INTERNATIONAL STANDARD

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Edition 3.1
2006-09

Edition 3:2005 consolidated with amendment 1:2006

Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – Performance requirements

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUXILIARIES FOR LAMPS – BALLASTS FOR DISCHARGE LAMPS (EXCLUDING TUBULAR FLUORESCENT LAMPS) – PERFORMANCE REQUIREMENTS

FOREWORD

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International Standard IEC 60923 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This consolidated version of IEC 60923 consists of the third edition (2005) [documents 34C/688/FDIS and 34C/694/RVD] and its amendment 1 (2006) [documents 34C/749/FDIS and 34C/758/RVD].

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

It bears the edition number 3.1.

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

The purpose of publishing the third edition of IEC 60923 was to remove EMC related requirements which are deemed to be of a regional nature. At the same time, references to quoted standards were updated.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard is to be read in conjunction with IEC 61347-2-9, *Lamp controlgear – Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)* together with IEC 61347-1, *Lamp controlgear – Part 1: General and safety requirements.*

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.

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- withdrawn,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 standard covers performance requirements for ballasts for discharge lamps.

In order to obtain satisfactory performance of discharge lamps and their associated ballasts, it is necessary that certain features of their design be properly coordinated. Therefore, it is essential that specifications for them be written in terms of measurements made against some common baseline of reference, which should be permanent and reproducible.

These conditions may be fulfilled by special or selected inductive-type ballasts, called "reference ballasts". These ballasts may be used for testing ordinary ballasts and for the selection of reference lamps.

Moreover, the testing of ballasts requires a clear definition of testing methods. This testing will, in general, be made with reference lamps and, in particular, by comparing results obtained on such lamps with these ballasts and with the reference ballast.

Because of the special characteristics of discharge lamps, two ranges of supply voltage variation had to be considered. Whenever safety is involved, the classical range of variation from 90 % to 110 % of the rated supply voltage is retained, but for certain clauses where only operational conditions are concerned a smaller range from 92 % to 106 % of the rated value has been considered.

AUXILIARIES FOR LAMPS – BALLASTS FOR DISCHARGE LAMPS (EXCLUDING TUBULAR FLUORESCENT LAMPS) – PERFORMANCE REQUIREMENTS

1 Scope

This International Standard specifies performance requirements for ballasts for discharge lamps such as high-pressure mercury vapour, low-pressure sodium vapour, high-pressure sodium vapour and metal halide lamps. Clauses 12 through 15 each detail specific requirements for a particular type of ballast. This standard covers inductive type ballasts for use on a.c. supplies up to 1 000 V at 50 Hz to 60 Hz associated with discharge lamps, having rated wattage, dimensions and characteristics as specified in the relevant IEC lamp standards.

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

NOTE 2 Extension of the standard to cover ballasts incorporating, or for use with, series capacitors is under consideration.

NOTE 3 The performance requirements of ballasts for tubular fluorescent lamps are covered by IEC 60921.

NOTE 4 There are regional standards regarding the regulation of mains current harmonics for end-products such as luminaires and independent control gear. In a luminaire the control gear is dominant in this respect. Control gear, together with other components, should comply with these standards.

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 60188, *High-pressure mercury vapour lamps – Performance specifications*

IEC 60192, *Low pressure sodium vapour lamps – Performance specifications*

IEC 60662, *High-pressure sodium vapour lamps*

IEC 61167, *Metal halide lamps*

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)*

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

3 Terms and definitions

The terms and definitions given in IEC 61347-2-9 and IEC 61347-1 apply.

4 General notes on tests

Tests according to this specification are type tests.

NOTE The requirements and tolerances permitted by this standard are based on testing of a type test sample submitted by the manufacturer for that purpose. In principle this type test sample should consist of units having characteristics typical of the manufacturer's production and be as close to the production centre point values as possible. It may be expected with the tolerances given in the standard that products manufactured in accordance with the type test sample will comply with the standard for the majority of the production. Due to the production spread, however, it is inevitable that there will sometimes be ballasts outside the specified tolerances. For guidance of sampling plans and procedures for inspection by attributes, see IEC 60410.

The tests are carried out in the order of the clauses, unless otherwise specified.

One sample is submitted to all tests.

In general all tests are made on each type of ballast or, where a range of similar ballasts is involved, for each rated wattage in the range, or a representative selection from the range, as agreed with the manufacturer.

Reference ballasts and reference lamps shall be in accordance with Annexes A and B.

The tests are made under the conditions specified in Annex C.

All ballasts specified in this standard shall meet the requirements of IEC 61347-2-9 and IEC 61347-1.

Attention is drawn to lamp performance standards which contain “information for ballast design”. This information should be followed for proper lamp operation. However, this standard does not require the testing of lamp performance as part of the type test approval for ballasts.

5 Marking

The following additional marking is included, if appropriate:

Circuit power-factor, e.g. λ 0,85.

6 Ballasts designed to operate at various supply voltages

If a ballast is rated for more than one value of supply voltage, it shall comply with the relevant clauses of this specification at all voltages for which it is marked. In case of a ballast with taps, it is tested using the appropriate tappings.

7 Circuit power-factor

The measured circuit power-factor shall not differ from the marked value by more than 0,05 when the ballast is operated with one or more appropriate lamp(s) and the whole combination is supplied at its rated voltage and frequency.

In cases where a minimum value of the power-factor is required for a high power-factor ballast, it shall be 0,85 measured under the conditions stated above. For these high power-factor ballasts, the measured value shall in no case be less than 0,85.

NOTE The United States of America requires a power-factor of at least 0,9 for high power-factor ballasts.

8 Supply current

At rated voltage, the supply current shall not differ by more than 10 % from the value marked on the ballast when the latter is operated with a reference lamp.

9 Current waveform

9.1 Lamp operating current waveform

The maximum ratio of peak value to root-mean-square (r.m.s.) value shall not exceed the values in Table 1 when the ballast associated with a reference lamp is operated at its rated voltage.

Table 1 – Lamp operating current waveform, maximum ratio of peak value to r.m.s.

Lamp type	Maximum ratio of peak value to r.m.s.
High-pressure mercury	1,9
Low-pressure sodium[a]	1,6
Metal halide	Under consideration
High-pressure sodium	1,8
[a] Deviating from this table, for ignitor circuits for low-pressure sodium lamps, the maximum ratio of peak value to r.m.s. value of the lamp operating current shall not exceed 2,0 for a short duration, e.g. <0,20 ms, and 1,8 for a longer duration.	

9.2 Test procedure

The peak value of the lamp current shall be determined by means of a calibrated cathode-ray oscilloscope, the resistor R_1 being inserted in the earthed side of the circuit (see Figure 1).

This resistor shall have a sufficiently low value such that the voltage drop shall not exceed 0,5 % of the nominal lamp voltage.

The oscilloscope is connected with its earth connection on the supply side.

Care is taken to ensure a sufficiently low impedance of the supply for the different frequencies involved. Moreover, the supply voltage distortion of maximum 3 % (see item c) of Clause C.2) shall be taken into account when evaluating test results. In case of doubt a distortion-free supply is used.