

Specification for

Auxiliaries for lamps — Starting devices (other than glow starters) — General and safety requirements

The European Standard EN 60926 : 1996 with the incorporation of amendment A1:1999 has the status of a British Standard

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Committees responsible for this British Standard

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BEAMA Capacitor Manufacturers' Association
British Lighting Association for the Preparation of Standards (BRITLAPS)
British Sign Association
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Institution of Lighting Engineers
Lighting Industry Federation Ltd.
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Co-opted members

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National foreword

This British Standard has been prepared by Subcommittee CPL/34/3 and is the English language version of EN 60926 : 1996 *Auxiliaries for lamps — Starting devices (other than glow starters) — General and safety requirements*, including amendment A1:1999, published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by CENELEC from IEC 60926 : 1995, including amendment 1:1999 published by the International Electrotechnical Commission (IEC). The CENELEC common modification has been incorporated into the text and is indicated by a sideline.

This British Standard supersedes BS EN 60926 : 1991 which was withdrawn on 15 August 1996. Certificates or marks will not be awarded after this date with respect to the withdrawn British Standard. However such Certificates and Marks, already awarded, may apply to production until 2001-02-15.

The following print types are used in this standard:

requirement proper	in roman type
<i>test specification</i>	<i>in italic type</i>
explanatory matter	in smaller roman type

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 30, an inside back cover and a back cover.

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Double sidelining in this document indicates the most recent changes by amendment.

Descriptors: lighting equipment, discharge lamp, tubular lamp, fluorescent lamp, starting device, safety requirement

English version

Auxiliaries for lamps
Starting devices (other than glow starters)
General and safety requirements
(includes amendment A1:1999)
(IEC 60926 : 1995, modified + A1:1999)

Appareils auxiliaires pour lampes
Dispositifs d'amorçage (autres que starters à
lueur)
Prescriptions générales et prescriptions de
sécurité
(inclut l'amendement A1:1999)
(CEI 60926 : 1995, modifiée + A1:1999)

Geräte für Lampen
Startgeräte (andere als Glimmstarter)
Allgemeine und
Sicherheits- Anforderungen
(enthält Änderung A1:1999)
(IEC 60926, modifiziert + A1:1999)

This European Standard was approved by CENELEC on 1995-11-28. 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.

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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 the document 34C(CO)278, future amendment to IEC 926, prepared by SC 34C, Auxiliaries for lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote.

The text of this document, together with that of IEC 926 : 1990 and its amendments 1 : 1992 and 2 : 1993, was published by IEC as the second edition of IEC 926 in January 1995.

The text of the International Standard IEC 926 : 1995, together with common modifications prepared by the Technical Committee CENELEC TC 34Z, Luminaires and associated equipment, was approved by CENELEC as EN 60926 on 1995-11-28.

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) 1996-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-09-01

For products which have complied with EN 60926 : 1990 and its amendment A2 : 1994 and its corrigendum August 1994 before 1996-09-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-09-01.

Annexes designated 'normative' are part of the body of the standard. In this standard, annexes A, B, C and ZA are normative. Annex ZA has been added by CENELEC.

Foreword to amendment A1

The text of document 34C/482/FDIS, future amendment 1 to IEC 60926, prepared by SC 34C, Auxiliaries for 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 60926 : 1996 on 1999-12-01.

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) 2000-09-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2006-12-01

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AUXILIARIES FOR LAMPS – STARTING DEVICES (OTHER THAN GLOW STARTERS) –

General and safety requirements

Section 1: General

1 Scope

This standard specifies general and safety requirements for starting devices (starters and ignitors) for tubular fluorescent and other discharge lamps for use on a.c. supplies up to 1 000 V at 50 Hz or 60 Hz which produce starting pulses not greater than 100 kV and which are used in combination with lamps and ballasts covered in IEC 81, IEC 188, IEC 192, IEC 662, IEC 920 and IEC 922.

NOTE – A standard on metal halide lamps is under consideration.

This standard also covers starting devices for lamps which are not yet standardized.

It does not apply to glow starters or starting devices which are incorporated in discharge lamps or which are manually operated. Preheat transformers for tubular fluorescent lamps are covered by IEC 920.

Tests in this standard are type tests. Requirements for testing individual starting devices during production are not included.

NOTE – Glow starters are included in IEC 155.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and 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. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 81: 1984, *Tubular fluorescent lamps for general lighting service*

IEC 112: 1983, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 155: 1983, *Starters for tubular fluorescent lamps*

IEC 188: 1974, *High-pressure mercury vapour lamps*

IEC 192: 1973, *Low-pressure sodium vapour lamps*

IEC 249: *Base materials for printed circuits*

IEC 249-1: 1982, *Part 1: Test methods*

IEC 255-8: 1990, *Electrical relays – Part 8: Thermal electrical relays*

IEC 317-1: 1990, *Specifications for particular types of winding wires – Part 1: Polyvinyl acetal enamelled round copper wire, class 105*

IEC 410: 1973, *Sampling plans and procedures for inspection by attributes*

IEC 417C: 1977, *Graphical symbols for use on equipment – Index, survey and compilation of the single sheets*
Third supplement.

IEC 529: 1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 598-1: 1992, *Luminaires – Part 1: General requirements and tests*

IEC 662: 1980, *High pressure sodium vapour lamps*

IEC 695-2-1: 1991, *Fire hazard testing – Part 2: Test methods – Section 1: Glow-wire test and guidance*

IEC 695-2-2: 1991, *Fire hazard testing – Part 2: Test methods – Section 2: Needle-flame test*

IEC 817: 1984, *Spring-operated impact-test apparatus and its calibration*

IEC 920: 1990, *Ballasts for tubular fluorescent lamps – General and safety requirements*

IEC 922: 1989, *Ballasts for discharge lamps (excluding tubular fluorescent lamps) – General and safety requirements*

IEC 927: 1988, *Starting devices (other than glow starters) – Performance requirements*

IEC 990: *Methods of measurement of touch-current and protective conductor current*

ISO 4046: 1978, *Paper board, pulp and related terms - Vocabulary*

3 Definitions

For the purpose of this standard the following definitions apply:

3.1 starting device: Apparatus which provides, by itself or in combination with other components in the circuit, the appropriate electrical conditions needed to start a discharge type of lamp.

3.1.1 Independent starting device: Starting device which is intended to be mounted separately outside a luminaire and without any additional enclosure.

3.1.2 built-in starting device: Starting device consisting of one or more separate units, exclusively designed to be built into a luminaire, a box, an enclosure or the like.

3.1.3 Integral starting device: Starting device which forms a non-replaceable part of a luminaire and which cannot be tested separately from the luminaire.

3.2 starter: Starting device, usually for fluorescent lamps, which provides for the necessary preheating of the electrodes and may, in combination with the series impedance of the ballast, cause a surge in the voltage applied to the lamp.

NOTE – The starter element that releases the starting voltage pulse may be either triggered, for example phase angle synchronized, or non-triggered.

3.3 Ignitor: Starting device intended to generate voltage pulses to start discharge lamps and which does not provide for the preheating of electrodes.

NOTE – The element that releases the starting voltage pulse may be either triggered or non-triggered.

3.4 starting device with operating time limitation: Starting device which prevents prolonged attempts to start lamps which refuse to start, for example lamps with de-activated electrodes.

NOTE – Prevention of starting attempts means that in the case of starters the starting-current circuit is switched off and/or the current in the starting circuit is limited to a value equal to or smaller than the rated lamp current.

In the case of ignitors, prevention of starting attempts means that pulse generation has ceased, or voltage pulses are significantly reduced in amplitude.

3.5 ballast: Unit inserted between the supply and one or more discharge lamps which by means of inductance, capacitance, or a combination of inductance and capacitance serves mainly to limit the current of the lamp(s) to the required value. The unit may consist of one or more separate components.

It may also include means for transforming the supply voltage and arrangements which help provide starting voltage and pre-heating current, prevent cold starting, reduce stroboscopic effects, correct the power factor and/or suppress radio interference.

3.6 supply voltage: Voltage applied to the circuit in which the starting device operates.

3.7 working voltage: Highest r.m.s. voltage which may occur across any insulation, transients being neglected, in open-circuit conditions or during lamp operation, when the starting device is operated at its rated voltage.

3.8 peak voltage " U_p ": The highest value of the voltage pulses generated by an ignitor at the output terminals.

3.9 short-circuit power: The short-circuit power of a voltage source is the quotient of the square of the voltage produced at its output terminals (in open circuit conditions) and the internal impedance of the source (as seen from the same terminals).

3.10 live part: Conductive part which may cause an electric shock in normal use.

The test to determine whether or not a conductive part is a live part which may cause an electric shock is given in annex A.

Nevertheless, a neutral conductor is regarded as a live part.

3.11 rated maximum operating temperature (of a capacitor case or of a starting device case). Symbol: t_c : Highest permissible temperature which may occur on the outer surface (at the indicated place, if marked) of the component under normal operating conditions.

3.12 rated maximum operating temperature of a winding. Symbol: t_w : The winding temperature assigned by the manufacturer as the highest temperature at which the starting device may be expected to have a service life of at least 10 years' continuous operation.

3.13 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.

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

3.15 spherical spark gap: Two metal spheres of the same nominal diameter arranged at a specified distance and used under specified conditions for the measurement of peak voltages in excess of 15 kV.

4 General requirements

Starting devices shall be so designed and constructed that in normal use they cause no danger to the user or surroundings.

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

In addition, the outer case of independent starting devices shall comply with the requirements of IEC 598-1, including the classification and marking requirements of that standard.

5 General notes on tests

5.1 *Tests in this standard are type tests. Requirements for testing individual starting devices during production are not included.*

5.2 *The tests are carried out at an ambient temperature between 10 °C and 30 °C, unless otherwise specified.*

5.3 *The tests are carried out in the order of the clauses, unless otherwise specified.*

5.4 *Starting devices, intended for use with lamps having different electrical characteristics, are tested with the lamp which gives the most unfavourable conditions.*

5.5 *The following number of specimens shall be submitted for testing:*

- 1 unit for the tests of clauses 6 to 13 and 15 to 21;
- 1 unit for the tests of clause 14, fault conditions (additional units or components, where necessary, may be required in consultation with the manufacturer).

5.6 *In general all tests are made for each type of starting device or, where a range of similar starting devices is involved, for each wattage in the range or on a representative selection from the range, as agreed with the manufacturer.*

6 Classification

6.1 Method of installation

Starting devices are classified according to the method of installation as:

- independent;
- built-in;
- integral.

6.2 Output voltage

Starting devices are classified according to output voltage categories:

- up to including 5 kV;
- greater than 5 kV, and up to and including 10 kV;
- greater than 10 kV, and up to and including 100 kV.

7 Marking

7.1 Mandatory markings

Starting devices (other than integral starting devices) shall be clearly and durably marked with the following mandatory markings:

- a) mark of origin, which may take the form of a trade mark, or the manufacturer's name or the name of the responsible vendor;
- b) manufacturer's model number or type reference;
- c) marking to show the peak value of the voltage produced if the peak value exceeds 1 500 V. Connections having this voltage shall be marked; for ignitors with a pulse voltage over 5 kV, this marking shall be a flash symbol, see ISO 3864.
- d) identification of terminals (by colour, letters, figures or the like). The earthing terminal, if any, shall be identified by the symbol  417-IEC-5019. This symbol shall not be placed on screws or other easily removable parts. This marking is not required for ignitors with pulses over 5 kV because these are mandatorily provided with a time limitation.
- e) Symbol for an independent starting device, if applicable.