

# INTERNATIONAL STANDARD

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**Test method on electromagnetic emissions –  
Part 1: Electronic control gear for single- and double-capped fluorescent lamps**

CISPR TR 30-1:2012

<https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012>



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2012 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### Useful links:

IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the

Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

<https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012>

# INTERNATIONAL STANDARD

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**Test method on electromagnetic emissions –  
Part 1: Electronic control gear for single- and double-capped fluorescent lamps**

CISPR TR 30-1:2012

<https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

R

ICS 33.100.10

ISBN 978-2-83220-312-5

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references .....	6
3 Presumption of compliance.....	6
4 Test method .....	7
5 Reference luminaire .....	7
5.1 Construction .....	7
5.2 Mounting and wiring schemes.....	7
5.3 Grounding .....	8
5.4 Wiring.....	8
6 Marking .....	9
7 Guidance for luminaire design .....	9
Annex A (informative) Mounting and wiring schemes .....	10
Figure A.1 – Mounting and wiring scheme of a reference luminaire for two double-capped fluorescent lamps .....	10
Figure A.2 – Mounting and wiring scheme of a reference luminaire for two single-capped fluorescent lamps, two-sided electronic control gear terminals.....	11
Figure A.3 – Mounting and wiring scheme of a reference luminaire for two single-capped fluorescent lamps, single-sided electronic control gear terminals .....	12
Figure A.4 – Mounting scheme of a reference luminaire for one, two, three or four double-capped fluorescent lamps.....	13
Figure A.5 – Mounting scheme of a reference luminaire for one, two, three or four single-capped fluorescent lamps, two-sided electronic control gear terminals .....	14
Figure A.6 – Mounting scheme of a reference luminaire for one, two, three or four single-capped fluorescent lamps, single-sided electronic control gear terminals.....	15
Figure A.7 – Mounting and wiring schema of a reference luminaire for four double-capped fluorescent lamps where the output terminals of the electronic control gear are positioned on both ends.....	16
Figure A.8 – Mounting and wiring schema of reference luminaires for one, two, three or four double-capped fluorescent lamps where the output terminals of the electronic control gear are positioned on both ends .....	17
Figure A.9 – Mounting and wiring schema of a reference luminaire for one circular-shaped fluorescent lamp, single-sided electronic control gear terminals.....	18
Figure A.10 – Mounting and wiring schema of a reference luminaire for two circular-shaped fluorescent lamps, single-sided electronic control gear terminals.....	19
Table 1 – Grounding connection overview for protection class I and class II applications .....	9

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## TEST METHOD ON ELECTROMAGNETIC EMISSIONS –

**Part 1: Electronic control gear for single- and double-capped fluorescent lamps**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

CISPR 30-1, which is a technical report, has been prepared by CISPR subcommittee F: Interference relating to household appliances tools, lighting equipment and similar apparatus.

This first edition of CISPR/TR 30-1 cancels and replaces the first edition of CISPR/TR 30 published in 2001. It is a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- minor correction of wiring distances of reference luminaire in Figure A.1;

- addition of reference luminaires for electronic control gear with output terminals on both ends;
- addition of reference luminaires for electronic control gear for circular-shaped fluorescent lamps;
- introduction of control gear marking indicating suitability for application in protection class I and/or class II luminaires.

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

Enquiry draft	Report on voting
CISPR/F/538/DTR	CISPR/F/577/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 [CISPR TR 30-1:2012](https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012)
- amended. <https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012>

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.

Most electronic control gear for lamps (tubular fluorescent, low voltages halogen incandescent lamps or HID-lamps) are 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 control gear in the radiofrequency spectrum.

This edition of CISPR/TR 30-1, which replaces CISPR/TR 30, is published in conjunction with CISPR/TR 30-2. 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 30-1 is a technical report for such a method, and it concerns electronic control gear for single- and double-capped fluorescent lamps.

CISPR 30-2 describes reference luminaires for EMC testing of electronic control gear for discharge lamps other than fluorescent lamps.

## TEST METHOD ON ELECTROMAGNETIC EMISSIONS –

### Part 1: Electronic control gear for single- and double-capped 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 electronic control gear for fluorescent lamp luminaires with protection classes I and/or II may be compared against the requirements of CISPR 15.

This technical report covers electronic control gear for double-capped fluorescent lamps fitted with G5 or G13 lamp caps and to single-capped fluorescent lamps fitted with lamp caps: 2GX7, 2G8, 2G10, 2G11, 2GX13, G23, GX23, G24q, GX24q, GR8, and GR10q.

NOTE The above listing shows a typical selection of caps which are commonly used and does not lay claim to be exhaustive.

It is specifically applicable for equipment to be connected to 230 V – 50 Hz mains power networks. For other power systems, modifications may be necessary.

#### 2 Normative references (standards.iteh.ai)

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 of Table 2c of CISPR 15:2005. Limits of disturbance voltage at the load terminals do not apply.

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 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.

The reference luminaire is tested according to the methods of measurement as described in 8.1, 9.1 and 9.2 (or Annex B) of CISPR 15:2005.

Tests shall be carried out with lamps for which the electronic control gear is designed.

The operating conditions of Clause 6 of CISPR 15:2005 apply.

## 5 Reference luminaire

### 5.1 Construction

The reference luminaire is built up of a metal plate  $1\text{ mm} \pm 0,5\text{ mm}$  thick having external dimensions as given in Figures A.1 to A.10. This metal plate is mounted on a piece of insulating material  $20\text{ mm} \pm 2\text{ mm}$  thick having dimensions slightly larger than the metal plate. The electronic lamp control gear and lamp holders are mounted on this metal plate. The height of the lamp holders shall be such that the distance between the lamp and the metal plate is  $9\text{ mm} \pm 1\text{ mm}$  for lamps having a nominal tube diameter lower or equal to 25 mm and  $20\text{ mm} \pm 1\text{ mm}$  for lamps having a nominal tube diameter greater than 25 mm. Single-capped fluorescent lamps shall be mounted with the plane through the centre lines of both tubes parallel to the metal plate and supported at the end by a small piece of insulating material.

The length of the metal plate shall be as indicated on the drawing. For double-capped fluorescent lamps, it is recommended that a reference luminaire for each lamp length be designed. However, as some types of fluorescent lamps have only a small difference in length, a reference luminaire may be used for more than one lamp length.

### 5.2 Mounting and wiring schemes

Figures A.1 to A.10 describe the mounting and wiring schemes.

- Figure A.1 gives the mounting and wiring scheme of a reference luminaire for two double-capped fluorescent lamps.
- Figure A.2 gives the mounting and wiring scheme of a reference luminaire for two single-capped fluorescent lamps where the output terminals of the electronic control gear are at the opposite side to the input terminals.
- Figure A.3 gives the mounting and wiring scheme of a reference luminaire for two single-capped fluorescent lamps where the output terminals of the electronic control gear are at the same side as the input terminals.
- Figure A.4 gives the mounting scheme of reference luminaires for one, two, three or four double-capped fluorescent lamps.
- Figure A.5 gives the mounting scheme of a reference luminaire for one, two, three or four single-capped fluorescent lamps where the output terminals of the electronic control gear are at the opposite side to the input terminals.
- Figure A.6 gives the mounting scheme of a reference luminaire for one, two, three or four single-capped fluorescent lamps where the output terminals of the electronic control gear are at the same side as the input terminals.

- Figure A.7 gives the mounting schema of a reference luminaire for four double-capped fluorescent lamps where the output terminals of the electronic control gear are positioned on both ends of the electronic control gear.
- Figure A.8 gives the mounting schema of reference luminaires for one, two, three or four double-capped fluorescent lamps where the output terminals of the electronic control gear are positioned on both ends of the electronic control gear.
- Figure A.9 gives the mounting schema of a reference luminaire for one circular-shaped fluorescent lamp, single-sided electronic control gear terminals.
- Figure A.10 gives the mounting schema of a reference luminaire for two circular-shaped fluorescent lamps, single-sided electronic control gear terminals.

### 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 control gear is given in Table 1.

If a metal plate is used (application of electronic lamp control gear in luminaire with metal housing or in luminaires designed with parts of metal) then the metal plate shall be connected to the reference earth of the V-network.

If the electronic control gear has an earth terminal and the electronic control gear is designed for metal housing luminaire, this terminal shall be connected to the metal plate with the shortest possible wire. Electronic control gear having a metal housing shall be fixed to the metal plate to ensure proper galvanic contact.

For electronic control gear applications in luminaire with plastic housing the metal plate of the reference luminaires shall be removed.

[CISPR TR 30-1:2012](https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012)

<https://standards.iteh.ai/catalog/standards/sist/dabdde3c-aad2-4439-8a1a-b090dc840b40/cispr-tr-30-1-2012>

### 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 and to the metal plate. 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	<b>reference luminaire <u>with</u> metal plate:</b> <ul style="list-style-type: none"> <li>PE terminal of the reference luminaire is connected to the metal plate</li> <li>PE or FE terminal of the control gear is connected to the metal plate</li> <li>control gear housing is connected to the metal plate using the means for fixing the control gear</li> </ul>	<b>reference luminaire <u>without</u> metal plate:</b> <ul style="list-style-type: none"> <li>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.</li> </ul>
L, N	<b>reference luminaire <u>with</u> metal plate:</b> <ul style="list-style-type: none"> <li>PE terminal of the reference luminaire is connected to the metal plate</li> <li>if applicable the control gear housing is connected to the metal plate by using the means for fixing the control gear</li> </ul>	<b>reference luminaire <u>without</u> metal plate</b>

## 6 Marking

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

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 30-1: M” indicates the selected protection class I luminaire design;
- “CIS 30-1: P” indicates the selected protection class II luminaire design;
- “CIS 30-1: 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 give 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).