

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Lamp controlgear –
Part 1: General and safety requirements**

**Appareillages de lampes –
Partie 1: Exigences générales et exigences de sécurité**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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
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.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables 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 It also gives information on projects, replaced and withdrawn publications.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

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

Electropedia - 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 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - 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.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Lamp controlgear –
Part 1: General and safety requirements**

**Appareillages de lampes –
Partie 1: Exigences générales et exigences de sécurité**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.99

ISBN 978-2-8322-2243-0

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	9
INTRODUCTION.....	11
1 Scope.....	12
2 Normative references	12
3 Terms and definitions	14
4 General requirements	22
5 General notes on tests	22
6 Classification.....	23
7 Marking	24
7.1 Items to be marked	24
7.2 Durability and legibility of marking.....	26
8 Terminals	26
9 Earthing.....	26
9.1 Provisions for protective earthing (Symbol: IEC 60417-5019 (2006-08)).....	26
9.2 Provisions for functional earthing (Symbol: IEC 60417-5018 (2011-07)).....	27
9.3 Lamp controlgear with conductors for protective earthing by tracks on printed circuit boards	27
9.4 Earthing of built-in lamp controlgear.....	27
9.5 Earthing via independent controlgear.....	27
9.5.1 Earth connection to other equipment	27
9.5.2 Earthing of the lamp compartments powered via the independent lamp controlgear	28
10 Protection against accidental contact with live parts	28
11 Moisture resistance and insulation.....	29
12 Electric strength	30
13 Thermal endurance test for windings of ballasts	31
14 Fault conditions	35
15 Construction	39
15.1 Wood, cotton, silk, paper and similar fibrous material	39
15.2 Printed circuits.....	39
15.3 Plugs and socket-outlets used in SELV or ELV circuits	39
15.4 Insulation between circuits and accessible parts	39
15.4.1 General	39
15.4.2 SELV circuits.....	40
15.4.3 FELV circuits	40
15.4.4 Other circuits.....	41
15.4.5 Insulation between circuits and accessible conductive parts	41
16 Creepage distances and clearances	43
16.1 General.....	43
16.2 Creepage distances	45
16.2.1 General	45
16.2.2 Minimum creepage distances for working voltages	46
16.2.3 Creepage distances for working voltages with frequencies above 30 kHz.....	46
16.2.4 Compliance with the required creepage distances	47

16.3	Clearances	48
16.3.1	General	48
16.3.2	Clearances for working voltages	49
16.3.3	Clearances for ignition voltages and working voltages with higher frequencies.....	50
16.3.4	Compliance with the required clearances	52
17	Screws, current-carrying parts and connections.....	53
18	Resistance to heat, fire and tracking.....	53
19	Resistance to corrosion	54
20	No-load output voltage	54
Annex A (normative) Test to establish whether a conductive part is a live part which may cause an electric shock		55
A.1	General test requirements.....	55
A.2	Limits for measured voltages	55
A.3	Limits for touch current	55
Annex B (normative) Particular requirements for thermally protected lamp controlgear		56
B.1	Introductory remark.....	56
B.2	General.....	56
B.3	Terms and definitions.....	56
B.4	General requirements for thermally protected lamp controlgear.....	57
B.5	General notes on tests	57
B.6	Classification	57
B.6.1	General	57
B.6.2	According to the class of protection	57
B.6.3	According to the type of protection	57
B.7	Marking.....	58
B.8	Thermal endurance of windings	58
B.9	Lamp controlgear heating	58
B.9.1	Preselection test.....	58
B.9.2	"Class P" thermally protected lamp controlgear	59
B.9.3	Temperature declared thermally protected lamp controlgear as specified in IEC 61347-2-8, with a rated maximum case temperature of 130 °C or lower	60
B.9.4	Temperature declared thermally protected lamp controlgear as specified in IEC 61347-2-8 with a rated maximum case temperature exceeding 130 °C	61
B.9.5	Temperature declared thermally protected lamp controlgear as specified in IEC 61347-2-9	62
Annex C (normative) Particular requirements for electronic lamp controlgear with means of protection against overheating.....		64
C.1	General.....	64
C.2	Terms and definitions.....	64
C.3	General requirements for electronic lamp controlgear with means of protection against overheating	64
C.4	General notes on tests	65
C.5	Classification	65
C.6	Marking.....	65
C.7	Limitation of heating	65
C.7.1	Pre-selection test.....	65

C.7.2	Functioning of the protection means	65
Annex D (normative)	Requirements for carrying out the heating tests of thermally protected lamp controlgear	67
D.1	Test enclosure	67
D.2	Heating of enclosure	67
D.3	Lamp controlgear operating conditions	67
D.4	Lamp controlgear position in the enclosure	67
D.5	Temperature measurements	68
Annex E (normative)	Use of constant S other than 4 500 in t_w tests	69
E.1	General	69
E.2	Procedure A	69
E.3	Procedure B	69
Annex F (normative)	Draught-proof enclosure	72
Annex G (normative)	Explanation of the derivation of the values of pulse voltages	73
G.1	Pulse voltage rise time T	73
G.2	Long-duration pulse voltages	73
G.3	Short-duration pulse voltages	73
G.4	Measurement of short-duration pulse energy	73
Annex H (normative)	Tests	79
H.1	Ambient temperature and test room	79
H.2	Supply voltage and frequency	79
H.2.1	Test voltage and frequency	79
H.2.2	Stability of supply and frequency	79
H.2.3	Supply voltage waveform for reference ballast only	79
H.3	Electrical characteristics of lamps	80
H.4	Magnetic effects	80
H.5	Mounting and connection of reference lamps	80
H.6	Reference lamp stability	80
H.7	Instrument characteristics	80
H.7.1	Potential circuits	80
H.7.2	Current circuits	80
H.7.3	RMS measurements	81
H.8	Inverter power sources	81
H.9	Reference ballast	81
H.10	Reference lamps	81
H.11	Test conditions	81
H.11.1	Resistance measurement delays	81
H.11.2	Electrical resistance of contacts and leads	81
H.12	Lamp controlgear heating	81
H.12.1	Built-in lamp controlgear	81
H.12.2	Independent lamp controlgear	82
H.12.3	Integral lamp controlgear	82
H.12.4	Test conditions	83
Annex I (normative)	Additional requirements for built-in magnetic ballasts with double or reinforced insulation	84
I.1	General	84
I.2	Terms and definitions	84
I.3	General requirements	84
I.4	General notes on tests	85

I.5	Classification	85
I.6	Marking.....	85
I.7	Protection against accidental contact with live parts.....	85
I.8	Terminals.....	85
I.9	Provision for earthing.....	85
I.10	Moisture resistance and insulation	85
I.11	High-voltage impulse test.....	85
I.12	Thermal endurance test for windings of ballasts.....	86
I.13	Ballast heating.....	86
I.14	Screws, current-carrying parts and connections	86
I.15	Creepage distances and clearances.....	86
I.16	Resistance to heat and fire	86
I.17	Resistance to corrosion	86
Annex J (normative) Schedule of more onerous requirements.....		87
Annex K (informative) Conformity testing during manufacture		88
K.1	General.....	88
K.2	Testing	88
K.3	Additional dielectric strength tests for controlgear with protection against pollution by the use of coating or potting material	90
Annex L (normative) Particular additional requirements for controlgears providing SELV		91
L.1	General.....	91
L.2	Terms and definitions.....	91
L.3	Classification	92
L.4	Marking.....	92
L.5	Protection against electric shock.....	93
L.6	Heating.....	93
L.7	Short-circuit and overload protection.....	94
L.8	Insulation resistance and electric strength	95
L.8.1	General	95
L.8.2	Insulation resistance.....	95
L.8.3	Electric strength	95
L.9	Construction	96
L.10	Components	96
L.11	Creepage distances, clearances and distances through insulation	97
Annex M (informative) Dielectric strength test voltages for controlgear intended for the use in impulse withstand Category III.....		98
Annex N (normative) Requirements for insulation materials used for double or reinforced insulation		99
N.1	General.....	99
N.2	Reference document.....	99
N.3	Terms and definitions.....	99
N.4	General requirements	99
N.4.1	Material requirements	99
N.4.2	Solid insulation	99
N.4.3	Thin sheet insulation.....	99
Annex O (normative) Additional requirements for built-in electronic controlgear with double or reinforced insulation		103
O.1	General.....	103

O.2	Terms and definitions.....	103
O.3	General requirements	103
O.4	General notes on tests	103
O.5	Classification	104
O.6	Marking.....	104
O.7	Protection against accidental contact with live parts.....	104
O.8	Terminals.....	104
O.9	Provision for earthing.....	104
O.10	Moisture resistance and insulation	104
O.11	Electric strength.....	104
O.12	Thermal endurance of windings	104
O.13	Fault conditions	104
O.14	Construction	105
O.15	Creepage distances and clearances.....	105
O.16	Screws, current-carrying parts and connections	105
O.17	Resistance to heat and fire	105
O.18	Resistance to corrosion	105
Annex P (normative) Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting		106
P.1	General.....	106
P.2	Creepage distances	106
P.2.1	General	106
P.2.2	Minimum creepage distances for working voltages and rated voltage with frequencies up to 30 kHz.....	106
P.2.3	Creepage distances for working voltages with frequencies above 30 kHz	106
P.2.4	Compliance with the required creepage distances	107
P.3	Distance through isolation.....	108
P.3.1	General	108
P.3.2	Compliance tests	109
P.3.3	Preconditioning of the lamp controlgear	109
P.3.4	Electrical tests after conditioning	109
Annex Q (informative) Example for U_p calculation		111
Annex R (informative) Concept of creepage distances and clearances.....		112
R.1	Basic concept considerations.....	112
R.1.1	Creepage distances	112
R.1.2	Clearances	112
R.2	Why setting up tables?.....	113
Annex S (informative) Examples of controlgear insulation coordination		114
Annex T (informative) Creepage distances and clearances for controlgear with a higher degree of availability (impulse withstand category III).....		115
T.1	General.....	115
T.2	Clearances for working voltages of lamp controlgear not protected against pollution by coating or potting materials	115
T.3	Clearances for working voltages of lamp controlgear protected against pollution by coating or potting	116
T.4	Distances through insulation – Particular additional requirements for controlgear providing SELV	116
Bibliography.....		118

Figure 1 – Relation between winding temperature and endurance test duration	33
Figure 2 – Test circuit for controlgear	38
Figure 3 – Example of a controlgear insulation related to Table 6	42
Figure 4 – Application of Table 7 and Table 8	45
Figure 5 – Application of Table 9, Table 10 and Table 11	48
Figure 6 – Application of Table 10 and Table 11	49
Figure B.1 – Test circuit for thermally protected lamp controlgear	62
Figure D.1 – Example of heating enclosure for thermally protected ballasts	68
Figure E.1 – Assessment of claimed value of S	71
Figure G.1 – Circuit for measuring short-duration pulse energy	76
Figure G.2 – Suitable circuit for producing and applying long-duration pulses	78
Figure H.1 – Test arrangement for heating test	83
Figure N.1 – Test arrangement for checking mechanical withstanding of insulating materials in thin sheet layers	102
Figure Q.1 – Example for the calculation of U_p	111
Figure S.1 – Example of schematic drawings, showing the different controlgear insulation coordination	114
Table 1 – Required rated impulse withstand voltage of equipment	21
Table 2 – Working voltage and U_{out} steps	25
Table 3 – Electric strength test voltage	30
Table 4 – Theoretical test temperatures for ballasts subjected to an endurance test duration of 30 days	34
Table 5 – Minimum creepage distance on printed circuit board	37
Table 6 – Insulation requirements between active parts and accessible conductive parts	43
Table 7 – Minimum creepage distances for working voltage	46
Table 8 – Minimum value of creepage distances for sinusoidal or non-sinusoidal working voltages at different frequency ranges; basic or supplementary insulation	47
Table 9 – Minimum clearances for working voltages	49
Table 10 – Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; basic or supplementary insulation	51
Table 11 – Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; reinforced insulation	52
Table B.1 – Thermal protection operation	60
Table B.2 – Thermal protection operation	61
Table G.1 – Component values for measurement of pulse energy	76
Table K.1 – Minimum values for electrical tests	89
Table L.1 – Symbols for marking if marking is used	93
Table L.2 – Values of temperatures in normal use	94
Table L.3 – Values of insulation resistances	95
Table L.4 – Table of dielectric strength test voltages for controlgears intended for use in impulse withstand Category II	96
Table L.5 – Distances through insulation (DTI) for the impulse withstand category II / material group IIIa ($175 \text{ CTI} < 400$)	97

Table M.1 – Table of dielectric strength test voltages for controlgears intended for use in impulse withstand Category III	98
Table N.1 – Electric strength test voltage required during the mandrel test	101
Table P.1 – Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz	106
Table P.2 – Minimum value of creepage distances for sinusoidal or non-sinusoidal working voltages at different frequency ranges; basic or supplementary insulation	107
Table P.3 – Impulse withstand test voltage for products of impulse withstand category II	110
Table T.1 – Minimum clearances for working voltages – Impulse withstand category III	115
Table T.2 – Impulse withstand test voltages of impulse withstand category III for lamp controlgear protected against pollution by coating or potting material	116
Table T.3 – Distances through insulation (DTI) for the impulse withstand category III/material group IIIa (175 CTI < 400)	117

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LAMP CONTROLGEAR –

Part 1: General and safety requirements

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.

International Standard IEC 61347-1 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This third edition cancels and replaces the second edition published in 2007, Amendment 1:2010 and Amendment 2:2012. This edition constitutes a technical revision.

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

- a) additional marking requirements;
- b) additional requirements for creepage distances and clearances:
 - for working voltages with operating frequencies up to 30 kHz;
 - for working voltages with higher operating frequencies than 30 kHz;
 - for impulse and resonance voltages ignition;
 - for basic, supplementary and reinforced insulation;

- for insulation between circuits;
- for coated or potted controlgear;
- c) modification of definition of ELV and FELV;
- d) modification of schematic drawing, showing the different controlgear classification and insulation requirements;
- e) scope extension;
- f) new Annex A: test to establish whether a conductive part is a live part which may cause an electric shock;
- g) new Annex M: creepage distances and clearances for controlgear where a higher degree of availability (impulse withstand category III) may be requested;
- h) new Annex Q: example for U_p calculation;
- i) new Annex P: creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting;
- j) new Annex R: concept of creepage distances and clearances.

The text of this standard is based on the following documents:

FDIS	Report on voting
34C/1118/FDIS	34C/1135/RVD

Full information on the voting for the approval of this standard 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.

This Part 1 is to be used in conjunction with the appropriate Part 2, which contains clauses to supplement or modify the corresponding clauses in Part 1, to provide the relevant requirements for each type of product.

NOTE In this standard, the following print types are used.

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Explanatory matter: in smaller roman type.

A list of all parts of the IEC 61347 series, published under the general title *Lamp controlgear*, can be found 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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

This part of IEC 61347 provides a set of general and safety requirements and tests which are considered to be generally applicable to most types of lamp controlgear and which can be called up as required by the different parts that make up IEC 61347-2. This Part 1 is thus not to be regarded as a specification in itself for any type of lamp controlgear, and its provisions apply only to particular types of lamp controlgear, to the extent determined by the appropriate Part 2 of IEC 61347.

The parts which make up IEC 61347-2, in referring to any of the clauses of this part, specify the extent to which such a clause is applicable and the order in which the tests are to be performed; they also include additional requirements as necessary. The order in which the clauses of this part are numbered has no particular significance, as the order in which their provisions apply is determined for each type of lamp controlgear by the appropriate Part 2 of the IEC 61347-2 series. All such parts are self-contained and therefore do not contain references to each other.

Where the requirements of any of the clauses of this part of IEC 61347 are referred to in the various parts that make up IEC 61347-2 by the phrase "The requirements of clause n of IEC 61347-1 apply", this phrase will be interpreted as meaning that all requirements of the clause in question of Part 1 apply, except any which are clearly inapplicable to the particular type of lamp controlgear covered by the Part 2 concerned.

Lamp controlgear which complies with the text of this standard will not necessarily be judged to comply with the safety principles of the standard if, when examined and tested, it is found to have other features which impair the level of safety covered by these requirements.

Lamp controlgear employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirement and, if found to be substantially equivalent, may be judged to comply with the safety principles of the standard.

Performance requirements for lamp controlgear are the subject of IEC 60921, IEC 60923, IEC 60925, IEC 60927, IEC 60929, IEC 61047 and IEC 62384 as appropriate for the type of lamp controlgear.

Safety requirements ensure that electrical equipment constructed in accordance with these requirements does not endanger the safety of persons, domestic animals or property when properly installed and maintained and used in applications for which it was intended.

Requirements for electronic lamp controlgear for other types of lamps will be the subject of a separate standard, as the need arises.

Controlgear can consist of a printed circuit board and may incorporate the following:

- controlgear;
- lampholder(s);
- switch(es);
- supply terminals.

The lamp controlgear should comply with this standard.

The lampholders(s), switch(es) and supply terminals should comply with their own standards.

LAMP CONTROLGEAR –

Part 1: General and safety requirements

1 Scope

This part of IEC 61347 specifies general and safety requirements for lamp controlgear for use on d.c. supplies up to 250 V and/or a.c. supplies up to 1 000 V at 50 Hz or 60 Hz.

This standard also covers lamp controlgear for lamps which are not yet standardized.

Tests dealt with in this standard are type tests. Requirements for testing individual lamp controlgear during production are not included.

Requirements for semi-luminaires are given in IEC 60598-1:2014 (see definition 1.2.60).

Particular requirements for controlgears providing safety extra low voltage (from now on SELV) are given in Annex L.

It can be expected that lamp control gear which comply with this standard will not compromise safety between 90 % and 110 % of their rated supply voltage in independent use and when operated in luminaires complying with the safety standard IEC 60598-1 and the relevant part IEC 60598-2-xx and with lamps complying with the relevant lamp standards. Performance requirements may require tighter limits.

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 60065:2001¹, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60085:2007, *Electrical insulation – Thermal classification and designation*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*
IEC 60112:2003/AMD1:2009

IEC 60216 (all parts), *Electrical insulating materials – Thermal endurance properties*

IEC 60317-0-1:2013, *Specifications for particular types of windings wires – Part 0-1: General requirements – Enamelled round copper wire*

¹ Seventh edition. This edition has been replaced in 2014 by IEC 60065:2014.

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60417, *Graphical symbols for use on equipment*. Available at <http://www.graphical-symbols.info/equipment>

IEC 60449:1973, *Voltage bands for electrical installations of buildings*

IEC 60449:1973/AMD1:1979

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60598-1:2014, *Luminaires – Part 1: General requirements and tests*

IEC 60598-2, (all parts), *Luminaires – Part 2: Particular requirements*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60691:2002, *Thermal-links – Requirements and application guide*

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

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60730-2-3, *Automatic electrical controls for household and similar use – Part 2: Particular requirements for thermal protectors for ballasts for tubular fluorescent lamps*

IEC 60884-2-4, *Plugs and socket-outlets for household and similar purposes – Part 2-4: Particular requirements for plugs and socket outlets for SELV*

IEC 60901, *Single-capped fluorescent lamps – Performance specifications*

IEC 60906-3, *IEC System of plugs and socket-outlets for household and similar purposes – Part 3: SELV plugs and socket-outlets, 16 A 6 V, 12 V, 24 V, 48 V, a.c. and d.c.*

IEC 60921:2004, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 60921:2004/AMD1:2006

IEC 60923:2005, *Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – Performance requirements*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61180-1:1992, *High-voltage test techniques for low voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61189-2:2006, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 2: Test methods for materials for interconnection structures*

IEC 61249-2 (all parts), *Materials for printed boards and other interconnecting structures*

IEC 61347-2 (all parts), *Lamp controlgear – Part 2: Particular requirements*

IEC 61347-2-8, *Lamp controlgear – Part 2-8: Particular requirements for ballasts for fluorescent lamps*

IEC 61347-2-9:2012, *Lamp controlgear – Part 2-9: Particular requirements electromagnetic controlgear for discharge lamps (excluding fluorescent lamps)*

IEC 61558-1:2005, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

IEC 61558-2-6:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

IEC 61558-2-16:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

ISO 4046-4:2002, *Paper, board, pulp and related terms – Vocabulary – Part 4: Paper and board grades and converted products*

3 Terms and definitions

For the purposes of document, the following terms and definitions apply.

3.1

lamp controlgear

one or more components between the supply and one or more lamps which may serve to transform the supply voltage, limit the current of the lamp(s) to the required value, provide starting voltage and preheating current, prevent cold starting, correct power factor or reduce radio interference

3.1.1

built-in lamp controlgear

lamp controlgear generally designed to be built into a luminaire, a box, an enclosure or the like and not intended to be mounted outside a luminaire, etc. without special precautions

Note 1 to entry: The controlgear compartment in the base of a road lighting column is considered to be an enclosure.

3.1.2

independent lamp controlgear

lamp controlgear consisting of one or more separate elements so designed that it can be mounted separately outside a luminaire, with protection according to the marking of the lamp controlgear and without any additional enclosure

Note 1 to entry: This may consist of a built-in lamp controlgear housed in a suitable enclosure which provides all the necessary protection according to its markings.