IEC 61347-2-9

Edition 1.2 2009-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Lamp controlgear –
Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)

Appareillages de lampes –
Partie 2-9: Prescriptions particulières pour les ballasts pour lampes à décharge (à l'exclusion des lampes fluorescentes)

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LAMP CONTROLGEAR –

Part 2-9: Particular requirements for ballasts for discharge lamps (excluding 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.
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International Standard IEC 61347-2-9 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This part 2 supplements or modifies the corresponding clauses in IEC 61347-1, so as to convert that publication into the IEC Standard: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps).

This standard shall be used in conjunction with IEC 61347-1. It was established on the basis of the first edition (2000) of that standard.

This consolidated version of IEC 61347-2-9 consists of the first edition (2000) [documents 34C/506/FDIS and 34C/520/RVD], its amendment 1 (2003) [documents 34C/605/FDIS and 34C/617/RVD] and its amendment 2 (2006) [documents 34C/735/FDIS and 34C/750/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

Annexes A, B, D, E, F, H, I and K form an integral part of this standard.

Annex J is for information only.

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.

IEC 61347 consists of the following parts, under the general title *Lamp controlgear:*

– Part 1: General and safety requirements
– Part 2-1: Particular requirements for starting devices (other than glow starters)
– Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps
– Part 2-3: Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps
– Part 2-4: Particular requirements for d.c. electronic ballasts for general lighting
– Part 2-5: Particular requirements for d.c. supplied electronic ballasts for public transport lighting
– Part 2-6: Particular requirements for d.c. supplied electronic ballasts for aircraft lighting
– Part 2-7: Particular requirements for d.c. supplied electronic ballasts for emergency lighting
– Part 2-8: Particular requirements for ballasts for fluorescent lamps
– Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)
– Part 2-10: Particular requirements for electronic invertors and convertors for high-frequency operation of cold start tubular discharge lamps (neon tubes)
– Part 2-11: Particular requirements for miscellaneous electronic circuits used with luminaires

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result 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.

INTRODUCTION

This first edition of IEC 61347-2-9, published in conjunction with IEC 61347-1, represents an editorial review of IEC 60922. 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 recognized.

This standard, and the parts which make up IEC 61347-2, in referring to any of the clauses of IEC 61347-1, 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. All parts which make up IEC 61347-2 are self-contained and, therefore, do not include references to each other.

Where the requirements of any of the clauses of IEC 61347-1 are referred to in this standard by the phrase "The requirements of clause n of IEC 61347-1 apply", this phrase is interpreted as meaning that all requirements of the clause in question of part 1 apply, except any which are clearly inapplicable to the specific type of lamp controlgear covered by this particular part of IEC 61347-2.

LAMP CONTROLGEAR –

Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)

1 Scope

This part of IEC 61347 specifies particular safety requirements for ballasts for discharge lamps such as high-pressure mercury vapour, low-pressure sodium vapour, high-pressure sodium vapour and metal halide lamps. The standard covers inductive-type ballasts for use on a.c. supplies up to 1 000 V at 50 Hz or 60 Hz, associated with discharge lamps, having rated wattages, dimensions and characteristics as specified in IEC 60188, IEC 60192 and IEC 60662.

This standard applies to complete ballasts and to their component parts such as reactors, transformers and capacitors. Particular requirements for thermally protected ballasts are given in annex B.

NOTE 1 For certain types of discharge lamps, an ignitor is required.

NOTE 2 Ballasts for fluorescent lamps are covered by IEC 61347-2-8.

Performance requirements are the subject of IEC 60923.

2 Normative references

For the purpose of this part of IEC 61347, the normative references given in clause 2 of IEC 61347-1 which are mentioned in this standard apply, together with the following normative references.

IEC 60188, *High-pressure mercury vapour lamps*

IEC 60192, *Low-pressure sodium vapour lamps*

IEC 60662, *High-pressure sodium vapour lamps*

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

IEC 61347-1, *Lamp controlgear – Part 1: General and safety requirements*

IEC 61347-2-1, *Lamp controlgear – Part 2-1: Particular requirements for starting devices (other than glow starters*)

3 Definitions

For the purpose of this part of IEC 61347, the definitions given in clause 3 of IEC 61347-1 apply, together with the following:

3.1
rated temperature rise of a ballast winding Δt
temperature rise assigned by the manufacturer under the conditions specified in this standard

NOTE The specifications for the supply and mounting conditions of the ballast are given in annex H.

3.2
high-voltage impulse
intentionally applied aperiodic transient voltage which rises rapidly to a peak value and then falls, usually less rapidly, to zero. Such an impulse is, in general, well represented by the sum of two exponentials

NOTE The term "impulse" is to be distinguished from the term "surge", which refers to transients occurring in electrical equipment or networks in service.

4 General requirements

The requirements of clause 4 of IEC 61347-1 apply, together with the following additional requirements:

4.1 Capacitors and other components

Capacitors and other components incorporated in ballasts shall comply with the requirements of the appropriate IEC standard.

4.2 Thermally protected ballasts

Thermally protected ballasts shall comply with the requirements of annex B.

5 General notes on tests

The requirements of clause 5 of IEC 61347-1 apply, together with the following additional requirements:

5.1

The type test is carried out on one sample consisting of eight ballasts submitted for the purpose of the type test. Seven ballasts are for the endurance test and one for all other tests. For conditions of compliance for the endurance test, see clause 13.

In addition, six ballasts are required for the high-voltage impulse testing according to clause 15 below, for ballasts for metal halide and high-pressure sodium lamps. There shall be no failure during the test.

5.2

The tests are made under the conditions specified in annex H of IEC 61347-1. In general, all the tests are carried out on each type of ballast or, where a range of similar ballasts is involved, on each rated wattage in the range, or on a representative selection from the range as agreed with the manufacturer. A reduction in the number of samples for the endurance test according to clause 13 and including the use of constant *S* other than 4 500 as shown in annex E, or even the omission of these tests, is allowed when ballasts of the same construction but with different characteristics are submitted together for approval, or when test reports from the manufacturer or other authority are accepted by the testing station.

6 Classification

The requirements of clause 6 of IEC 61347-1 apply.

7 Marking

Ballasts which form an integral part of the luminaire need not be marked. For ballasts intended to be mounted in the base compartment of a column, all necessary markings according to 7.1 and 7.2 shall be on the ballast. The requirements of 7.2 of IEC 61347-1 apply.

7.1 Mandatory markings

Ballasts, other than integral ballasts, shall be clearly and durably marked with the following mandatory markings:

– items a), b), e), f), g) and r) of 7.1 of IEC 61347-1, together with,

– in the case of ballasts intended to be used with ignitors (IEC 61347-2-1), the terminals/terminations subjected to the pulse voltage shall be marked on the ballast.

NOTE This marking may be in the form of a wiring diagram. Simple reactor ballasts which have several uses, for example, for controlling high-pressure mercury vapour lamps, certain metal halide lamps, etc., need not be marked in this way.

7.2 Information to be provided, if applicable

In addition to the above mandatory markings, the following information, if applicable, shall be given either on the ballast, or be made available in the manufacturer's catalogue or similar:

– items c), h), i), j), k), o), p) and q) of 7.1 of IEC 61347-1, together with

– for ballasts for use with high-pressure sodium vapour or metal halide lamps:

  1) the maximum peak value of the pulse voltage to which the ballast can be subjected if this value exceeds 1 500 V;

  2) the catalogue reference of the ignitor(s) which may be used with the ballast.

– In the case of a ballast consisting of more than one separate unit, the current-controlling inductive element(s) marked with the essential details of the other unit(s) and/or essential capacitors.

– In the case of an inductive ballast used with a separate series capacitor other than a radio interference suppression capacitor, repetition of the marking of rated voltage, capacitance and tolerance.

– Advice to the installer to prevent overheating of ballasts and associated components in a multi-ballast installation mounted in poles, boxes, etc.

7.3 Other information

Manufacturers may provide the following non-mandatory information, if available:

– the rated temperature rise of the winding following the symbol Δt, values increasing in multiples of 5 K.

8 Protection against accidental contact with live parts

The requirements of clause 10 of IEC 61347-1 apply.

9 Terminals

The requirements of clause 8 of IEC 61347-1 apply.

10 Provisions for earthing

The requirements of clause 9 of IEC 61347-1 apply.

11 Moisture resistance and insulation

The requirements of clause 11 of IEC 61347-1 apply.

12 Electric strength

The requirements of clause 12 of IEC 61347-1 apply.

Additionally for ballasts using ignitors where the pulse voltage is generated within the ballast an electric strength test shall be conducted across insulation barriers subject to the ignition voltage. The test voltage shall be (U = working voltage):

	Pulse voltage ≤ 4 U × 1,414	**Pulse voltage > 4 U × 1,414**
Double or reinforced insulation	4 U + 2 750 V	U_{pmax}/1,414 + 2 750 V
Basic or supplementary insulation	2 U + 1 000 V	U_{pmax}/2 × 1,414 + 1 000 V

13 Thermal endurance test for windings

The requirements of clause 13 of IEC 61347-1 apply.

14 Ballast heating

Ballasts, or their mounting surfaces, shall not attain a temperature which would impair safety.

Compliance is checked by the tests of 14.1 to 14.2 and H.12 of IEC 61347-1.

14.1

When the ballast is tested in accordance with the requirements of 14.2, the temperature shall not exceed the appropriate values given in table 1 for the test under normal and abnormal conditions, if applicable.

Before the test, the following shall be checked and measured:

a) the ballast shall start and operate the lamp(s) normally;

b) the resistance of each winding shall be measured, if required, at the ambient temperature.

After this heating test, the ballast shall be allowed to cool to room temperature and then shall comply with the following conditions:

a) the ballast marking shall still be legible;

b) the ballast shall withstand without damage a dielectric strength test according to clause 12, the test voltage, however, being reduced to 75 % of the values given in table 1 of IEC 61347-1, but not less than 500 V.

14.2

Ballasts are tested under normal and, if required, under abnormal conditions in accordance with the following details: at 110 % of rated supply voltage and at rated frequency, until steady temperatures are attained, except that the verification of the Δt marking, if any, shall be carried out at the rated supply voltage.

For the tests under normal conditions, ballasts are operated with appropriate lamps which are placed in such a way that the heat generated does not contribute to the heating of the ballast. Lamps are deemed to be appropriate if they pass, under the prescribed test conditions, a current within the tolerances of the current a reference lamp would pass.

For the tests under abnormal conditions, simulating the case of a circuit which under abnormal conditions can short-circuit the ballast, the ballast is directly connected to the supply, with the lamp terminals short-circuited.

NOTE It is permitted, at the manufacturer's discretion, for a reactor ballast (simple choke impedance in series with the lamp), that the test and measurement be made without a lamp, provided that the current is adjusted to the same value as found with the lamp at 110 % of rated supply voltage. With a non-reactor type ballast, it is necessary to ensure that representative losses are obtained.

NOTE If it is required to measure the temperature rise of the ballast winding (this is non-mandatory), then this is measured when steady temperature has been attained after operating the ballast with an appropriate lamp at rated supply voltage and at rated frequency. In such a case, with a reactor type ballast (simple choke impedance in series with the lamp), the test and measurement may be made without a lamp, providing that the current is adjusted to the same value as found with the lamp at rated supply voltage.