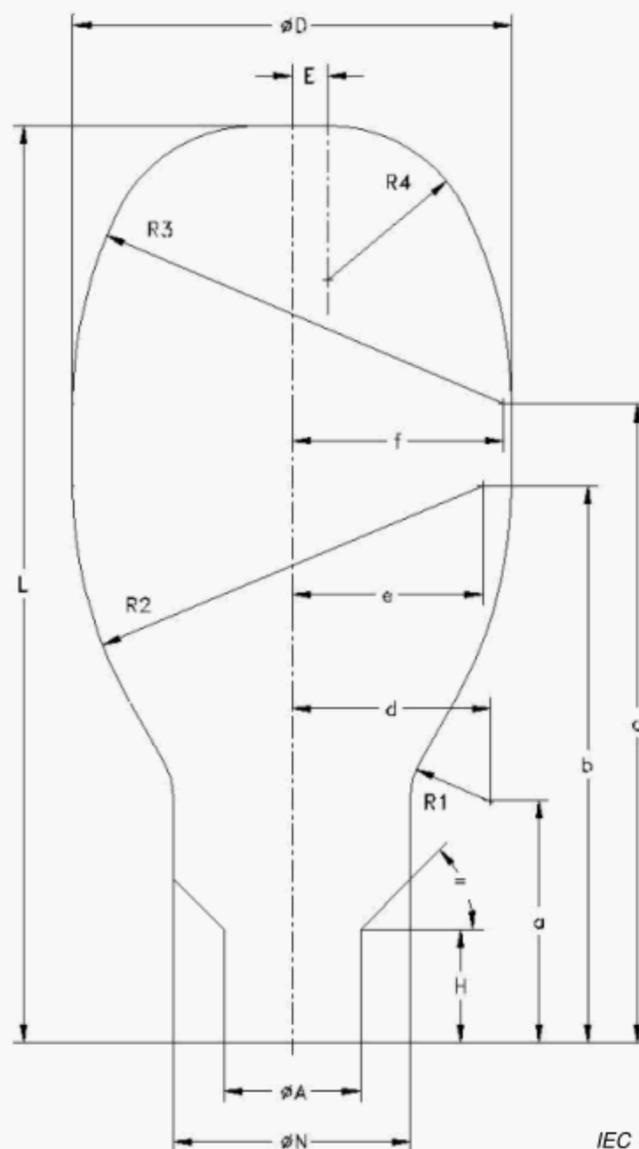
IEC 496/01

Wattage	50 W	80 W	125 W	250 W	400 W	700 W	1 000 W	2 000 W
Cap	E27	E27	E27	E40	E40	E40	E40	E40
A	26,45	26,45	26,45	39,5	39,5	39,5	39,5	39,5
D	64	81	85	104	140	170	190	207
E	4,5	6	7	8	16	28	13	8
H	22	22	22	34	34	34	34	34
L	130	166	178	228	292	357	411	446
N	37	40	46	58	66	70	70	76
R1	22	37	14	41	51	40	39	63
R2	57	80	85	125	112	170	75	197
R3	57	80	85	104	140	170	190	197
R4	20	30	30	35	40	22	62	67
a	33	33	47,5	50	55	60	70	79
b	77	98	108	134	158	195	170	252,5
c	87	114	124	159	200	242	281	300
d	40,5	57	37	70	84	75	74	101
e	25	39,5	42,5	73	42	85	-20	93,5
f	25	39,5	42,5	53	70	85	95	93,5
a	45°	45°	45°	45°	45°	45°	45°	45°

blank

**HIGH-PRESSURE MERCURY VAPOUR LAMP
MAXIMUM LAMP OUTLINES**

Dimensions in millimetres



IEC 497/01

Wattage	50 W	175 W	250 W	400 W	700 W	1 000 W
Cap	E26	E39	E39	E39	E39	E39
A	26,45	39,5	39,5	39,5	39,5	39,5
D	64	104	104	141,4	172,4	204,4
E	4,5	8	8	16	28	24
H	22	34	34	34	34	34
L	130	211	211	292	369	391
N	37	58	58	66	70	71
R1	22	41	41	51	45	20
R2	57	125	125	112	139,5	115
R3	57	104	104	140	170	250
R4	20	35	35	40	25	64
a	33	50	50	55	60	70
b	77	134	134	158	191	209
c	87	159	159	200	249	243
d	40,5	70	70	84	80	55,5
e	25	73	73	41,3	53,3	12,5
f	25	53	53	69,3	83,8	147,5
a	45°	45°	45°	45°	45°	45°

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.

Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001. Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

Tel: 020 8996 7002. Fax: 020 8996 7001. Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.