

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



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

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

IEC 61347-1:2007

<https://standards.iteh.ai/standards/iec/61347-1/2007>



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## LAMP CONTROLGEAR –

## Part 1: General and safety requirements

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**This consolidated version of IEC 61347-1 consists of the second edition (2007) [documents 34C/776/FDIS and 34C/779/RVD] and its amendment 1 (2010) [documents 34C/916/FDIS and 34C/918/RVD]. It bears the edition number 2.1.**

**The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.**

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

The definition clause has been extended (rated no-load output voltage, controllable ballasts, control terminals, control signal). General requirements for lamp control gear which do not have their own enclosure have been added. The informative information (for ballasts in lamp standards) is now transformed into a normative requirement (in ballast standards). The test schedule has been minimised where possible, see 5.7 and Annex J. For printed circuit boards, the (non-) inflammability requirements have been specified. An Annex on conformity testing during manufacture has been added.

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 the base publication and its amendments 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

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- withdrawn,
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## 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 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 (in preparation) as appropriate for the type of lamp controlgear.

NOTE 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.

NOTE 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 (see definition 1.2.60).

In addition to the requirements given in this Part 1 of IEC 61347, Annex B sets out general and safety requirements applicable to thermally protected lamp controlgear.

Annex C sets out additional general and safety requirements as they apply to electronic lamp controlgear with means of protection against overheating.

Additional requirements for built-in ballasts with double or reinforced insulation are given in Annex I.

**NOTE** 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 referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60317-0-1:1997, *Specifications for particular types of winding wires – Part 0: General requirements – Section 1: Enamelled round copper wire<sup>1)</sup>*

Amendment 1 (1999)

Amendment 2 (2005)

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*

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<sup>1)</sup> There exists a consolidated edition 2.2 (2005) including the base publication and its Amendments 1 and 2.

IEC 60529:1989 , *Degrees of protection provided by enclosures (IP Code)*<sup>2)</sup>

Amendment 1 (1999)

IEC 60598-1:2003, *Luminaires – Part 1: General requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

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

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

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

IEC 60929:2006, *AC-supplied electronic ballasts for tubular fluorescent lamps – Performance requirements*

IEC 60990:1999, *Methods of measurement of touch current and protective conductor current*

IEC 61189-2: *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 61347-2-9:2000, *Lamp controlgear – Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)*

Amendment 1 (2003)

Amendment 2 (2006)

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

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<sup>2)</sup> There exists a consolidated edition 2.1 (2001) including the base publication and its Amendment 1.

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

##### 3.1.3

##### **integral lamp controlgear**

lamp controlgear which forms a non-replaceable part of a luminaire and which cannot be tested separately from the luminaire

#### 3.2

##### **ballast**

unit inserted between the supply and one or more discharge lamps which by means of inductance, capacitance, or a combination of inductance and capacitance, serves mainly to limit the current of the lamp(s) to the required value.

NOTE It may also include means for transforming the supply voltage and arrangements which help provide starting voltage and pre-heating current.

##### 3.2.1

##### **d.c. supplied electronic ballast**

d.c. to a.c. inverter using semiconductor devices which may include stabilizing elements for supplying power to one or more fluorescent lamps

##### 3.2.2

##### **reference ballast**

special inductive ballast designed for the purpose of providing comparison standards for use in testing ballasts and for the selection of reference lamps, and essentially characterized by a stable voltage-to-current ratio, which is relatively uninfluenced by variations in current, temperature and magnetic surroundings (see also Annex C of IEC 60921 and Annex A of IEC 60923)

### 3.2.3

#### **controllable ballast**

electronic ballast whose lamp operating characteristics can be changed by means of a signal via mains or extra control input

### 3.3

#### **reference lamp**

lamp selected for testing ballasts which, when associated with a reference ballast, has electrical characteristics which are close to the rated values as stated in the relevant lamp standard

### 3.4

#### **calibration current of a reference ballast**

value of the current on which are based the calibration and control of the reference ballast

NOTE Such a current should preferably be approximately equal to the rated running current of the lamps for which the reference ballast is suitable.

### 3.5

#### **supply voltage**

voltage applied to the complete circuit of lamp(s) and lamp controlgear

### 3.6

#### **working voltage**

highest r.m.s. voltage which may occur across any insulation at rated supply voltage, transients being neglected, in open-circuit conditions or during normal operation

### 3.7

#### **design voltage**

voltage declared by the manufacturer to which all the lamp controlgear characteristics are related. This value is not less than 85 % of the maximum value of the rated voltage range

### 3.8

#### **voltage range**

range of supply voltage over which the ballast is intended to be operated

### 3.9

#### **rated no-load output voltage**

the output voltage when the ballast is connected to rated supply voltage at rated frequency, with no load on the output, transient and starting phase being neglected

### 3.10

#### **supply current**

current supplied to the complete circuit of lamp(s) and lamp controlgear

### 3.11

#### **live part**

conductive part which may cause an electric shock in normal use. The neutral conductor is, however, regarded as a live part

NOTE The test to determine whether or not a conductive part is a live part which may cause an electric shock is given in Annex A.

### 3.12

#### **type test**

test or series of tests made on a type-test sample for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard

**3.13****type-test sample**

sample consisting of one or more similar units submitted by the manufacturer or responsible vendor for the purpose of a type test

**3.14****circuit power factor** $\lambda$ 

power factor of the combination of lamp controlgear and the lamp or lamps for which the lamp controlgear is designed

**3.15****high power factor ballast**

ballast having a circuit power factor of at least 0,85 (leading or lagging)

NOTE 1 The value 0,85 takes into account the distortion of the current waveform.

NOTE 2 For North America, a high power factor is defined as a power factor of at least 0,9.

**3.16****rated maximum temperature** $t_c$ 

highest permissible temperature which may occur on the outer surface (at the indicated place, if marked) under normal operating conditions and at the rated voltage or the maximum of the rated voltage range

**3.17****rated maximum operating temperature of a lamp controlgear winding** $t_w$ 

winding temperature assigned by the manufacturer as the highest temperature at which 50 Hz/60 Hz lamp controlgear may be expected to have a service life of at least 10 years' continuous operation

**3.18****rectifying effect**

effect which may occur at the end of lamp life when one cathode is either broken or has insufficient electron emission, resulting in the arc current being constantly unequal in consecutive half-cycles

**3.19****test duration of endurance test** $D$ 

optional duration of the endurance test on which the temperature conditions are based

**3.20****degradation of insulation of a ballast winding** $S$ 

constant which determines the degradation of ballast insulation

**3.21****ignitor**

device intended to generate voltage pulses to start discharge lamps and which does not provide for the preheating of electrodes

NOTE The element that releases the starting voltage pulse may be either triggered or non-triggered.

### 3.22 protective earth (ground)



(IEC 60417-5019 (2002-10))

terminal to which are connected parts which are connected to earth for safety reasons

### 3.23 functional earth (ground)



(IEC 60417-5017 (2002-10))

terminal to which are connected parts which may be necessary to connect to earth for reasons other than safety

NOTE 1 In some instances, starting aids adjacent to the lamp(s) are connected to one of the output terminals but need not be connected to the earth on the supply side.

NOTE 2 In some cases, functional earthing may be necessary to facilitate starting or for e.m.c. purposes.

### 3.24 frame (chassis)



(IEC 60417-5020 (2002-10))

terminal whose potential is taken as reference

### 3.25 control terminals

connections, other than power supply terminals, to the electronic ballast, which are used to exchange information with the ballast

NOTE The power supply terminals can also be used to exchange information with the ballast.


### 3.26 control signal

signal, which may be an a.c. or d.c. voltage, and which by analogue, digital or other means may be modulated to exchange information with the ballast

## 4 General requirements

Lamp controlgear shall be so designed and constructed that in normal use it operates without danger to the user or surroundings.

Compliance is checked by carrying out all the tests specified.

In addition, independent lamp controlgear shall comply with the requirements of IEC 60598-1, including the classification and marking requirements of that standard such as IP classification,  marking, etc. Built-in ballasts with double or reinforced insulation shall comply additionally with the requirements of Annex I.

Some built-in lamp controlgear do not have their own enclosure and are composed of printed circuit boards and electrical components thereon, and shall comply with the requirements of IEC 60598-1 when built into the luminaire. Integral lamp controlgear not having their own enclosure shall be treated as integral components of luminaires defined in Clause 0.5 in IEC 60598-1 and shall be tested assembled in the luminaire.