IEC 61347-2-8

Edition 2.0 2024-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Controlgear for electric light sources – Safety – Part 2-8: Particular requirements – Ballasts for fluorescent lamps

Appareillages de commande pour les sources de lumière électriques – Sécurité – Partie 2-8: Exigences particulières – Ballasts pour lampes fluorescentes

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Appareillages de commande pour les sources de lumière électriques – Sécurité – Partie 2-8: Exigences particulières – Ballasts pour lampes fluorescentes

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CONTROLGEAR FOR ELECTRIC LIGHT SOURCES – SAFETY –

Part 2-8: Particular requirements – Ballasts for fluorescent lamps

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IEC 61347-2-8 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lighting. It is an International Standard.

This second edition cancels and replaces the first edition published in 2000 and Amendment 1:2006. This edition constitutes a technical revision.

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

a) introduction of dated references where appropriate;
b) alignment of clause numbers with those of IEC 61347-1.

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The text of this International Standard is based on the following documents:

Draft	Report on voting
34C/1583/CDV	34C/1591/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This document is intended to be used in conjunction with IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017. Where the requirements of any of the clauses of IEC 61347-1:2015 and IEC61347-1:2015/AMD1:2017 are referred to in this document by the phrase "IEC 61347-1:2015, Clause n and IEC 61347-1:2015/AMD1:2017, Clause n apply", this phrase is interpreted as meaning that all the requirements of the clause in question of IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017 apply, except any which are clearly inapplicable to the specific type of controlgear covered by this document.

NOTE In this document, the following print type is used:

– *compliance statements: in italic type*.

A list of all parts in the IEC 61347 series, published under the general title *Controlgear for electric light sources – Safety,* can be found on the IEC website.

Future documents in this series will carry the new general title as cited above. Titles of existing documents in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
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INTRODUCTION

The technical requirements in this document compared to IEC 61347-2-8:2000 and IEC 61347-2-8:2000/AMD1:2006 are essentially unchanged. Nevertheless, a new edition of this document could not be avoided, as without the introduction of dated references to IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017, the fourth edition of IEC 61347-1:—[1] would have been implicitly applicable due to the undated nature of the references to IEC 61347-1 in IEC 61347-2-8:2000 and IEC 61347-2-12:2000/AMD1:2006.

This document, in referring to any of the clauses of IEC 61347-1:2015 and IEC 61347-1:2015/AMD1:2017, specifies the extent to which such a clause is applicable. Additional requirements are also included, as necessary.

[1] Fourth edition under preparation. Stage at the time of publication IEC FDIS 61347-1:2024.

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CONTROLGEAR FOR ELECTRIC LIGHT SOURCES – SAFETY –

Part 2-8: Particular requirements – Ballasts for fluorescent lamps

1 Scope

This part of IEC 61347 specifies safety requirements for ballasts, excluding resistance types, for use on AC supplies up to 1 000 V at 50 Hz or 60 Hz, associated with fluorescent lamps with or without pre-heated cathodes operated with or without a starter or starting device and having rated powers, dimensions and characteristics as specified in IEC 60081 and IEC 60901.

This document applies to complete ballasts and to their component parts such as reactors, transformers and capacitors. Ballasts for conventional operation of lamps at mains frequency are covered, while AC supplied electronic ballasts for high-frequency operation are excluded.

NOTE 1 AC supplied electronic ballasts for high-frequency operation are specified in IEC 61347-2-3.

NOTE 2 Performance requirements are the subject of IEC 60921.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60317-0-1:2013, *Specifications for particular types of winding wires – Part 0-1: General requirements – Enamelled round copper wire*
IEC 60317-0-1:2013/AMD1:2019

IEC 61347-1:2015, *Lamp controlgear – Part 1: General and safety requirements*
IEC 61347-1:2015/AMD1:2017

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61347-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
rated temperature rise of the ballast winding
Δt
temperature rise assigned by the manufacturer under the conditions specified in IEC 61347-2-8

Note 1 to entry: The specifications for the supply and mounting conditions of the ballast are given in IEC 61347-1:2015, Annex H.

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4 General requirements

IEC 61347-1:2015, Clause 4 applies, together with the following:

– For thermally protected ballasts IEC 61347-1:2015, Annex B applies.

– For capacitors and other components incorporated in ballasts, the appropriate IEC standard applies.

NOTE Capacitors having a capacitance greater than 0,1 µF are covered by IEC 61048 and IEC 61049. Capacitors having a capacitance less than or equal to 0,1 µF are specified in IEC 60384-14.

5 General notes on tests

IEC 61347-1:2015, Clause 5 applies, together with the following:

– The type test is carried out on one sample consisting of eight ballasts used 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 intended for circuits in which high-voltage impulse occurs within the ballast. There shall be no failure during the test.

– IEC 61347-1:2015, Annex H applies.

– 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 power 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 IEC 61347-1:2015, 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.

For information on requalification of products compliant with the previous edition of this document, i.e. IEC 61347-2-8:2000 and IEC 61347-2-8:2000/AMD1:2006, refer to Annex C.

6 Classification

IEC 61347-1:2015, Clause 6 applies.

7 Marking

7.1 Marking and information

7.1.1 Mandatory marking

Ballasts, other than integral ballasts, shall be marked with the following:

– items a), b), e), f), g) and r) of IEC 61347-1:2015, 7.1 and IEC 61347-1:2015/AMD1:2017, 7.1;

– the peak value of the voltage produced, if the peak value exceeds 1 500 V, with connections subjected to this voltage marked as such.

Pulse generated by a glow starter and ballast combination are exempt from this requirement.

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7.1.2 Information to be provided

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 IEC 61347-1:2015, 7.1;
– 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) 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.

Manufacturers may provide the rated temperature rise of the ballast winding following the symbol Δt, values increasing in multiples of 5 K, if available.

7.2 Durability and legibility of marking

IEC 61347-1:2015, 7.2 applies.

8 Terminals

IEC 61347-1:2015, Clause 8 and IEC 61347-1:2015/AMD1:2017, Clause 8 apply.

9 Earthing

IEC 61347-1:2015, Clause 9 applies.

10 Protection against accidental contact with live parts

IEC 61347-1:2015, Clause 10 and IEC 61347-1:2015/AMD1:2017, Clause 10 apply.

11 Moisture resistance and insulation

IEC 61347-1:2015, Clause 11 and IEC 61347-1:2015/AMD1:2017, Clause 11 apply.

12 Electric strength

IEC 61347-1:2015, Clause 12 applies.

13 Thermal endurance test for windings of ballasts

IEC 61347-1:2015, Clause 13 applies.

14 Ballast heating

14.1 General

Ballasts, including their mounting surfaces, shall not attain a temperature which would impair safety which is checked by the following tests.

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14.2 Pre-test, checks and measures

Before the test, the following is checked and measured:

a) the ballast starts and operates the lamp(s) normally;

b) the resistance of each ballast winding is measured at the ambient temperature, if required.

14.3 Voltage across capacitors

At rated frequency, the voltage across a capacitor incorporated in a ballast shall comply with the requirements given in items a) and b) below. Such requirements do not apply to the capacitors in starters or starting devices or to those having a capacitance less than or equal to 0,1 µF (nominal). Neither do the requirements of item b) apply to self-healing capacitors.

a) Under normal conditions, when the ballast is tested at its rated supply voltage, the voltage across the capacitor shall not exceed the rated voltage of the latter.

b) Under abnormal conditions (see 14.4) when the ballast is tested at 110 % of its rated supply voltage, the voltage across the capacitor shall not be greater than the appropriate test voltage of the capacitor given in Table 1.

Table 1 – Abnormal conditions – Capacitor test voltages

Designation	Rated voltage U_n	Limiting voltage
Any	Rated voltage of 240 V or less, 50 Hz or 60 Hz and maximum rated temperature less than or equal to 50 °C	1,25 U_n
Non-self-healing	Other ratings, 50 Hz or 60 Hz	1,50 U_n
Self-healing	Other ratings, 50 Hz or 60 Hz	1,25 U_n

14.4 Ballast heating test

When the ballast is tested in accordance with the conditions of IEC 61347-1:2015, Annex H and the information given in Annex B, the temperature shall not exceed the appropriate values given in Table 2 for the tests under normal and abnormal conditions, if applicable.

NOTE Abnormal circuit conditions are detailed in IEC 60598-1:2020, Annex C.

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Table 2 – Maximum temperatures

Parts	Maximum temperature °C		
	Normal operation at 100 % of rated voltage	Normal operation at 106 % of rated voltage	Abnormal operation at 110 % of rated voltage
Ballast windings if Δt is provided	[a]		
Ballast windings with declared temperature under abnormal conditions			[b]
Ballast case adjacent to capacitor, if any (incorporated in ballast enclosure)			
– without temperature declaration		50	
– with indication of t_c		t_c	
Parts made of			
– wood-filled phenolic mouldings		110	
– mineral-filled phenolic mouldings		145	
– urea mouldings		90	
– melamine mouldings		100	
– laminated, resin bonded paper		110	
– rubber		70	
– thermoplastic materials		[c]	

[a] The measurement of the temperature rise of the ballast windings under normal conditions at 100 % of rated voltage – i.e. verification of a declared value so as to provide information for luminaire design – is non-mandatory and its measurement is only performed when marked on the ballast or otherwise required in the catalogue.

[b] This measurement is only mandatory for circuits which can produce abnormal conditions. The declared limiting temperature of the ballast windings under abnormal conditions shall not be higher than the value which corresponds to a number of days equal to at least two-thirds of the theoretical endurance test period (see Table 3).

[c] The temperature of thermoplastic material, other than that used for the insulation of the wiring, which provides protection against contact with live parts or supporting such parts, is also measured. Values thus obtained serve to establish the conditions of the test of IEC 61347-1:2015, 18.1.

If materials or manufacturing methods are used other than those indicated in Table 2, they shall not be operated at temperatures higher than those which are proved to be permissible for those materials.

The temperature in Table 2 shall not be exceeded when the ballast is operated at its maximum declared ambient temperature, if any. Maximum ambient temperature for a ballast, if not declared, shall be considered as the difference between the marked t_w and the measured ballast winding temperature rise at 100 % rated voltage.

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Table 3 – Limiting temperatures of ballast windings under abnormal operating conditions and at 110 % of rated voltage for ballasts subjected to an endurance test duration of 30 days

Constant S		Limiting temperature °C					
		S4,5	**S5**	**S6**	**S8**	**S11**	**S16**
For t_w =	90	171	161	147	131	119	110
	95	178	168	154	138	125	115
	100	186	176	161	144	131	121
	105	194	183	168	150	137	126
	110	201	190	175	156	143	132
	115	209	198	181	163	149	137
	120	217	205	188	169	154	143
	125	224	212	195	175	160	149
	130	232	220	202	182	166	154
	135	240	227	209	188	172	160
	140	248	235	216	195	178	166
	145	256	242	223	201	184	171
	150	264	250	230	207	190	177
The limiting temperatures specified in column S4,5 apply, unless otherwise indicated on the ballast.							

For ballasts which are subjected to an endurance test duration of longer than 30 days, the limiting temperatures shall be calculated using IEC 61347-1:2015, Clause 13, Equation (2), but for an objective test life (in days) equal to two-thirds of the theoretical endurance test period. Table 2 shall be read together with Table 3 where necessary.

14.5 Marking legibility and electric strength after test

After these heating tests, the ballast shall be allowed to cool to room temperature and shall comply with the following conditions:

a) the ballast marking shall still be legible;

b) the ballast shall withstand without damage a voltage test according to Clause 12, the test voltage, however, being reduced to 75 % of the values given in IEC 61347-1:2015, Clause 12, but not less than 500 V.

15 High-voltage impulse testing

15.1 General

Ballasts marked in accordance with 7.1.2 with a rated temperature rise of the ballast winding shall be subjected to the test either in 15.2 or 15.3 below according to their type.

The manufacturer shall declare to which test their product has been subjected.

15.2 Simple reactor type ballasts

From the six ballasts specified in Clause 5, three are subjected to the moisture resistance and insulation test and the electric strength test specified in Clause 11 and Clause 12.

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