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PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

Cold cathode fluorescent lamps –
Part 1: Safety specifications

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FOREWORD

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A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC/PAS 62815-1 has been processed by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
34A/1595/PAS	34A/1614/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

COLD CATHODE FLUORESCENT LAMPS –

Part 1: Safety specifications

1 Scope

This part of IEC/PAS 62815 specifies the safety requirements for tubular type cold cathode fluorescent lamps for backlight unit purposes (used for flat panel displays such as TVs and monitors etc.), hereafter called “lamps”. This PAS will be revised to include other types of lamp when a need for them is recognized.

It also specifies the method a manufacturer should use to show compliance with the requirements of this PAS on the basis of whole production appraisal in association with test records on finished products.

NOTE Compliance with this PAS concerns only safety criteria and does not take into account the performance of cold cathode fluorescent lamps for general lighting purposes with respect to colour, starting and operational characteristics.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>)

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

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 61195, *Double-capped fluorescent lamps – Safety specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-845 and the following apply.

3.1
cold cathode fluorescent lamp
fluorescent lamp with cold cathode, in which most light is emitted by the excitation of phosphors coated in the discharge vessel

3.2

rated value
quantity value for a characteristic of a lamp for specified operating conditions

Note 1 to entry: The value and the conditions are specified in this PAS, or assigned by the manufacturer or responsible vendor.

3.3
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

3.4
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

3.5
running test
test repeated at frequent intervals to provide data for assessment

3.6
batch
all lamps of one family and/or group identified as such and put forward at one time for testing to check compliance

3.7
whole production
production during a period of twelve months of all types of lamps within the scope of this PAS

4 Safety requirements

4.1 General

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

It may be expected that lamps which comply with this PAS can be operated at voltages between 94 % and 106 % of rated voltage and at an ambient temperature of between 23 °C and 27 °C.

4.2 Marking

4.2.1 The following information shall be distinctly and durably marked on the lamp:

a) manufacturer's model number or type reference;

b) date of manufacture;

c) mark of origin (this may take the form of a trade mark, the manufacturer's identification mark or the name of the responsible vendor);

d) tube length, tube diameter, and the name of the product.

NOTE For b) to d), if it is difficult to mark on the lamp, these can be marked on the packing unit.

4.2.2 Compliance with the requirements of 4.2.1 is checked by inspection and by the following test.

The durability of the marking is checked by trying to remove it by rubbing lightly for 15 s with a piece of cloth soaked with water and, after drying, for a further 15 s with a piece of cloth soaked with petroleum spirit.

4.3 Insulation resistance

When measured using test equipment with a d.c. voltage of 500 V, the insulation resistance shall not be less than 2 MΩ.

4.4 Electric strength

4.4.1 Electric strength shall withstand the test voltage of 4.4.2. No flashover or breakdown shall occur during the test.

Conditions and method of test are given in Annex A.

4.4.2 A 2 500 V (2U + 1 000 V) a.c. voltage of substantially sine-wave form, with a frequency of 50 Hz or 60 Hz shall be applied for 1 min. Initially, not more than half the prescribed voltage shall be applied, it shall then be raised gradually to the full value.

NOTE U specifies the operating voltage.

Glow discharges without a drop in voltage are neglected.

4.5 Resistance to heat and fire

4.5.1 Insulating material of caps shall be resistant to heat.

4.5.2 Compliance is checked by the following test.

Samples are tested in a heating cabinet at a temperature of 125 °C ± 5 °C for a period of 168 h.

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

– reduction in the protection against electric shock as required in 4.4 and 4.5;
– loosening of cracks, swelling and shrinking as determined by visual inspection.

4.5.3 External parts of insulating material shall be resistant to abnormal heat and to fire.

4.5.4 Compliance is checked by the following test.

Parts are subjected to a test using a nickel-chromium glow-wire heated to 650 °C. The test apparatus shall be that described in IEC 60695-2-10.

The sample 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 sample. The penetration of the glow-wire into the sample is mechanically limited to 7 mm. After 30 s the sampled is withdrawn from contact with the glow-wire tip.

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 sample during this period. The glow-wire tip temperature is measured in IEC 60695-2-1/0.

NOTE Precautions should be taken to safeguard the health of personnel conducting tests against risk of

– explosion of fire;
– inhalation of smoke and/or toxic products;
– toxic residues.

5 Sequence of the tests

The testing shall be carried out in the order listed in Table 1.

Where tests are subsequently carried out on the same samples, the influence of previous tests carried out shall not affect the subsequent test results.

Except for design tests (see Annex A), where tests can be applied to both ends of the lamps, both ends shall be tested. The lamp shall be non-compliant if either one or both ends fail the requirement.

Damage test shall be carried out at the end of the test and each test sample may be taken separately from the original sample.

Table 1 – Sampling and acceptable quality levels

Test item	Sample quantity	Acceptance number
Marking	10	1
Insulation resistance, electric strength	5	0
Resistance to heat and fire	1	0

Annex A
(normative)

Condition of compliance for design tests

A.1 General

For these tests, both ends of the lamp shall be connected and after the tube is wrapped with aluminum foil, the test voltage shall be applied.

The one end of the aluminum foil shall be positioned at the end of the electrode inside the glass tube. The width of aluminum foil shall be the same as the distance between internal electrodes if the distance between internal electrodes is less than 20 cm or 20 cm if the distance between internal electrodes is more than 20 cm and shall be tested again with the end of the aluminum foil positioned at the end of other electrode.

A.2 Insulation resistance and electric strength (see 4.3 and 4.4.2)

(Each test shall be assessed separately.)

First sample: 125	Rejection number: 2
If one failure is found, take a second sample of 125	Rejection number: 2 in the combined sample

Bibliography

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

IEC 61347-2-3, *Lamp control gear – Part 2-3: Particular requirements for a.c. and/or d.c. supplied electronic control gear for fluorescent lamps*

ISO 2859-1, *Sampling procedures for inspection by attribute –Part 1: Sampling schemes indexed by acceptable quality level (AQL) for lot-by-lot inspection*

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