

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 © 2017 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 It also gives information on projects, replaced and withdrawn publications.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 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 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 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

65 000 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 978-2-8322-4852-2

**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.**

Withdrawn

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC 61347-1:2015](#)

<https://standards.iteh.ai/catalog/standards/iec/54ca935-5405-4c96-98e8-30fa303b4e3a/iec-61347-1-2015>

REDLINE VERSION

VERSION REDLINE



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

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

CONTENTS

FOREWORD.....	9
INTRODUCTION.....	12
1 Scope.....	13
2 Normative references	13
3 Terms and definitions	15
4 General requirements	23
5 General notes on tests	24
6 Classification.....	25
7 Marking	25
7.1 Items to be marked	25
7.2 Durability and legibility of marking.....	28
8 Terminals	28
8.1 Integral terminals	28
8.2 Terminals other than integral terminals	28
9 Earthing.....	29
9.1 Provisions for protective earthing (Symbol: IEC 60417-5019 (2006-08)).....	29
9.2 Provisions for functional earthing (Symbol: IEC 60417-5018 (2011-07)).....	29
9.3 Lamp controlgear with conductors for protective earthing by tracks on printed circuit boards	29
9.4 Earthing of built-in lamp controlgear.....	29
9.5 Earthing via independent controlgear.....	29
9.5.1 Earth connection to other equipment	29
9.5.2 Earthing of the lamp compartments powered via the independent lamp controlgear	30
10 Protection against accidental contact with live parts	30
11 Moisture resistance and insulation.....	32
12 Electric strength	32
13 Thermal endurance test for windings of ballasts	33
14 Fault conditions.....	37
15 Construction.....	41
15.1 Wood, cotton, silk, paper and similar fibrous material	41
15.2 Printed circuits.....	41
15.3 Plugs and socket-outlets used in SELV or ELV circuits	42
15.4 Insulation between circuits and accessible parts	42
15.4.1 General	42
15.4.2 SELV circuits.....	42
15.4.3 FELV circuits	43
15.4.4 Other circuits.....	44
15.4.5 Insulation between circuits and accessible conductive parts	44
16 Creepage distances and clearances	45
16.1 General.....	45
16.2 Creepage distances	47
16.2.1 General	47
16.2.2 Minimum creepage distances for working voltages	49

16.2.3	Creepage distances for working voltages with frequencies above 30 kHz	50
16.2.4	Compliance with the required creepage distances	51
16.3	Clearances	52
16.3.1	General	52
16.3.2	Clearances for working voltages	53
16.3.3	Clearances for ignition voltages and working voltages with higher frequencies.....	54
16.3.4	Compliance with the required clearances.....	56
17	Screws, current-carrying parts and connections.....	57
18	Resistance to heat, fire and tracking.....	57
19	Resistance to corrosion	58
20	No-load output voltage	58
Annex A (normative)	Test to establish whether a conductive part is a live part which may cause an electric shock	59
A.1	General test requirements.....	59
A.2	Limits for measured voltages	59
A.3	Limits for touch current	59
Annex B (normative)	Particular requirements for thermally protected lamp controlgear	60
B.1	Introductory remark.....	60
B.2	General.....	60
B.3	Terms and definitions.....	60
B.4	General requirements for thermally protected lamp controlgear.....	61
B.5	General notes on tests	61
B.6	Classification	61
B.6.1	General	61
B.6.2	According to the class of protection	61
B.6.3	According to the type of protection	61
B.7	Marking.....	62
B.8	Thermal endurance of windings	62
B.9	Lamp controlgear heating	62
B.9.1	Preselection test.....	62
B.9.2	"Class P" thermally protected lamp controlgear	63
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	64
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	65
B.9.5	Temperature declared thermally protected lamp controlgear as specified in IEC 61347-2-9	66
Annex C (normative)	Particular requirements for electronic lamp controlgear with means of protection against overheating.....	68
C.1	General.....	68
C.2	Terms and definitions.....	68
C.3	General requirements for electronic lamp controlgear with means of protection against overheating	68
C.4	General notes on tests	69
C.5	Classification	69

C.6	Marking.....	69
C.7	Limitation of heating	69
C.7.1	Pre-selection test.....	69
C.7.2	Functioning of the protection means	69
Annex D (normative)	Requirements for carrying out the heating tests of thermally protected lamp controlgear	71
D.1	Test enclosure	71
D.2	Heating of enclosure	71
D.3	Lamp controlgear operating conditions.....	71
D.4	Lamp controlgear position in the enclosure	71
D.5	Temperature measurements	72
Annex E (normative)	Use of constant S other than 4 500 in t_w tests.....	73
E.1	General.....	73
E.2	Procedure A.....	73
E.3	Procedure B.....	73
Annex F (normative)	Draught-proof enclosure.....	76
Annex G (normative)	Explanation of the derivation of the values of pulse voltages	77
G.1	Pulse voltage rise time T	77
G.2	Long-duration pulse voltages	77
G.3	Short-duration pulse voltages	77
G.4	Measurement of short-duration pulse energy	77
Annex H (normative)	Tests	83
H.1	Ambient temperature and test room	83
H.2	Supply voltage and frequency	83
H.2.1	Test voltage and frequency.....	83
H.2.2	Stability of supply and frequency	83
H.2.3	Supply voltage waveform for reference ballast only	83
H.3	Electrical characteristics of lamps	84
H.4	Magnetic effects	84
H.5	Mounting and connection of reference lamps	84
H.6	Reference lamp stability.....	84
H.7	Instrument characteristics	84
H.7.1	Potential circuits	84
H.7.2	Current circuits	84
H.7.3	RMS measurements	85
H.8	Inverter power sources	85
H.9	Reference ballast.....	85
H.10	Reference lamps.....	85
H.11	Test conditions	85
H.11.1	Resistance measurement delays	85
H.11.2	Electrical resistance of contacts and leads	85
H.12	Lamp controlgear heating	85
H.12.1	Built-in lamp controlgear	85
H.12.2	Independent lamp controlgear	86
H.12.3	Integral lamp controlgear	86
H.12.4	Test conditions	87
Annex I (normative)	Additional requirements for built-in magnetic ballasts with double or reinforced insulation	88
I.1	General.....	88

I.2	Terms and definitions.....	88
I.3	General requirements	88
I.4	General notes on tests	89
I.5	Classification	89
I.6	Marking.....	89
I.7	Protection against accidental contact with live parts.....	89
I.8	Terminals.....	89
I.9	Provision for earthing.....	89
I.10	Moisture resistance and insulation	89
I.11	High-voltage impulse test.....	89
I.12	Thermal endurance test for windings of ballasts.....	90
I.13	Ballast heating.....	90
I.14	Screws, current-carrying parts and connections	90
I.15	Creepage distances and clearances.....	90
I.16	Resistance to heat and fire	90
I.17	Resistance to corrosion	90
Annex J (normative) Schedule of more onerous requirements.....		91
Annex K (informative) Conformity testing during manufacture		92
K.1	General.....	92
K.2	Testing	92
K.3	Additional dielectric strength tests for controlgear with protection against pollution by the use of coating or potting material	94
Annex L (normative) Particular additional requirements for controlgears providing SELV		95
L.1	General.....	95
L.2	Terms and definitions.....	95
L.3	Classification.....	96
L.4	Marking.....	96
L.5	Protection against electric shock.....	97
L.6	Heating.....	97
L.7	Short-circuit and overload protection.....	98
L.8	Insulation resistance and electric strength	99
L.8.1	General	99
L.8.2	Insulation resistance.....	99
L.8.3	Electric strength	99
L.9	Construction	100
L.10	Components	100
L.11	Creepage distances, clearances and distances through insulation	101
Annex M (informative) Dielectric strength test voltages for controlgear intended for the use in impulse withstand Category III.....		102
Annex N (normative) Requirements for insulation materials used for double or reinforced insulation		103
N.1	General.....	103
N.2	Reference document.....	103
N.3	Terms and definitions.....	103
N.4	General requirements	103
N.4.1	Material requirements	103
N.4.2	Solid insulation	103
N.4.3	Thin sheet insulation.....	103

Annex O (normative) Additional requirements for built-in electronic controlgear with double or reinforced insulation	107
O.1 General.....	107
O.2 Terms and definitions.....	107
O.3 General requirements	107
O.4 General notes on tests	107
O.5 Classification	108
O.6 Marking.....	108
O.7 Protection against accidental contact with live parts.....	108
O.8 Terminals.....	108
O.9 Provision for earthing.....	108
O.10 Moisture resistance and insulation	108
O.11 Electric strength.....	108
O.12 Thermal endurance of windings	108
O.13 Fault conditions	108
O.14 Construction	109
O.15 Creepage distances and clearances.....	109
O.16 Screws, current-carrying parts and connections	109
O.17 Resistance to heat and fire	109
O.18 Resistance to corrosion	109
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.....	110
P.1 General.....	110
P.2 Creepage distances	110
P.2.1 General.....	110
P.2.2 Minimum creepage distances for working voltages and rated voltage with frequencies up to 30 kHz.....	110
P.2.3 Creepage distances for working voltages with frequencies above 30 kHz.....	110
P.2.4 Compliance with the required creepage distances	112
P.3 Distance through isolation.....	113
P.3.1 General	113
P.3.2 Compliance tests.....	113
P.3.3 Preconditioning of the lamp controlgear.....	113
P.3.4 Electrical tests after conditioning	114
Annex Q (informative) Example for U_p calculation	116
Annex R (informative) Concept of creepage distances and clearances.....	117
R.1 Basic concept considerations.....	117
R.1.1 Creepage distances.....	117
R.1.2 Clearances	117
R.2 Why setting up tables?.....	118
Annex S (informative) Examples of controlgear insulation coordination	119
Annex T (informative) Creepage distances and clearances for controlgear with a higher degree of availability (impulse withstand category III).....	120
T.1 General.....	120
T.2 Clearances for working voltages of lamp controlgear not protected against pollution by coating or potting materials	120
T.3 Clearances for working voltages of lamp controlgear protected against pollution by coating or potting	121

T.4 Distances through insulation – Particular additional requirements for controlgear providing SELV	121
Bibliography.....	123
Figure 1 – Relation between winding temperature and endurance test duration	35
Figure 2 – Test circuit for controlgear	41
Figure 3 – Example of a controlgear insulation related to Table 6	44
Figure 4 – Application of Table 7 and Table 8	49
Figure 5 – Application of Table 9, Table 10 and Table 11.....	52
Figure 6 – Application of Table 10 and Table 11	53
Figure B.1 – Test circuit for thermally protected lamp controlgear	66
Figure D.1 – Example of heating enclosure for thermally protected ballasts	72
Figure E.1 – Assessment of claimed value of S.....	75
Figure G.1 – Circuit for measuring short-duration pulse energy.....	80
Figure G.2 – Suitable circuit for producing and applying long-duration pulses	82
Figure H.1 – Test arrangement for heating test	87
Figure N.1 – Test arrangement for checking mechanical withstanding of insulating materials in thin sheet layers	106
Figure Q.1 – Example for the calculation of U_p	116
Figure S.1 – Example of schematic drawings, showing the different controlgear insulation coordination	119
Table 1 – Required rated impulse withstand voltage of equipment	22
Table 2 – Working voltage and U_{out} steps	27
Table 3 – Electric strength test voltage	33
Table 4 – Theoretical test temperatures for ballasts subjected to an endurance test duration of 30 days	36
Table 5 – Minimum creepage distance on printed circuit board	39
Table 6 – Insulation requirements between active parts and accessible conductive parts	45
Table 7 – Minimum creepage distances for working voltage	50
Table 8 – Minimum value of creepage distances for sinusoidal or non-sinusoidal working voltages at different frequency ranges; basic or supplementary insulation	51
Table 9 – Minimum clearances for working voltages	54
Table 10 – Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; basic or supplementary insulation	55
Table 11 – Minimum distances of clearances for sinusoidal or non-sinusoidal voltages; inhomogeneous field conditions; reinforced insulation.....	56
Table B.1 – Thermal protection operation	64
Table B.2 – Thermal protection operation	65
Table G.1 – Component values for measurement of pulse energy	80
Table K.1 – Minimum values for electrical tests	93
Table L.1 – Symbols for marking if marking is used	97
Table L.2 – Values of temperatures in normal use	98
Table L.3 – Values of insulation resistances	99

Table L.4 – Table of dielectric strength test voltages for controlgears intended for use in impulse withstand Category II 100

Table L.5 – Distances through insulation (DTI) for the impulse withstand category II / material group IIIa (175 CTI < 400) 101

Table M.1 – Table of dielectric strength test voltages for controlgears intended for use in impulse withstand Category III 102

Table N.1 – Electric strength test voltage required during the mandrel test 105

Table P.1 – Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz 110

Table P.2 – Minimum value of creepage distances for sinusoidal or non-sinusoidal working voltages at different frequency ranges; basic or supplementary insulation 111

Table P.3 – Impulse withstand test voltage for products of impulse withstand category II 114

Table T.1 – Minimum clearances for working voltages – Impulse withstand category III 121

Table T.2 – Impulse withstand test voltages of impulse withstand category III for lamp controlgear protected against pollution by coating or potting material 121

Table T.3 – Distances through insulation (DTI) for the impulse withstand category III/material group IIIa (175 CTI < 400) 122

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

WITHDRAWN

IEC 61347-1:2015

<https://standards.iteh.ai/standards/iec/54ca935-5405-4c96-98e8-30fa303b4e3a/iec-61347-1-2015>

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.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61347-1 edition 3.1 contains the third edition (2015-02) [documents 34C/1118/FDIS and 34C/1135/RVD] and its amendment 1 (2017-09) [documents 34C/1351/FDIS and 34C/1358/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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 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.

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.