

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

The European Standard EN 60923:2005, with the incorporation of amendment A1:2006, has the status of a British Standard

ICS 29.140.30

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 60923:2005, incorporating amendment A1:2006. It is identical with IEC 60923:2005, incorporating amendment 1:2006. It supersedes BS EN 60923:1996 which is withdrawn.

The start and finish of text introduced or altered by IEC amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/3, Auxiliaries for lamps.

A list of organizations represented on CPL/34/3 can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 13 February 2006

© BSI 2007

ISBN 0 580 47271 X

Amendments issued since publication

Amd. No.	Date	Comments
17069	30 April 2007	See national foreword

English version

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

Appareillages de lampes –
Ballasts pour lampes à décharge
(à l'exclusion des lampes tubulaires
à fluorescence) –
Exigences de performance
(CEI 60923:2005)

Geräte für Lampen –
Vorschaltgeräte für Entladungslampen
(ausgenommen röhrenförmige
Leuchtstofflampen) –
Anforderungen an die Arbeitsweise
(IEC 60923:2005)

This European Standard was approved by CENELEC on 2005-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 34C/688/FDIS, future edition 3 of IEC 60923, prepared by SC 34C, Auxiliaries for lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60923 on 2005-10-01.

This European Standard supersedes EN 60923:1996 + A1:2001.

The purpose of publishing this new edition of EN 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.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2006-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-10-01

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

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60923:2005 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 34C/749/FDIS, future amendment 1 to IEC 60923:2005, prepared by SC 34C, Auxiliaries for lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60923:2005 on 2006-08-01.

The following dates were fixed:

- latest date by which the amendment has to be
implemented at national level by publication of
an identical national standard or by endorsement (dop) 2007-05-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2012-10-01

Endorsement notice

The text of amendment 1:2006 to the International Standard IEC 60923:2005 was approved by CENELEC as an amendment to the European Standard without any modification.

CONTENTS

INTRODUCTION.....	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 General notes on tests.....	7
5 Marking	7
6 Ballasts designed to operate at various supply voltages	7
7 Circuit power-factor	7
8 Supply current	8
9 Current waveform	8
9.1 Lamp operating current waveform	8
9.2 Test procedure	8
10 Magnetic screening	9
11 Ignitors.....	9
12 Electrical requirements for ballasts for high-pressure mercury vapour lamps	9
12.1 Ballast setting.....	9
12.2 Short-circuit current	10
12.3 Open-circuit voltage (minimum voltage for stable operation)	10
13 Electrical requirements for ballasts for low-pressure sodium vapour lamps.....	11
13.1 Ballast setting.....	11
13.2 Short-circuit current and run-up conditions	11
13.3 Open-circuit voltage (minimum voltage for stable operation)	12
14 Electrical requirements for ballasts for metal halide lamps	12
14.1 Ballast setting.....	12
14.2 Short-circuit current and run-up conditions	12
14.3 Open-circuit voltage (minimum voltage for stable operation)	13
15 Electrical requirements for ballasts for high-pressure sodium vapour lamps	14
15.1 Ballast setting.....	14
15.2 Short-circuit current	14
15.3 Open-circuit voltage.....	15
Annex A (normative) Reference ballasts	16
Annex B (normative) Reference lamps.....	19
Annex C (normative) General requirements for tests.....	21
Annex D (normative) Explanation of measurements of ballast setting and lamp- operating current waveform for high-pressure sodium vapour lamps	23
Annex E (informative) Interpretations	25
Annex ZA (normative) Normative references to international publications with their corresponding European publications	27

Figure 1 – Measurement of current waveform	9
Figure 2 – Circuit for testing ballasts for high-pressure mercury vapour and low-pressure sodium vapour lamps	10
Figure 3 – Lamp inrush-current test circuit.....	13
Figure A.1 – Recommended circuit for the measurement of voltage/current ratio of the reference ballast.....	17
Figure A.2 – Recommended circuit for the determination of power-factor of the reference ballast.....	17
Figure B.1 – Recommended circuit for the selection of reference lamps	20
Figure D.1 – HPS ballast setting compliance characteristics for a lamp operated from a reference ballast and from a test ballast	24
Table 1 – Lamp operating current waveform, maximum ratio of peak value to r.m.s.	8
Table 2 – Test current.....	12
Table 3 – Short-circuit current ratio	15

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.

[A₁] 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. **[A₁]**

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 tapings.

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.