
British Standard Specification for

Limits and methods of measurement of radio interference characteristics of fluorescent lamps and luminaires

Limites et méthodes de mesure des caractéristiques des lampes à fluorescence et des luminaires relatives aux perturbations radioélectriques

Grenzwerte und Meßverfahren für Funkstörungen von Leuchtstofflampen und Leuchtstofflampenleuchten

The European Standard EN 55 015 has the status of a British Standard

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National foreword

This British Standard has been prepared under the direction of the General Electrotechnical Engineering Standards Committee and is the English language version of EN 55 015, which is based on CISPR Publication 15 : 1985 'Limits and methods of measurement of radio interference characteristics of fluorescent lamps and luminaires', with CENELEC common modifications. It is a revision of BS 5394 : 1983, but it will become effective only from a date to be announced later by amendment. The reasons for this are explained in the following paragraphs of this foreword.

The title has been changed from that of the 1983 edition to align with EN 55 015.

Withdrawal of BS 5394 : 1983 will be announced at the appropriate time. It is at present specifically referred to in Statutory Instrument 1985 No. 807, which is an amendment to SI 1978 No. 1268, which implements in the United Kingdom the provisions of EEC Directive 82/500/EEC.

EEC Directive 87/310 makes compliance with EN 55 015 mandatory. It is not possible to say precisely how and on what date HM Government will implement the revised EEC Directive, but this is expected to be by a new Statutory Instrument replacing SI 1985 No. 807 and SI 1978 No. 1268 and making compliance with BS 5394 : 1988 mandatory. Withdrawal of BS 5394 : 1983 will follow at the appropriate time.

NOTE. Upon publication of this revision, BSI Sales Department will respond to purchase orders for BSI 5394 by supply copies of the 1988 edition. Copies of the 1983 edition may be obtained by quoting the number 'BS 5394/83'.

Page numbering. Attention is drawn to the fact that the page numbers quoted in the text of EN 55 015 in relation to the figures are the page numbers of CISPR Publication 15. These page references do not correspond to the EN page numbers. All the figures can be found on EN pages 12 to 25.

Cross-references. Details of other international publications quoted in this standard are given in annex A. Where there are British Standards either identical or technically equivalent to these international standards the relationship is given in national appendix Z.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Amendment No. 1
published and effective from 31 August 1990
to BS 5394 : 1988 [EN 55 015 : 1987]

Limits and methods of measurement of radio
interference characteristics of fluorescent
lamps and luminaires

Revised text

NOTE. This amendment is issued to implement Amendment 1 to the English language version of EN 55 015. It also contains a change to the national foreword.

National foreword

Delete paragraphs three and four and substitute the following text.

HM Government has implemented Directive 87/310/EEC with effect from 24 April 1989 by means of Statutory Instrument 1989 No. 561 which amends SI 1978 No. 1268 as amended by SI 1985 No. 807.

The effect of SI 1989 No. 561 was that equipment complying with either BS 5394 : 1983 or BS 5394 : 1988 could be marketed freely until 31 December 1989, at which time BS 5394 : 1983 was withdrawn and thereafter only equipment which complies with BS 5394 : 1988 can be placed on the market.

By 1 July 1991, HM Government is obliged to enact further legislation which will come into force on 1 January 1992 to implement the provisions of Directive 89/336/EEC (Electromagnetic Compatibility), at which time Directive 76/890/EEC as amended by Directives 82/500/EEC and 87/310/EEC will be repealed.

Under this legislation the main way of meeting the essential requirements of Directive 89/336/EEC is by compliance with harmonized standards. BS 5394 : 1988 is one of the harmonized standards.

Text of EN 55 015. Amend the text of European Standard EN 55 015 in accordance with the details given on the attached pages.

Attention is drawn to the following.

- (a) The IEC text consists of Amendment 1 to CISPR Publication 15. Page numbering refers to the page numbers of CISPR Publication 15, and should be ignored.
- (b) The CENELEC common modification on page 2 is a deletion to the text of Amendment 1 to CISPR Publication 15 (see pages 3 to 8), the effect of which is to retain the original text of EN 55 015. The deleted text is indicated by double side lines.
- (c) The effect of the note on page 2 covering the text of **8.1** of Amendment 1 to CISPR Publication 15 is that the text of EN 55 015 remains unchanged.

UDC: 621.326:621.391.82

Descriptors: radio interference, luminaire, fluorescent lamp, method of measurement, characteristic

Amendment 1 to the English version of EN 55 015

Limits and methods of measurement of radio interference characteristics of fluorescent lamps and luminaires

(CISPR 15:1985/Amdt 1:1989, modified)

Limites et méthodes de mesure des
caractéristiques des lampes à fluorescence et
des luminaires relatives aux perturbations
radioélectriques
(CISPR 15:1985/Amdt 1:1989, modifiée)

Grenzwerte und Meßverfahren für
Funkstörungen von Leuchtstofflampen und
Leuchtstofflampenleuchten
(CISPR 15:1985/Amdt 1989, modifiziert)

This Amendment 1 modifies the European Standard EN 55 015, edition February 1987.
It was ratified by CENELEC on 11 September 1989.

CENELEC members are bound to comply with the requirements of the CENELEC
Internal Regulations which specify under which conditions this Amendment should be
incorporated, without any alteration, in the corresponding national standard.

This Amendment exists in the three official versions (English, French and German).
A version in any other language made by translation under the responsibility of a
CENELEC member into its own language and notified to CENELEC 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 Bréderode 2, B-1000 Brussels

Brief history

During its meeting held in November 1988 in Brussels, the CENELEC Technical Committee CISPR decided to submit Amendment No. 1 (manuscript October 1988) to Publication CISPR 15 : 1985 to the voting procedure.

This procedure was started in January 1989.

Technical text

The text of Amendment No. 1 : 1989 to Publication CISPR 15 : 1985 was approved by CENELEC on 11 September 1989 as Amendment 1 to EN 55 015 : 1987, with the common modification as given below.

The following date is applicable:

- latest date of announcement of the EN at national level (doa) 1990-03-01

The 63rd Technical Board has decided to publish this Amendment without date of latest publication of a new harmonized standard (dop) or date of withdrawal of conflicting national standards (dow). As a consequence, the certification clause is not applicable.

Common modification

Table 1, note 3, delete the following:

“In Japan, Sweden and the United Kingdom the limit values in the frequency range 9 kHz to 150 kHz are not applicable.”

NOTE: The text of clause 8.1 of Amendment No. 1 : 1989 to CISPR 15 : 1985 is identical to the text of the relevant common modifications in EN 55 015 : 1987.

Page 9

1. Scope

Replace the text of Sub-clause 1.2 by the following:

1.2 The frequency range covered is 9 kHz to 30 MHz.

4. Limits

Replace the first sentence in Sub-clause 4.1 by the following:

Luminaires, connected to electrical supplies feeding dwelling-houses in the voltage range 100 V/250 V between phases or phase and earth, shall have an insertion loss, equal to or greater than 28 dB in the frequency range 150 kHz to 160 kHz, decreasing linearly with the logarithm of the frequency to 20 dB at 1 400 kHz and 20 dB in the frequency range 1 400 kHz to 1 605 kHz, provided these luminaires are designed for:

- linear fluorescent lamps with a nominal diameter of 15 mm, 25 mm or 38 mm;
- circular fluorescent lamps with a nominal diameter of 28 mm or 32 mm;
- U-type fluorescent lamps with a nominal diameter of 15 mm, 25 mm or 38 mm;
- single-capped fluorescent lamps, without integrated starter and with a nominal diameter of 15 mm.

Page 11

Replace the titles and the texts of Sub-clauses 4.2 and 4.3 by the following:

4.2 Terminal interference voltages of luminaires

All types of luminaires for which the insertion loss limits of Sub-clause 4.1 do not apply shall comply with the terminal voltage limits as shown in the table:

Table I

*Limits of mains terminal interference voltage
in the range 9 kHz to 30 MHz*

Frequency range	Limits (dB μ V) ¹⁾	
	Quasi-peak	Average ⁴⁾
9 kHz to 50 kHz ³⁾	110 ²⁾	-
50 kHz to 150 kHz ³⁾	90-80 ²⁾	-
150 kHz to 0.5 MHz	66-56 ²⁾	56-46 ²⁾
0.5 MHz to 5 MHz	56	46
5 MHz to 30 MHz	60	50

Notes 1.- At the transition frequencies the lower limit applies.

2.- The limit decreases linearly with the logarithm of the frequency in the ranges 50 kHz to 150 kHz and 150 kHz to 0.5 MHz.

3.- The limit values in the frequency range 9 kHz to 150 kHz are considered to be "provisional limits" which may be modified after some years of experience.

In Japan, Sweden and the United Kingdom the limit values in the frequency range 9 kHz to 150 kHz are not applicable.

4.- If it is certain that only broadband interference sources are present, then the average measurements need not be made.

4.3 Interference voltages of self-ballasted fluorescent lamps

For self-ballasted fluorescent lamps the limits shown in Table I of Sub-clause 4.2 apply.

5. Methods of measurement of the insertion loss of luminaires

Replace the first paragraph in Sub-clause 5.1.1 by the following:

For luminaires as described in Sub-clause 4.1, the insertion loss is measured as shown in Figure 1, page 25 and respectively, for luminaires for circular lamps as in Figure 2, page 27, with dummy lamps as specified in Sub-clause 5.2.4 and represented in Figures 4a, 4b, 4c and 4d, pages 31 to 35.

Delete Sub-clause 5.1.2.

Renumber the second paragraph of Sub-clause 5.1.1 as Sub-clause 5.1.2.

Page 13

5.2.4 Dummy lamps

Amend the end of the first paragraph as follows: "...in Figures 4a, 4b, 4c and 4d, pages 31 to 35."

After Figure 4c, on page 35, add a new Figure 4d. (See page 13)

Page 15

Delete Sub-clause 6.1.2.

Page 17

Add in Sub-clause 6.3.6: "Only lamps which have been in operation for more than 100 h shall be used."

Page 19

Add in Sub-clause 7.2.4: "Only lamps which have been in operation for more than 100 h shall be used."

Delete Sub-clause 7.2.6.

8. Interpretation of C.I.S.P.R. radio interference limits

Replace the text of this clause by the following:

Note.- Clause 8 of this publication is based on C.I.S.P.R. Recommendation No. 46/1.

8.1 Significance of a C.I.S.P.R. limit

8.1.1 A C.I.S.P.R. limit is a limit which is recommended to national authorities for incorporation in national standards, relevant legal regulations and official specifications. It is also recommended that international organizations use these limits.

8.1.2 The significance of the limits for type-approved appliances shall be that on a statistical basis at least 80% of the mass-produced appliances comply with the limits with at least 80% confidence.

8.1.3 Tests shall be made:

8.1.3.1 either on a sample of appliances of the type, using the statistical method of evaluation in accordance with Sub-clause 8.1.5 and 8.1.6;

8.1.3.2 or, for simplicity's sake, on one appliance only (see also Sub-clause 8.2 and 8.3).

8.1.4 Subsequent tests are necessary from time to time on appliances taken at random from production, especially in the case indicated in Sub-clause 8.1.3.2.

The banning of sales or withdrawal of a type approval, as the result of a dispute shall be considered only after tests have been carried out in accordance with Sub-clause 8.1.3.1.

Statistical assessment of compliance with limits shall be made as follows:

This test shall be performed on a sample of not less than five, and not more than 12 items of the type, but if in exceptional circumstances five items are not available, then a sample of four or three shall be used.

8.1.5 If insertion loss measurements are performed, compliance is achieved when the following relationship is met:

$$\bar{x} - kS_n \geq L$$

where:

$\bar{x}$ = the arithmetic mean of the measured value of items in the sample

$$S_n^2 = \sum_n (x_n - \bar{x})^2 / (n - 1)$$

x_n = the value of individual item

L = permissible limit

k = factor derived from tables of the non-central t -distribution which ensures with 80% confidence that 80% or more of the production exceeds the minimum value of insertion loss; the value of k depends on the sample size n and is stated below

(The quantities x_n , $\bar{x}$, S_n and L are expressed logarithmically (dB).)

n	3	4	5	6	7	8	9	10	11	12
k	2,04	1,69	1,52	1,42	1,35	1,30	1,27	1,24	1,21	1,20



- 8.1.6 If limits of terminal interference voltages according to Sub-clauses 4.2 and 4.3 are considered, the formula in Sub-clause 8.1.5 should read:

$$\bar{x} + kS_n \leq L$$

where:

$\bar{x}$, S_n and x_n have the same meaning as given under Sub-clause 8.1.5

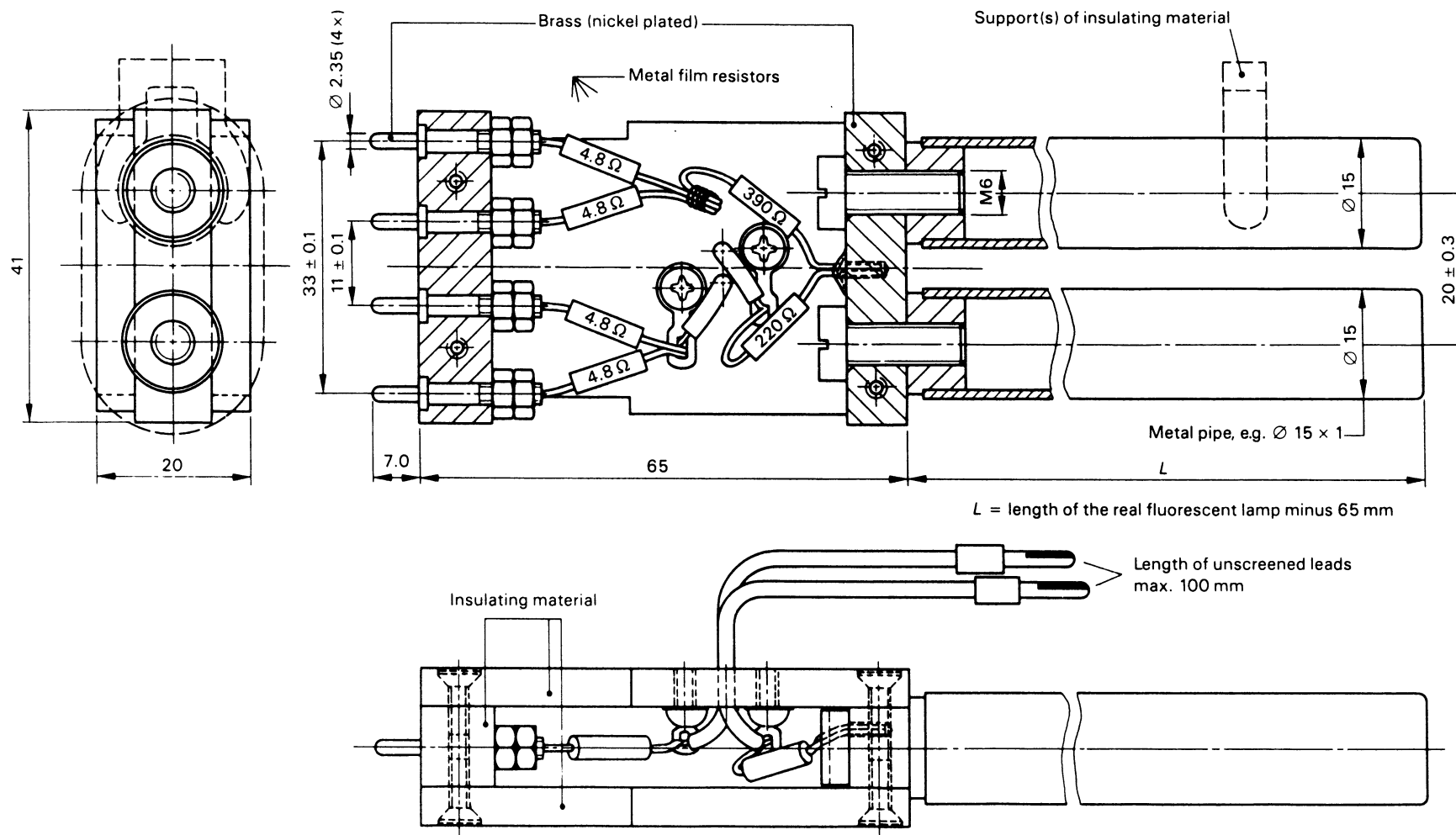
k = factor derived from tables of the non-central t distribution which ensures with 80% confidence that 80% or more of the production is below the limit; the value of k depends on the sample size n and is stated under Sub-clause 8.1.5.

The quantities x_n , $\bar{x}$, S_n and L are expressed logarithmically (dB(μ V)).

- 8.2 When measurements are made according to Clause 6 on appliances where luminaire and lamp can be separated a minimum of five luminaires are tested, each luminaire with its own lamp.

If for reasons of simplicity one luminaire is tested it has to be tested with five lamps and the limit shall be met for each lamp.

- 8.3 When measurements are made according to Clause 7 on self-ballasted fluorescent lamps a minimum of five items are to be tested. (Because of the dispersion of the interference potential of the lamps, several items have to be considered.)
- 8.4 For general information, see C.I.S.P.R. Publication 16, Section Nine: Statistical considerations in the determination of limits of radio interference.



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Note.- Tolerances in dimensions: ± 1 in the last decimal,
tolerances in resistances: $\pm 5\%$, unless otherwise specified.

FIG. 4d. - Dummy lamp for 15 mm single capped fluorescent lamps.

UDC: 621.326:621.391.82

Key words: radio interference; luminaire; fluorescent lamp; method of measurement; characteristic

English version

Limits and methods of measurement of radio interference characteristics of fluorescent lamps and luminaires

(CISPR 15 (1985, 3rd ed., modified), not appended)

Limites et méthodes de mesure des caractéristiques des
lampes à fluorescence et des luminaires relatives aux
perturbations radioélectriques
(CISPR 15 (1985, 3e éd., modifiée), non jointe)

Grenzwerte und Meßverfahren für Funkstörungen von
Leuchtstofflampen und Leuchtstofflampenleuchten

(CISPR 15 (1985, 3. Ausg., modifiziert), liegt bei)

This European Standard was ratified by CENELEC on 26 June 1986. CENELEC members are bound to comply with the requirements of the 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 CENELEC 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 CENELEC 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

Secretariat: rue Bréderode 2, B-1000 Brussels

Brief history

This European Standard has been prepared by the Secretariat of CENELEC Technical Committee CISPR in accordance with the decisions taken by that Committee during its meetings held in October 1984 in Eindhoven and in November 1985 in London.

During the meeting held in 1984 in Eindhoven it was decided to base EN 55 015 on the third edition of CISPR publication 15 (1985) and to take into account Directive 82/500/EEC.

Amendment 1 to prEN 55 015 taking care of the statistical evaluation of tests and an extension in frequency range was incorporated as a common modification.

The following dates were fixed:

doa: 1987-01-01

dolp/dow: left open pending issue of new Adaptation to Technical Progress Directive

Technical text

The text of the CISPR Publication 15 (1985, 3rd edition), not appended, together with common modifications was approved by CENELEC on 26 June 1986 as a European Standard.

Annexes designated 'normative' are part of the body of the standard. Annexes designated 'informative' are given only for information.

In this standard, Annex A is normative
 Annex B is informative