CISPR TR 30-2

Edition 1.0 2012-08

INTERNATIONAL STANDARD

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Test method on electromagnetic emissions – Part 2: Electronic control gear for discharge lamps excluding fluorescent lamps

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE L

ICS 33.100.10

ISBN 978-2-83220-311-8

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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CISPR 30-2, which is a technical report, has been prepared by CISPR subcommittee F: Interference relating to household appliances tools, lighting equipment and similar apparatus.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
CISPR/F/539/DTR	CISPR/F/578/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the CISPR 30 series can be found, under the general title *Test method on electromagnetic emissions*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Requirements to limit radio-frequency disturbances from lighting equipment are standardized in CISPR 15. They are restricted to those kinds of lighting equipment which are considered as finished products and intended to be placed on the market for the end user, viz. luminaires, self-ballasted lamps and independent lamp control gear. No emission requirements apply to components intended to be built into luminaires.

Electronic control gears for discharge lamps are also built into a number of different types of luminaires; not only in luminaires of different manufacturers but also in different types of luminaires of one manufacturer.

All those luminaires are tested, although disturbance data of a certain luminaire can be predicted from other luminaire measurements equipped with the same electronic control gear and lamps.

This has led to the question whether a worst-case test luminaire could be designed in which the electronic control gear could be tested. In the event that this test luminaire complies with the relevant requirements, all luminaires where that particular electronic control gear is built in comply, and a great deal of superfluous testing can be avoided. This idea looks correct, simple and interesting, but leads to two comments:

- a worst-case luminaire is too strict. From pre-measurements it appeared that commercial electronic control gear did not pass some tests in a worst-case dummy luminaire, whereas they do in real luminaires;
- even if the electronic control gear passes the tests in a worst-case luminaire, the question remains who is responsible in case the real luminaire, where it is built in, does not comply.

The conclusion is that it is not advisable to change the basic principle of CISPR 15 that no emission requirements apply to components built into a luminaire.

There is, however, a need for an independent test method to check the behaviour of an electronic lamp control gear in the radiofrequency spectrum.

This first edition of CISPR/TR 30-2 is published in conjunction with CISPR/TR 30-1. Each part of CISPR 30 series is independent and describes the test set-up for electronic control gear use together with a special lamp family. The formatting into separately published parts provides for ease of future amendments and revisions. Additional requirements will be added as and when a need for them is recognised.

CISPR 30-2 is technical report for such a method, and it concerns electronic control gear for discharge lamps excluding fluorescent lamps.

TEST METHOD ON ELECTROMAGNETIC EMISSIONS –

Part 2: Electronic control gear for discharge lamps excluding fluorescent lamps

1 Scope

This part of CISPR 30, which is a technical report, details with the aid of reference luminaires, an independent method by which the radio disturbance characteristics of built-in electronic control gear for discharge (excluding fluorescent) lamp luminaires with protection classes I and/or II may be compared against the requirements of CISPR 15. The scope of the part is limited to electronic lamp control gear with an output power (lamp power) up to and including 150 W.

Independent electronic lamp control gears are not covered by this technical report; they are within the scope of CISPR 15.

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.

CISPR 15:2005, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*
Amendment 1 (2006)
Amendment 2 (2008)

3 Presumption of compliance

The electronic lamp control gear in conjunction with the appropriate reference luminaire is deemed to comply with the radiofrequency disturbance limits of CISPR 15 if it complies with the terminal voltage limits of Table 2a of CISPR 15:2005 and with the radiated disturbance limits of Table 3a and Table 3b or Table B.1 of CISPR 15:2005. Where the electronic lamp control gear is controlled by an external device, the disturbance voltage at the control terminals shall comply with the limits according to CISPR 15.

It should, however, be noted that the reference luminaire is not a worst-case luminaire and the use of a reference luminaire cannot accurately predict the performance of a real luminaire. A real luminaire where the tested electronic lamp control gear is built in, would not automatically comply with the requirements of CISPR 15.

For EMC compliance the luminaire manufacturer should consider Clauses 6 and 7 of this technical report and the mounting instruction of the lamp control gear manufacturer.

4 Test method

The electronic lamp control gear is mounted on a reference luminaire as specified in Clause 5.

When the electronic control gear is designed for operating more than one lamp, all lamps shall be operated simultaneously.

It has to be tested with its maximum rated power lamp(s).

The reference luminaire is tested according to the methods of measurements described in CISPR 15.

Tests will be carried out with the lamps for which the electronic control gear has been designed.

The operating conditions of CISPR 15 apply.

5 Reference luminaire

5.1 Construction

The reference luminaire is built up of a metal plate 1 mm ± 0,5 mm thick having dimensions as given in Figure A.1 for electronic lamp control gear with an output power up to and including 150 W.

The lamp(s) is (are) installed inside a perforated metal housing. The metal housing is electrical and mechanical connected with the metal plate of the reference luminaire. This metal plate is mounted on a piece of insulating material 20 mm ± 2 mm thick for mechanical steadiness. The distance between the electronic lamp control gear and the lamp holder(s) shall be 170 mm ± 15 mm. The cables shall be mounted 5 mm ± 1 mm above the metal plate.

The electronic lamp control gear and the metal housing with lamp holders are mounted on this metal plate. The height of the single cap lamp holders shall be such that the distance between the central axis of the lamp and the metal plate or the metal housing is 45 mm ± 20 mm.

For one and for two lamp control gear the reference luminaire shall be used as recommended in Figure A.1 or Figure A.2.

Figure A.1 shows the mounting and wiring schema of a reference class I luminaire for discharge lamp(s) up to and including 150 W lamp power. The lamp housing is designed of perforated metal to prevent overheating of the lamp(s).

Figure A.2 shows the mounting and wiring schema of a reference class II luminaire for discharge lamp(s) up to and including 150 W lamp power. The lamp housing is designed of non-conducting perforated material to prevent overheating of the lamp(s).

Overheating of high pressure gas discharge lamps can often be detected by measuring the lamp voltage which should stay within the limits specified by the lamp manufacturer.

5.2 Mounting and wiring schemes

About the geometric disposition of the electronic lamp control gear, the cables and the load, Figure A.1 or Figure A.2 shall be taken as reference.

5.3 Grounding

Information of protective (PE) or functional (FE) earth connection of the metal plate (if existing) of the reference luminaires and the PE or FE connection of the electronic lamp control gear is given in Table 1.

If a metal plate is used (application of electronic lamp control gear for a protection class I luminaire) then the metal plate shall be connected to the PE terminal of the reference luminaire with a 150 mm ± 15 mm long wire.

If the electronic lamp control gear has an earth terminal and the electronic lamp control gear is designed for protection class I luminaire, this terminal shall be connected to the metal plate with a 100 mm ± 15 mm long wire. Electronic lamp control gear having a metal housing shall be fixed to the metal plate to ensure proper galvanic contact.

Electronic lamp control gear design for protection class II luminaire shall be tested on the reference board without the metal plate.

5.4 Wiring

Not twisted and flat multi-wire cables are recommended for the cables used on the reference luminaire. Where on the figures the connecting cables are drawn close together, they shall be mounted as close as possible to each other. Wiring dimension and insulation shall be adequate for the applied voltage and current. The wiring connecting the reference luminaire to the artificial mains network and the wiring to the CISPR measuring receiver shall be in conformity with CISPR 15:2005 (Figures 5 and 6).

Table 1 – Grounding connection overview for protection class I and class II applications

Control gear design (terminals)	Selected luminaire design	
	A) Protection Class – I	**B) Protection Class – II**
PE, L, N or FE, L, N	**reference luminaire <u>with</u> metal plate:** • PE terminal of the reference luminaire is connected to the metal plate • PE or FE terminal of the control gear is connected to the metal plate • control gear housing is connected to the metal plate using the means for fixing the control gear	**reference luminaire <u>without</u> metal plate:** • FE terminal of the reference luminaire is connected to the FE terminal of the control gear, only if needed for fulfilling the EMC requirements. A PE terminal of the control gear may not be connected.
L, N	**reference luminaire <u>with</u> metal plate:** • PE terminal of the reference luminaire is connected to the metal plate • if applicable the control gear housing is connected to the metal plate by using the means for fixing the control gear	**reference luminaire <u>without</u> metal plate**

6 Marking

The selected luminaire design for the measurement setup shall be specified in the technical documentation. As an option this information may be provided on the label of the control gear:

- “CIS 30-2: M” indicates the selected protection class I luminaire design;
- “CIS 30-2: P” indicates the selected protection class II luminaire design;
- “CIS 30-2: M + P” indicates the selected protection class I and class II luminaire design.

7 Guidance for luminaire design

When an electronic lamp control gear is incorporated in a luminaire, the method of installation of the electronic lamp control gear and the design of the luminaire itself can influence the overall radio disturbance characteristics of the luminaire.

It is recommended that the electronic lamp control gear manufacturer gives guidance to the luminaire designers on those aspects of the luminaire which affect its radio disturbance performance.

In this respect basic design rules are as follows:

– minimize wiring within the luminaire;
– separate mains wiring and control wiring from lamp wiring and lamp;
– if separation is not possible, screen the mains wiring and control wiring by a jacket;
– ensure a firm electrical contact and/or connection between all metal parts in the luminaire and the electronic control gear housing;
– ensure good connection to functional earth if metal shielding is used around the lamp(s).

Annex A
(informative)

Mounting and wiring schemes

Dimensions in millimetres

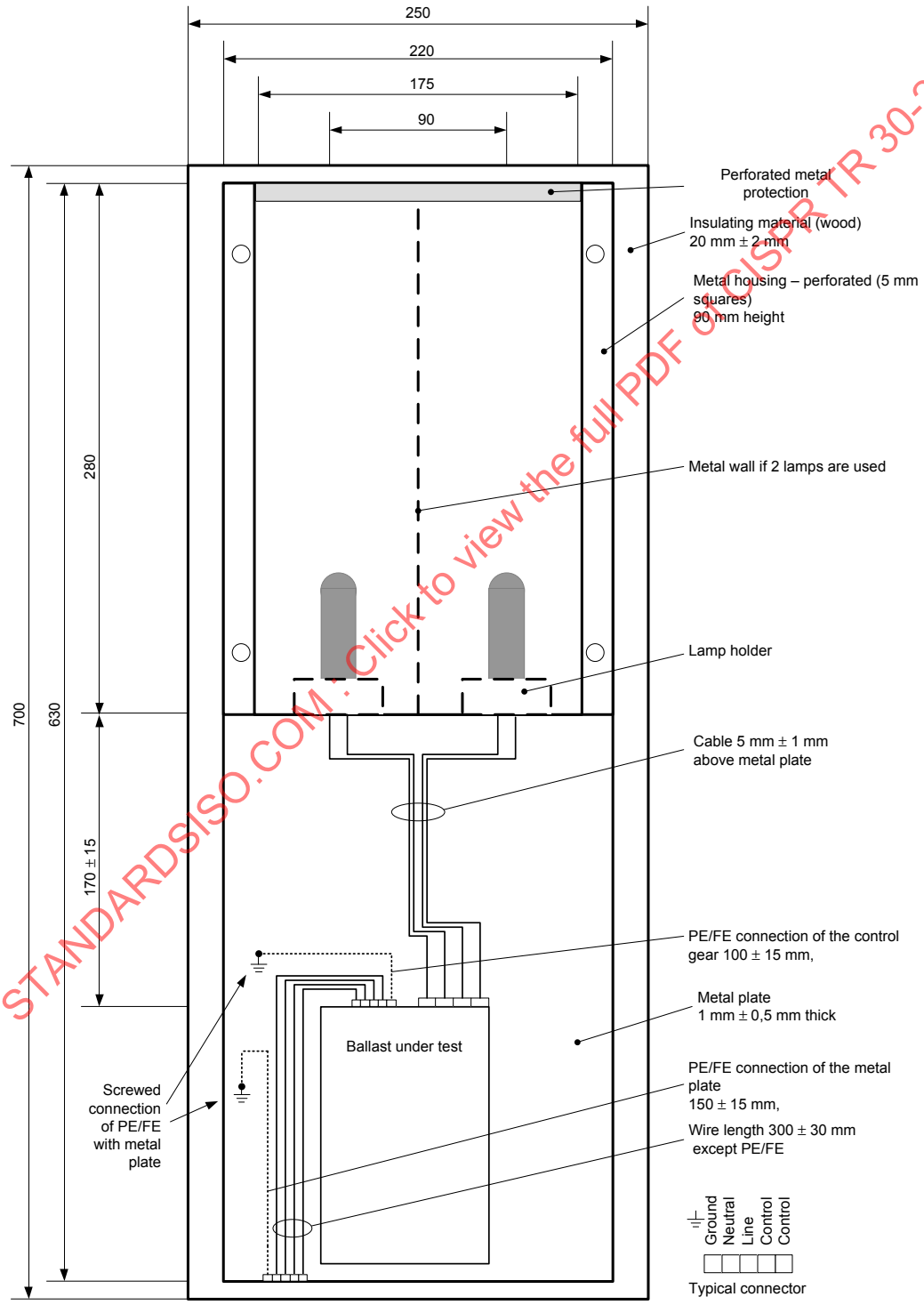

Figure A.1 – Mounting and wiring schema of a reference luminaire class I for discharge lamp(s) up to and including 150 W