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Incorporating corrigenda October 2016 and November 2017

BSI Standards Publication

Self-ballasted LED lamps for general lighting services with supply voltages > 50 V – Performance requirements (IEC 62612:2013)

bsi.

National foreword

This British Standard is the UK implementation of EN 62612:2013+A2:2018. It is derived from IEC 62612:2013, incorporating amendment 1:2015 and amendment 2:2018. It supersedes BS EN 62612:2013+A11:2017, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC or IEC amendment. For example, text altered by CENELEC amendment A11 is indicated by [A11] 〈A11; text altered by IEC amendment A1 is indicated by [A1] 〈A1.

The UK participation in its preparation was entrusted to Technical Committee CPL/34/1, Electric lamps.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

Date	Text affected
30 April 2018	Implementation of CENELEC amendment A11:2017, A1:2017, and IEC amendment 1:2015. CENELEC corrigendum November 2017 corrects the Date of Withdrawal in the European foreword to amendment A11. IEC corrigendum October 2016 removes paragraph 2 from Clause 4.
30 April 2019	Implementation of IEC amendment 2:2018 with CENELEC endorsement A2:2018

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62612:2013 +A2

November 2018

ICS 29.140.01

English Version

Self-ballasted LED lamps for general lighting services with supply voltages > 50 V – Performance requirements (IEC 62612:2013)

Lampes à LED autoballastées pour l'éclairage général avec des tensions d'alimentation > 50 V – Exigences de performances (CEI 62612:2013)

LED-Lampen mit eingebautem Vorschaltgerät für Allgemeinbeleuchtung mit Versorgungsspannungen > 50 V – Anforderungen an die Arbeitsweise (IEC 62612:2013)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 62612:2013+A2:2018: E

European Foreword

The text of document 34A/1662/FDIS, future edition 1 of IEC 62612, prepared by SC 34A "Lamps" of IEC/TC 34A "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62612:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-04-23
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-07-23

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The text of the International Standard IEC 62612:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60598	NOTE	Harmonised as EN 60598.
IEC 60901	NOTE	Harmonised as EN 60901.
IEC 61547	NOTE	Harmonised as EN 61547.
CISPR 15:2005	NOTE	Harmonised as EN 55015:2006 (not modified)

European foreword to amendment A1

The text of document 34A/1824/CDV, future IEC 62612:2013/A1, prepared by SC 34A "Lamps", of IEC/TC 34 "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62612:2013/A1:2017.

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• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-12-30
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-06-30

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For the relationship with EU Directive(s) see informative Annexes ZZA, ZZB and ZZC, included in EN 62612:2013/A11:2017.

Endorsement notice

The text of the International Standard IEC 62612:2013/A1:2015 was approved by CENELEC as a European Standard without any modification.

European foreword to amendment A11

This document (EN 62612:2013/A11:2017) has been prepared by CLC/TC 34A, "Lamps".

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-02-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-06-30

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Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62612:2013 and IEC 62612:2013/A1:2015 are prefixed "Z".

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s), see informative Annexes ZZA, ZZB and ZZC, which are an integral part of this document.

This standard provides test methods related to parameters as prescribed by Commission Regulation (EC) 244/2009, Commission Regulation (EU) 1194/2012 and Commission Regulation (EU) 874/2012 while conformity assessment (sampling, conformity procedures as well as limits) for market surveillance are specified in the text of the above Regulations.

European foreword to amendment A2

The text of document 34A/2086/FDIS, future IEC 62612:2013/A2, prepared by SC 34A "Lamps" of IEC/TC 34 "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62612:2013/A2:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-06-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-09-14

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For the relationship with EU Directives, see informative Annexes ZZ, included in EN 62612:2013 and its amendments.

Endorsement notice

The text of the International Standard IEC 62612:2013/A2:2018 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050	series	International electrotechnical vocabulary - Chapter 00: General index	-	series
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60081	-	Double-capped fluorescent lamps - Performance specifications	EN 60081	-
IEC 60630	-	Maximum lamp outlines for incandescent lamps	EN 60630	-
+ A2	2009		-	-
IEC 61000-3-2	2005	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)	-	-
IEC 61000-4-7	-	Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7	-
IEC 62560	-	Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Safety specifications	EN 62560	-
IEC 62717	-	LED modules for general lighting - Performance requirements	EN 62717	-
IEC/TR 61341	-	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps	EN 61341	-
IEC/TR 62732	-	Three-digit code for designation of colour rendering and correlated colour temperature	-	-
IEC/TS 62504	-	General lighting - LEDs and LED modules - Terms and definitions	-	-

Publication	Year	Title	EN/HD	Year
ANSI/IES LM-80-15	-	IES Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules		
CIE 121	1996	The photometry and goniophotometry of luminaires	-	-
CIE 13.2	-	Methods of measuring and specifying colour rendering properties of light sources	-	-
CIE 13.3	1995	Method of measurement and specifying colour rendering properties of light sources	-	-
CIE 177	-	Colour rendering of white LED light sources	-	-
CIE S 017/E	-	ILV: International Lighting Vocabulary	-	-

Annex ZZA
(informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EC) No 244/2009 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps [2009 OJ L76].

Once this standard is cited in the Official Journal of the European Union under that Commission Regulation, compliance with the clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA regulations.

Table ZZA.1 — Correspondence between this European Standard and Commission Regulation (EC) No 244/2009

Ecodesign requirement of Regulation (EC) No 244/2009 [2009 OJ L76]	Clause(s) / subclause(s) of this EN	Remarks / Notes
Annex II, Article 1	8.1	Lamp power
Annex II, Article 1	Annex A	luminous flux
Annex II, Article 3.1 (b)	Annex E	Lamp life
Annex II, Article 3.2 (f)	11.2	Lumen maintenance
Annex II, Article 3.1 (c)	11.3.3	Number of switches before failure
Annex II, Article 3.2 (g)	Z1.4.2	Starting time
Annex II, Article 3.1 (e)	Z1.4.2	Warm-up time to 60%
Article 1	Annex A	Chromaticity coordinates
Annex II, Article 3.2 (h)	Z1.4.3	Colour rendering index (CRI)
Annex II, Article 3.1 (d)	Z1.1	Correlated colour temperature (CCT)
Annex II, Article 3.2 (e)	Z1.4.5	Power factor (only for lamps with integrated control gear)
Annex II, Article 3.1 (h)	Clause 6	Lamp dimensions
	Z1.4.1	Spectral power distribution
Annex II, Article 3.1 (f)	Clause 4 (Remark: = EN 62560, clause 5.2)	Dimmability

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard.

Annex ZZB
(informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 1194/2012 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment [2012 OJ L342].

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Table ZZB.1 — Correspondence between this European Standard and Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment [2012 OJ L342] and Commission's standardization request M/495

Ecodesign requirement of Regulation (EU) No 1194/2012 [2012 OJ L342}	Clause(s) / subclause(s) of this EN	Remarks / Notes
Annex III, Article 1.1	8.1	Lamp power
Annex III, Article 1.1	Z1.2	(Useful) luminous flux
Annex III, Article 3.1.1	9.2.5	Beam angle
Annex III, Table 5	11.2	Lamp Survival Factor
Annex III, Article 3.1.2 (b)	Annex E	Lamp life
Annex III, Table 5	11.2	Lumen maintenance
Annex III, Table 5	11.3.3	Number of switches before failure
Annex III, Table 5	11.3.2	Premature failure rate
Annex III, Table 5	Z1.4.2	Starting time
Annex III, Table 5	Z1.4.2	Warm-up time to 95%
Annex I	Annex A	Chromaticity coordinates
Annex III, Table 5	Z1.4.3	Colour rendering index (CRI)
Annex III, Article 3.1.1	Z1.1	Correlated colour temperature (CCT)
Annex III, Table 5	Z1.4.4	Colour consistency
Annex III, Table 5	Z1.4.5	Power factor (only for lamps with integrated control gear)
Annex III, Article 3.1.2 (h) and (k)	Clause 6	Lamp dimensions
Annex III, Article 3.1.3 (m)	Z1.4.1	Spectral power distribution
Annex III, Article 3.1.2 (m)	Clause 4 (Remark: = EN 62560:2012, Clause 6)	Compatibility with filament lamp equipment

Ecodesign requirement of Regulation (EU) No 1194/2012 [2012 OJ L342}	Clause(s) / subclause(s) of this EN	Remarks / Notes
Annex III, Article 3.1.2 (f)	Clause 4 (Remark: = EN 62560:2012, 5.2)	Dimmability
Annex III, Article 3.1.2 (m)	Clause 4 (Remark: = EN 62560:2012, 6.1)	Lamp type (MR11 GU4 etc.)
Annex III, Article 3.1.3 (j)	9.2.4	Peak intensity in candela
Article 2.4	Annex A	Technical description of special purpose lamps for ecodesign

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Annex ZZC
(informative)

Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 874/2012 aimed to be covered

This European Standard has been prepared under a Commission's standardisation request M/495 to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 874/2012 of 12 July 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of electrical lamps and luminaires [2012 OJ L258].

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Table ZZC.1 — Correspondence between this European Standard and Commission Regulation (EU) No 874/2012 of 12 July 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of electrical lamps and luminaires [2012 OJ L258] and Commission's standardisation request M/495

Energy labelling requirement of Regulation (EU) No 874/2012 [2012 OJ L258]	Clause(s) / subclause(s) of this EN	Remarks / Notes
Article 1	Annex A	Applicable parameter according to Article 1 luminous flux
Annex VII	8.1	Lamp power
Annex VII	Annex A	Luminous flux (non-directional only)
Annex VII	Z1.2	Useful luminous flux (directional only)
Annex VII	9.2.5	Beam angle

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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 nongovernmental 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 62612 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

This first edition of IEC 62612 cancels and replaces IEC/PAS 62612. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC/PAS 62612.

a) The standard explicitly states that real life time tests are not part of the test regime. Instead, a period of up to 6 000 h is chosen in order to assess manufacturers' claims of maintenance.

b) Technical features have been adapted to IEC/PAS 62717 (performance of LED modules) as far as possible. Examples are the family approach and the temperature measuring point.

c) Marking requirements are shifted from the product to the packaging.

d) The number of lamps to be tested is made test specific, not general.

e) First requirements are given for setting the colour for colour adjustable lamps and the luminous flux level of dimmable lamps.

f) The structure of tests is clearly divided between requirement and compliance.

g) Statistical compliance is separated into individual and average.

h) Light output requirements are extended to luminous intensity distribution, peak intensity, beam angle and efficacy.

i) The use of the terms “correlated colour temperature” and “chromaticity coordinates” is corrected.

j) The number of tolerance categories is reduced from 8 to 4, and split between initial and maintained values.

k) Colour rendering is differently assessed at initial and maintained state.

l) Three lumen maintenance categories are given instead of five.

m) The endurance tests are completely re-established.

n) The verification (formerly: assessment) clause is completed.

o) Information for luminaire design is added.

p) Stabilisation is more precise (Annex A on the method of measuring lamp characteristics) and extension is made for the additional photometric and colorimetric parameters.

q) Annex B on measuring luminous flux is contained in Annex A. New Annex B provides the photometric code.

r) Further annexes are added: Annex C and D for displacement factor, Annex E for life time metrics/reliability and Annex F for examples of LED dies and LED packages.

The text of this standard is based on the following documents:

FDIS	Report on voting
34A/1662/FDIS	34A/1679/RVD

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

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

In this standard, the following print types are used:

— requirements: roman type;

— *test specifications: italic type;*

— notes: small roman type.

The committee has decided that the contents of this publication 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or

- amended.

The contents of the corrigendum of October 2016 have been included in this copy.

INTRODUCTION

This International Standard is the first edition of a performance standard (precursor: IEC/PAS 62612) for self-ballasted LED lamps for general lighting applications and acknowledges the need for relevant tests for this new source of electrical light, sometimes called “solid state lighting”.

The provisions in this standard represent the technical knowledge of experts from the fields of the semiconductor (LED chip) industry and of those of the traditional electrical light sources.

INTRODUCTION to Amendment 2

This amendment includes:

a) Adjustment of Table 1 markings;

b) Bypassing thermal device during test (11.3.4);

c) Inclusion of LM-80 data;

d) Maintained CRI.

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Self-ballasted LED lamps for general lighting services with supply voltages > 50 V – Performance requirements

1 Scope

This International Standard specifies the performance requirements, together with the test methods and conditions, required to show compliance of LED lamps with integral means for stable operation, intended for domestic and similar general lighting purposes, having:

- a rated power up to 60 W;
- a rated voltage of > 50 V a.c. up to 250 V a.c.;
- a lamp cap as listed in IEC 62560.

These performance requirements are additional to the safety requirements in IEC 62560.

The only feature provided by this standard, when applied for replacement purposes, is information on maximum lamp outlines.

The requirements of this standard relate to type testing. This standard covers LED lamps that intentionally produce white light, based on inorganic LEDs.

Recommendations for whole product testing or batch testing are under consideration.

The life time of LED lamps is in most cases much longer than the practical test times. Consequently, verification of manufacturer's life time claims cannot be made in a sufficiently confident way, because projecting test data further in time is not standardised. For that reason the acceptance or rejection of a manufacturer's life time claim, past an operational time as stated in 7.1, is out of the scope of this standard.

Instead of life time validation, this standard has opted for lumen maintenance codes at a defined finite test time. Therefore, the code number does not imply a prediction of achievable life time. The categories, represented by the code, are lumen-depreciation character categories showing behaviour in agreement with manufacturer's information, provided before the test is started.

In order to validate a life time claim, several methods of test data extrapolation exist. A general method of projecting measurement data beyond limited test time is under consideration.

The pass/fail criterion of the life time test as defined in this standard is different from the life time metrics claimed by manufacturers. For explanation of recommended life time metrics, see Annex E.

NOTE When lamps are operated in a luminaire the claimed performance data can deviate from the values established via this standard due to e.g. luminaire components that impact the performance of the lamp.

A1 It can be expected that self-ballasted LED lamps, which comply with this standard will start and operate satisfactorily at voltages between 92 % and 106 % of rated supply voltage and at an ambient air temperature between –20 °C and 40 °C and in a luminaire complying with IEC 60598-1.

If a supplier claims suitability for operation at different conditions (for instance, at higher voltage, temperature or humidity) then:

a) Lamps shall be tested under claimed different conditions; and

b) Lamps shall start and operate satisfactorily under claimed different conditions; and

c) Lamps shall meet the performance claims under the claimed different conditions, which may differ from the general conditions for measurement specified in A.1. A1