

D.C. or a.c. supplied electronic step-down convertors for filament lamps — General and safety requirements

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National foreword

This British Standard has been prepared by Technical Committee CPL/34/3 and is the English language version of EN 61046:1994 *D.C. or a.c. supplied electronic step-down convertors for filament lamps — General and safety requirements*, together with its amendment A1:1996, published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by CENELEC from IEC 1046:1993 and its Amendment No. 1:1995 published by the International Electrotechnical Commission (IEC).

The foreword of the EN makes reference to “date of withdrawal (dow) of conflicting national standards” as “1996-09-01”. In this case the relevant national standard is BS EN 61046 but the date of withdrawal relates only to those parts of the British Standard subject to Amendment A1. Certificates and marks will not be awarded after this date with respect to the British Standard not incorporating Amendment A1. They will be awarded only to the amended British Standard. However, such certificates and marks already awarded with respect to the British Standard not incorporating Amendment A1 may continue to apply for production until 2001-09-01.

This standard supersedes BS EN 61046:1992 which is withdrawn.

The foreword of the European Standard makes reference to “date of withdrawal (dow)” of the relevant national standard. In this case the relevant national standard is BS EN 61046:1992 which is withdrawn. Certificates and marks will not be awarded after 1995-07-15 with respect to BS EN 61046:1992. However, such certificates and marks already awarded may continue to apply for production until 2000-07-15.

Cross-references

Publication referred to	Corresponding British Standard
EN 60051 (IEC 51)	BS 89 <i>Direct acting indicating analogue electrical measuring instruments and their accessories</i>
EN 60065:1993 (IEC 65, mod)	BS 415:1990 <i>Specification for safety requirements for mains-operated electronic and related apparatus for household and similar general use</i>
EN 60127 (IEC 127)	BS EN 60127 <i>Miniature fuses</i>
EN 60249 (IEC 249)	BS EN 60249 <i>Base materials for printed circuits</i>
EN 60317 (IEC 317)	BS 6811 <i>Winding wires</i>
EN 60357:1988 (IEC 357:1982)	BS 1075:1989 <i>Specification for tungsten halogen lamps (non-vehicle)</i>
EN 60454 (IEC 454)	BS 3924:1978 <i>Specification for pressure-sensitive adhesive tapes for electrical insulating purposes</i>
EN 60529:1991 (IEC 529:1989)	BS EN 60529:1992 <i>Specification for degrees of protection provided by enclosures (IP code)</i>
EN 60598-1:1989 (IEC 598-1, mod:1986)	BS EN 60598 <i>Luminaires</i> BS EN 60598-1:1993 <i>General requirements and test</i>
EN 60598-2-6:1989	BS 4533 <i>Luminaires</i> Part 102 <i>Particular requirements</i> Section 102.6:1990 <i>Specification for luminaires with built-in transformers for filament lamps</i>

Publication referred to	Corresponding British Standard
EN 60691:1987 (IEC 691, mod:1980)	BS 7283:1990 <i>Specification for requirements and application guide for thermal-links</i>
EN 60730-2-3:1992	BS EN 60730 <i>Specification for automatic electrical controls for household and similar use</i> BS EN 60730-2-3:1992 <i>Thermal protectors for ballasts for tubular fluorescent lamps</i>
EN 60742:1989	BS 3535 <i>Isolating transformers and safety isolating transformers</i> Part 1:1990 <i>General requirements</i>
EN 60920:1991 (IEC 920:1990)	BS EN 60920:1991 <i>Specification for ballasts for tubular fluorescent lamps. General and safety requirements</i>
EN 61047:1992 (IEC 1047:1992)	BS EN 61047:1993 <i>Specification for d.c. or a.c. supplied electronic step-down convertors for filament lamps. Performance requirements</i>
HD 566 S1 (IEC 88:1984)	BS 2757:1986 <i>Method for determining the thermal classification of electrical insulation</i>
HD 243 S10	BS 5817 <i>Specification for audiovisual, video and television equipment and systems</i> Part 8:1990 <i>Symbols and identification</i>
HD 444.2.1 S1:1983 (IEC 695-2-1:1980)	BS 6458 <i>Fire hazard testing for electrotechnical products</i> Part 2 <i>Test methods</i> Section 2.1:1984 <i>Glow-wire test</i>
HD 444.2.2 S1:1983 (IEC 695-2-2:1980)	Section 2.2:1993 <i>Needle-flame test</i>
IEC 269-2:1987	BS 88 <i>Cartridge fuses for voltages up to and including 1 000 V a.c. and 1 500 V d.c.</i> Part 2 <i>Specification for fuses for use by authorized persons (mainly for industrial application)</i> Section 2.1:1988 <i>Supplementary requirements</i>
ISO 4046:1978	BS 3203:1979 <i>Glossary of paper, board, pulp and related terms</i>

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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN title page, pages 2 to 32, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Descriptors: Electronic equipment, convertors, AC-DC convertors, incandescent lamps, tungsten lamps, halogen lamps, marking, safety requirements.

English version

D.C. or a.c. supplied electronic step-down convertors for
filament lamps —
General and safety requirements
(includes amendment A1:1996)

(IEC 1046:1993 + A1:1995)

Convertisseurs abaisseurs électroniques
alimentés en courant continu ou alternatif
pour lampes à incandescence
Prescriptions générales et de sécurité
(inclut l'amendement A1:1996)
(CEI 1046:1993 + A1:1995)

Gleich-oder wechselstromversorgte
elektronische Konverter für Glühlampen —
Allgemeine und Sicherheits-Anforderungen
(enthält Änderung A1:1996)
(IEC 1046:1993 + A1:1995)

This European Standard was approved by CENELEC on 1994-09-01, amendment A1 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, 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

At the request of the CENELEC Technical Committee TC 34Z, Luminaires and associated equipment, the International Standard IEC 1046:1993 was submitted to the CENELEC Unique Acceptance Procedure (UAP) in November 1993 for acceptance as a European Standard.

The text of the International Standard was approved by CENELEC as EN 61046 on 1st September 1994.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-07-15
- latest date of withdrawal of conflicting national standards (dow) 1995-07-15

For products which have complied with EN 61046:1992 and its amendment A1:1992, before 1995-07-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-07-15.

Annexes designated “normative” are part of the body of the standard. In this standard, Annex A, Annex B, Annex C and Annex ZA are normative.

Foreword to amendment A1

The text of document 34C/307/DIS, future amendment 1 to IEC 1046:1993, 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 61046:1994 on 1995-11-28.

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

For products which have complied with EN 61046:1994 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.

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Section 1. General requirements

1 General

1.1 Scope

This International Standard specifies general and safety requirements for electronic step-down convertors for use on d.c. supplies up to 250 V or a.c. supplies up to 1 000 V at 50 Hz or 60 Hz and rated output voltage ≤ 50 V r.m.s. at a frequency deviating from the supply frequency or $\leq 50\sqrt{2}$ V unsmoothed d.c. between conductors or between any conductor and earth, associated with tungsten-halogen lamps as specified in IEC 357 and other filament lamps.

NOTE The limit of 50 V rated output voltage is in accordance with Band I of IEC 449.

Particular requirements for electronic step-down convertors with means of protection against overheating are given in Annex B.

Particular requirements for stationary independent SELV convertors, which are part of the wiring in installations, are given in Annex C.

Plug-in convertors, being part of the luminaire, are covered as built-in convertors together with the additional requirements of the luminaire standard.

NOTE These proposals have also been submitted to SC 14D for introduction in the new omnibus standard IEC 742 which is in preparation.

1.2 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.

1.2.1 IEC standards

IEC 51, *Direct acting indicating analogue electrical-measuring instruments and their accessories*.

IEC 65:1985, *Safety requirements for mains operated electronic and related apparatus for household and similar general use*.
Amendment No. 1 (1987). Amendment No. 2 (1989)

IEC 83:1975, *Plugs and socket-outlets for domestic and similar general use. Standards*.
Amendment No. 1 (1979)

IEC 85:1894, *Thermal evaluation and classification of electrical insulation*.

IEC 127, *Miniature fuses*.

IEC 249, *Base materials for printed circuits*.

IEC 269-2:1986, *Low-voltage fuses — Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)*.

IEC 269-3:1987, *Low-voltage fuses — Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)*.

IEC 317, *Specifications for particular types of winding wires*.

IEC 357:1982, *Tungsten-halogen lamps (non-vehicle)*.

Amendment No. 1 (1984), Amendment No. 2 (1985), Amendment No. 3 (1987), Amendment No. 4 (1989)

IEC 364-4-41:1982, *Electrical installations of buildings — Part 4: Protection for safety — Chapter 41: Protection against electric shock*.

IEC 417:1973, *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets*.

IEC 449:1973, *Voltage bands for electrical installations of buildings*.

Amendment No. 1 (1979)

IEC 454, *Specifications for pressure-sensitive adhesive tapes for electrical purposes*.

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

IEC 598-1:1986, *Luminaires — Part 1: General requirements and tests*.

Amendment No. 1 (1988)

IEC 598-2-6:1979, *Luminaires — Part 2: Particular requirements — Section 6: Luminaires with built-in transformers for filament lamps*.

Amendment No. 1 (1987)

IEC 691:1980, *Thermal-links*.

IEC 695-2-1:1980, *Fire hazard testing — Part 2: Test methods. Glow-wire test and guidance*.

IEC 695-2-2:1980, *Fire hazard testing — Part 2: Test methods. Needle-flame test*.

IEC 730-2-3:1990, *Automatic electrical controls for household and similar use — Part 2: Particular requirements for thermal protectors for ballasts for tubular fluorescent lamps*.

IEC 742:1983, *Isolating transformers and safety isolating transformers — Requirements*.

IEC 906, *IEC System of plugs and socket-outlets for household and similar purposes*.

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

IEC 1047:1991, *D.C. or a.c. supplied electronic step-down convertors for filament lamps — Performance requirements*.

1.2.2 ISO standard

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

2 Definitions

For the purposes of this International Standard the following definitions apply:

2.1 Convertors

2.1.1

electronic step-down convertor (convertor)

unit inserted between the supply and one or more tungsten-halogen or other filament lamps which serves to supply the lamp(s) with its (their) rated voltage, generally at high frequency. The unit may consist of one or more separate components

it may include means for dimming, correcting the power factor and suppressing radio interference

2.1.2

independent convertor

convertor which can be mounted separately outside the luminaire and without any additional enclosure. This may consist of a built-in convertor housed in a suitable enclosure which provides all the necessary protection according to its markings

2.1.3

built-in convertor

convertor exclusively designed to be built into a luminaire, a box, an enclosure or the like

2.1.4

integral convertor

convertor which forms a non-replaceable part of a luminaire and which cannot be tested separately from the luminaire

2.1.5

d.c. or a.c. supplied convertor

a d.c. to a.c. or a.c. to a.c. convertor including stabilizing elements for operating one or more filament lamps, generally at high frequency

2.1.6

safety isolating SELV-equivalent convertor

built-in convertor for operating one or more filament lamps with an output voltage equivalent to SELV

NOTE For the purposes of this standard, SELV-equivalent convertors, complying with 11.2, are deemed as giving protection against electric shock equivalent to SELV.

2.1.7

isolating convertor

convertor, the input and output circuit of which is electrically separated to limit hazards due to accidental simultaneous contact with earth and live parts or metal parts which may become live in the event of an insulation fault

2.1.8

independent SELV convertor

independent convertor providing a SELV output isolated from the supply mains by means such as a safety isolating transformer as specified in IEC 742

2.1.9

associated convertor

convertor designed to supply specific appliances or equipments, incorporated in or not, but specially designed to be used only with the specific appliance(s) or equipment

2.1.10

stationary convertor

either a fixed convertor or a convertor which cannot be easily moved from one place to another

2.1.11

plug-in convertor

convertor incorporated in an enclosure provided with an integral plug as the means of connection of the electrical supply

2.2 Voltages

2.2.1

supply voltage

voltage applied to the input circuit of the convertor

2.2.2

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 convertor is operated at its rated supply voltage

2.2.3

rated output voltage

output voltage, at rated supply voltage, rated frequency and at unity power factor, assigned to the convertor

2.3

supply current

current supplied to the complete circuit of lamp(s) and convertor

2.4

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 (normative)