

Discharge lamps (excluding fluorescent lamps) — Safety specifications

ICS 29.140.30

National foreword

This British Standard is the UK implementation of EN 62035:2000+A2:2012. It was derived from IEC 62035:1999, incorporating amendments 1:2003 and 2:2012. It supersedes BS EN 62035:2000+A1:2003, which is withdrawn.

The start and finish of text introduced or altered by IEC amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags **C1** **C1**. Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, common modifications introduced by CENELEC amendment A11 are indicated by **C11** **C11**.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and Related Equipment, to Subcommittee CPL/34/1, Electric Lamps.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 June 2000

© The British Standards Institution 2013.
Published by BSI Standards Limited 2013

ISBN 978 0 580 72418 3

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
13611	5 December 2001	
14977	23 February 2004	See national foreword
	28 February 2013	Implementation of IEC amendment 2:2012 with CENELEC endorsement A2:2012

EUROPEAN STANDARD

EN 62035:2000+A2

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2012

ICS 29.140.30

English version

**Discharge lamps
(excluding fluorescent lamps)
Safety specifications**
(includes amendment A1:2003)
(IEC 62035:1999 + A1:2003, modified)

Lampes à décharge
(à l'exclusion des lampes à fluorescence) -
Prescriptions de sécurité
(inclut l'amendement A1:2003)
(CEI 62035:1999 + A1:2003, modifiée)

Entladungslampen
(ausgenommen Leuchtstofflampen) –
Sicherheitsanforderungen
(enthält Änderung A1:2003)
(IEC 62035:1999 + A1:2003, modifiziert)

This European Standard was approved by CENELEC on 1999-12-01. Amendment A1 was approved by CENELEC on 2003-09-23. 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, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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

© 2003 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 62035:2000 + A1:2003 E

AVA Documents
Document Sharing Hub

Foreword

The text of document 34A/885/FDIS, future edition 1 to IEC 62035, 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, together with common modifications, prepared by CLC/SR 34A, as EN 62035 on 1999-12-01.

This standard replaces and combines the safety requirements previously contained in EN 60188:1988, EN 60192:1993, EN 60662:1993 and EN 61167:1994.

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) 2000-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2002-12-01

Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given the information only.

In this standard, annexes A to E and ZA are normative and annex F is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of International Standard IEC 62035:1999 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

Lamps with the following caps are excluded from this European Standard.

E26
E39

Foreword to amendment A1

The text of document 34A/1032/FDIS, future amendment 1 to IEC 62035:1999, 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 amendment A1 to EN 62035:2000 on 2003-09-23 with inclusion of the common modifications contained in EN 62035:2000.

The following dates were fixed:

- latest date by which the amendment has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2004-07-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2006-10-01

Endorsement notice

The text of amendment 1:2003 to the International Standard IEC 62035:1999 was approved by CENELEC as an amendment to the European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

In Table F.1, **delete** the rows as referring to E26 and E39 caps and **delete** the corresponding footnotes.

Foreword to amendment A2

The text of document 34A/1575/FDIS, future amendment 2 to edition 1 of IEC 62035, 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 62035:2000/A2:2012.

The following dates are fixed:

- latest date by which the document has (dop) 2013-05-31
to be implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2015-08-31
standards conflicting with the
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 62035:1999/A2:2012 was approved by CENELEC as a European Standard without any modification.

CONTENTS

Page

Clause	
1	Scope 5
2	Normative references..... 5
3	Definitions 6
4	General safety requirements 8
4.1	General 8
4.2	Marking 8
4.3	Mechanical requirements 9
4.4	Electrical requirements 11
4.5	Thermal requirements..... 12
5	Particular safety requirements..... 13
5.1	High-pressure sodium vapour lamps 13
5.2	Metal halide lamps..... 13
6	Information for luminaire design 14
7	Assessment..... 15
7.1	General..... 15
7.2	Assessment of whole production by means of manufacturer's records 15
7.3	Assessment of batches..... 21
Annex A (normative)	List of lamp caps and gauges 24
Annex B (normative)	Pull and torsion test values 25
Annex C (normative)	Torsion test holders 26
Annex D (normative)	Information for thermal tests 28
Annex E (normative)	Measurement of pulse height for lamps with internal starting device 29
Annex F (informative)	Information for luminaire design 32
Annex G (normative)	Conditions of compliance for designs tests 34
Annex H (normative)	Symbols 35
Annex I (normative)	Containment testing procedure for metal halide lamps with quartz arc tubes 36
Annex J (normative)	Containment testing procedure for metal halide lamps with ceramic arc tubes 40
Annex ZA (normative)	Normative references to international publications with their corresponding European publications 44
Bibliography	 46

DISCHARGE LAMPS (EXCLUDING FLUORESCENT LAMPS) – SAFETY SPECIFICATIONS

1 Scope

This International Standard specifies the safety requirements for discharge lamps (excluding fluorescent lamps) for general lighting purposes.

This International Standard is applicable to low-pressure sodium vapour lamps and to high-intensity discharge (HID) lamps, i.e. high-pressure mercury vapour lamps (including blended lamps), high-pressure sodium vapour lamps and metal halide lamps. It applies to single- and double-capped lamps, having caps as listed in annex A.

A1 Text deleted **A1**

NOTE This standard only concerns safety criteria and does not take into account performance. The performance standards IEC 60188, IEC 60192, IEC 60662, IEC 61167 and IEC 61549 should be referred to for such characteristics.

It may be expected that lamps which comply with this standard will operate safely at supply voltages between 90 % and 110 % of rated supply voltage and when operated with a ballast complying with IEC 60922 and IEC 60923, with a starting device complying with IEC 60926 and IEC 60927, and in a luminaire complying with IEC 60598-1.

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 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 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders*

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3: Gauges*

IEC 60061-4, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 4: Guidelines and general information*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60662, *High-pressure sodium vapour lamps*

IEC 60695-2-1/0, *Fire hazard testing – Part 2: Test methods – Section 1/Sheet 0: Glow-wire test methods – General*

IEC 60922, *Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – General and safety requirements*

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

IEC 60926, *Auxiliaries for lamps – Starting devices (other than glow starters) – General and safety requirements*

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

IEC 61167, *Metal halide lamps*

ISO 4046, *Paper, board, pulp and related terms – Vocabulary*

3 Definitions

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

3.1

high-intensity discharge lamp; HID lamp

electric discharge lamp in which the light-producing arc is stabilized by wall temperature and the arc has a bulb wall loading in excess of 3 watts per square centimetre

NOTE HID lamps include groups of lamps known as high-pressure mercury, metal halide and high-pressure sodium lamps.

[IEV 845-07-19]

3.2

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 kilopascals

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 the layer of phosphors excited by the ultraviolet radiation of the discharge.

[IEV 845-07-20]

3.3

blended lamp; self-ballasted mercury lamp (USA)

lamp containing in the same bulb certain elements of a mercury vapour lamp and an incandescent lamp filament connected in series

NOTE The bulb may be diffusing or coated with phosphors.

[IEV 845-07-21, modified]

3.4

high-pressure sodium (vapour) lamp

high-intensity discharge lamp in which the light is produced mainly by radiation from sodium vapour operating at a partial pressure of the order of 10 kilopascals

NOTE The term covers lamps with clear or diffusing bulb.

[IEV 845-07-23]

3.5

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]

3.6

metal halide lamp

high-intensity discharge lamp in which the major portion of the light is produced by radiation from a mixture of metallic vapour, metal halides and the products of the dissociation of metal halides

NOTE The definition covers clear and coated lamps.

[IEV 845-07-25, modified]

3.7

nominal wattage

approximate quantity value of lamp wattage used to designate or identify a lamp

3.8

specific effective radiant UV power

effective power of the UV radiation of a lamp related to its luminous flux

(unit: mW/klm)

NOTE The effective power of the UV radiation is obtained by weighting the spectral power distribution of the lamp with the UV hazard function $S_{UV}(\lambda)$. Information about the relevant UV hazard function is given in CIE S009. It only relates to possible hazards regarding UV exposure of human beings. It does not deal with the possible influence of optical radiation on materials, like mechanical damage or discoloration. 

3.9

type test

test or 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

3.10

type test sample

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

3.11

group

lamps of the same generic type (see 3.2. to 3.6)

3.12

type

lamps of the same group having the same nominal wattage, bulb shape and cap 

A₁ 3.13**family**

grouping of lamps characterized by common features such as materials, components and/or method of processing

3.14

design test

test made on a sample for the purpose of checking compliance of the design of a family, group or a number of groups with the requirements of the relevant clause or subclause

3.15

periodic test

test, or series of tests, repeated at intervals in order to check that a product does not deviate in certain respects from the given design

3.16

running test

test repeated at frequent intervals to provide data for assessment

3.17

batch

all lamps in one family and/or group and identified as such and put forward at one time for checking compliance

3.18

whole production

production during a period of 12 months of all types of lamps within the scope of this standard and nominated in a list of the manufacturer for inclusion in the certificate

3.19

self-shielded metal halide lamp

metal halide lamp for which the luminaire needs no protective shield **A₁**

4 General safety requirements**4.1 General**

Lamps shall be so designed and constructed that in normal use they present no danger to the user or the surroundings.

In general, compliance is checked by carrying out all the tests specified in this standard.

4.2 Marking**4.2.1 Lamp marking**

Lamps shall be marked as follows:

- mark of origin, which may take the form of a trade mark, the manufacturer's name or the name of the responsible vendor;
- nominal wattage (marked "W" or "watts") and/or any other indication which identifies the lamp.

NOTE 1 In the relevant lamp performance standards, the nominal wattage may still be indicated as "rated" wattage (and the rated wattage as "objective" wattage). This wording will be corrected in future editions of these standards.

NOTE 2 In the USA, additional product marking is required.

Marking shall be legible and durable.

Compliance is checked on unused lamps as follows:

- a) presence and legibility by visual inspection;
- b) durability by rubbing the area of the marking by hand for a period of 15 s, with a smooth cloth dampened with water. After this test the marking shall still be legible.



4.2.2 Additional information to be provided

In addition to the above lamp marking, all details and provisions which are necessary to ensure safe installation and use shall be given in the lamp manufacturer's instructions. Alternatively, the immediate lamp wrapping or container may be marked with the corresponding symbols as shown in Annex H.

NOTE In North America, a suitable cautionary notice is required. Additional use of symbols is optional.

If applicable, information shall be given about

- a) The provision that the lamp shall be operated in an enclosed luminaire only (for symbol, see H.1);
- b) the hazard associated with a high level of UV radiation emitted by the lamp (for symbol, see H.2). The value of the specified maximum specific effective radiant UV power shall be made available for proper luminaire design (see Clause F.5) if it exceeds
 - 6 mW/klm for a non-reflector lamp, or
 - $6 \text{ mW}/(\text{m}^2 \times \text{klx})$ for a reflector lamp;

NOTE In CIE S009 exposure limits are given as effective irradiance values (unit W/m^2) and for risk group classification the values for general lighting lamps are to be reported at an illuminance level of 500 lx. For example, the borderline for risk group exempt is $0,001 \text{ W}/\text{m}^2$ at an illuminance level of 500 lx. In other words the specific value, related to the illuminance, is $0,001$ divided by 500 in $\text{W}/\text{m}^2 \cdot \text{lx}$, which is $2 \text{ mW}/(\text{m}^2 \cdot \text{klx})$. Since $\text{lx} = \text{lm}/\text{m}^2$, which equals $2 \text{ mW}/\text{klm}$ specific effective UV power. The borderline between risk group 1 and 2 is $0.003 \text{ W}/\text{m}^2$, which equals $6 \text{ mW}/\text{klm}$ specific effective UV power.

- c) the risk of the occurrence of a rectifying effect at the end of lamp life;
- d) the hazard(s) that exist(s) when the outer envelope is broken (for symbol, see H.3).

Compliance is checked by visual inspection.

4.3 Mechanical requirements

4.3.1 Requirements for caps

4.3.1.1 Dimensions

If lamps use standardized caps, they shall be in accordance with the requirements on the cap data sheets of IEC 60061-1 listed in annex A. Non-standardized caps shall be in line with the lamp manufacturer's documentation.

Compliance is checked on finished lamps by gauging and/or measurement. For standardized caps, the gauges of IEC 60061-3 listed in annex A shall be used.

4.3.1.2 Creepage distance

The minimum creepage distance between contact pin(s) or contacts and a touchable metal shell of the cap shall be in accordance with the requirements of IEC 60061-4.

Compliance is checked by measurement.

4.3.1.3 Caps provided with keys

For lamps using cap types incorporating keys which ensure non-interchangeability with similar lamp types, the correct cap/key version shall be used.

Compliance is checked by visual inspection.

4.3.2 Construction and assembly

Caps shall be so constructed and assembled to the bulbs that the whole assembly remains intact and attached during and after normal operation.

Compliance is checked by carrying out the following tests.

4.3.2.1 Resistance to pull

Where lamps are so constructed that when withdrawing from the lampholder a pull is exerted, the pull shall be withstood without the cap or any part of the cap or bulb being loosened or pulled apart.

Compliance is checked by the following pull test.

A pull in the direction of the lamp axis shall be applied for 1 min to

- a) unused lamps,
- b) lamps after storage in a heating cabinet for a period of $2\,000\text{ h} \pm 50\text{ h}$.

The pull values and heating cabinet temperatures are given in annex B.

Care shall be taken that the means (clamp, etc.) of applying the pull to the lamp does not weaken the structure.

The pull shall be increased progressively from zero to the value given in annex B, table B.1. The pull shall not be applied with a jerk.

4.3.2.2 Resistance to torque

Where lamps are so constructed that, during insertion into or withdrawal from, the lampholder, a torque is applied to the cap or parts of the cap or to the cap/bulb connection, the torque shall be withstood without any loosening of the connections. For mechanically fixed screw caps, an angular displacement between cap and bulb of not more than 10° is allowed.

Compliance is checked by the following torsion test:

A torque shall be applied to

- a) unused lamps,
- b) lamps after storage in a heating cabinet for a period of $2\,000\text{ h} \pm 50\text{ h}$.

The torque values and the heating cabinet temperatures are given in annex B. The torsion test holders are specified in annex C.

Before each use, the test holder for screw caps shall be checked to ensure that it is clean and completely free of lubricants and grease. The cap of the test lamp shall be placed in the appropriate holder. Either the cap or the bulb may be mechanically clamped.

NOTE For some mechanically fixed screw caps, for example those positioned on a screw thread shaped sealing area, it is necessary to clamp the shell and to apply the torque in both directions.

The torque shall be increased progressively from zero to the value given in annex B, table B.2. The torque shall not be applied with a jerk.

4.4 Electrical requirements

4.4.1 Parts which can become accidentally live

Metal parts intended to be insulated from live parts shall not be or become live. Any movable conductive material shall be placed, without the use of a tool, in the most onerous position before inspection.

On bayonet caps, any projection from the contact plate shall not come within 1 mm of metal parts intended to be insulated.

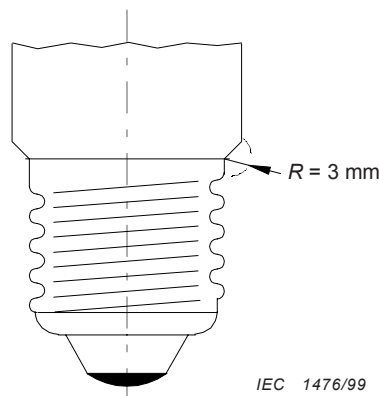


Figure 1 – Edison screw-capped lamp

On Edison screw caps any projection from the cap shell shall not project more than 3 mm from the surface of the cap (see figure 1).

Compliance is checked by either an appropriate automatic system or by visual inspection. In addition, there shall be regular daily checks of the equipment or a verification of the effectiveness of the inspection.

4.4.2 Insulation resistance

Lamps where the metal shell of the cap can be touched after insertion into the holder shall have an insulation resistance between the metal shell of the cap and the pin(s) or contacts of not less than 2 MΩ.

Compliance is checked by measurement with suitable test equipment using a d.c. voltage of 500 V.

4.4.3 Electric strength

The insulation between the same parts as those referred to in 4.4.2 shall have sufficient (di)electric strength.

Compliance is checked with a 1 500 V a.c. voltage of substantially sine-wave form, with a frequency of 50 Hz or 60 Hz and applied for 1 min. Initially, not more than half the prescribed voltage shall be applied. The voltage shall then be raised rapidly to the full value.

No flash-over or breakdown shall occur during the test. Glow discharges without a drop in voltage are neglected.

4.5 Thermal requirements

Insulating material of caps, which provide protection against electric shock, shall be resistant to heat and fire.

Compliance is checked by the following tests.

A1 These tests are not made on parts of ceramic or glass material. **A1**

4.5.1 Resistance to heat

4.5.1.1 Heat test

The sample is tested for a period of 168 h in a heating cabinet at a temperature according to the values given in annex D.

At the end of the test, the specimens shall not have undergone any change impairing their future safety, especially in the following respects:

- reduction in the protection against electric shock as required under insulation resistance and electric strength;
- loosening of any part of the cap, cracks, swelling and shrinking as determined by visual inspection.

At the end of the test, the dimensions shall comply with the dimensional requirements for caps.

4.5.1.2 Ball-pressure test

The sample is subjected to a ball-pressure test using the apparatus shown in annex D.

The specimens are conditioned for 1 h in the same heating cabinet where the test will be made, at a temperature according to the values given in annex D.

The surface of the part under test is placed in the horizontal position. A steel ball of 5 mm diameter is pressed against this surface by a force of 20 N. If the surface under test bends, the part where the ball presses shall be supported. If the test cannot be made on the complete specimen, a suitable section may be cut from it and used as a test specimen. The specimen shall be at least 2,5 mm thick, but if such a thickness is not available on the specimen then two or more pieces are placed together.

The test is made in a heating cabinet at a temperature according to values given in annex D. After 1 h, the ball shall be removed from the specimen, which is then immersed within 10 s in cold water for cooling down to approximately room temperature. The diameter of the impression caused by the ball is measured and shall not exceed 2 mm.

NOTE In the case of curved surfaces, the shorter axis is measured if the indent is elliptical.

In case of doubt, the depth p of the impression is measured and the diameter $\varnothing$ calculated using the formula: $\varnothing = 2 \sqrt{p(5 - p)}$.

4.5.2 Resistance to abnormal heat and fire

4.5.2.1 Glow-wire test

The sample is subjected to a test using a nickel-chromium glow-wire heated to 650 °C. The test apparatus shall be that described in IEC 60695-2-1/0.

The glow-wire temperature and heating current shall be constant for 1 min prior to commencing the test. Care shall be taken to ensure that heat radiation does not influence the specimen during this period. The glow-wire tip temperature is measured by means of a sheathed fine-wire thermocouple constructed and calibrated as described in IEC 60695-2-1/0.

The specimen to be tested is mounted vertically on the carriage and pressed against the glow-wire tip with a force of 1 N, preferably 15 mm or more from the upper edge of the specimen. The penetration of the glow-wire into the specimen is mechanically limited to 7 mm. After 30 s the specimen is withdrawn from contact with the glow-wire tip.

Any flame or glowing of the specimen shall extinguish within 30 s of withdrawing the glow-wire and any burning or molten drop shall not ignite a piece of five-layer tissue paper, specified in 6.86 of ISO 4046, spread out horizontally 200 mm ± 5 mm below the specimen.

NOTE Precautions should be taken to safeguard the health of personnel conducting tests against risk of explosion or fire, of inhalation of smoke and/or toxic products, and of toxic residues.

5 Particular safety requirements

5.1 High-pressure sodium vapour lamps

5.1.1 Pulse height for lamps with internal starting device

For lamps with an internal starting device, the voltage pulses generated during ignition shall not exceed the maximum pulse height as given in the information for ballast design specified on the relevant lamp data sheet in IEC 60662.

Compliance is checked by the measurement procedure described in annex E.

5.2 Metal halide lamps



5.2.1 General metal halide lamps (not self-shielded)

Text deleted

5.2.1.1 Marking

In addition to the requirements of 4.2, the following applies.

The immediate lamp wrapping or container of lamps with a specified maximum specific effective radiant UV power exceeding:

- 6 mW/klm for a non-reflector lamp; or
- $6 \text{ mW/klm}^2 \times \text{klx}$ for a reflector lamp;

shall be marked with the cautionary symbol given in H.2 or, alternatively, contain a suitable cautionary notice.

NOTE In North America a suitable cautionary notice is required. A risk group marking is also required on the lamp. (For further information, consult the national standards.) Use of the symbol is optional.

Compliance is checked by visual inspection.