



SLOVENSKI STANDARD
oSIST prEN 62717:2016
01-marec-2016

LED-moduli za splošno razsvetljavo - Tehnične zahteve

LED modules for general lighting - Performance requirements

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Ta slovenski standard je istoveten z: prEN 62717:2016

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ICS:

29.140.50	Instalacijski sistemi za razsvetljavo	Lighting installation systems
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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prEN 62717

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ICS 29.140.99

English Version

LED modules for general lighting - Performance requirements
(IEC 62717:2014 , modified + A1:2015 , modified)

Modules de LED pour éclairage général - Exigences de
performance
(IEC 62717:2014 , modifiée + A1:2015 , modifiée)

LED-Module für die Allgemeinbeleuchtung - Anforderungen
an die Arbeitsweise
(IEC 62717:2014 , modifiziert + A1:2015 , modifiziert)

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2016-04-08.

The text of this draft consists of the text of IEC 62717:2014 + A1:2015.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

165165b52367/sist-en-62717-2017

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

prEN 62717:2016 (E)

1 **European foreword**

2 This document (prEN 62717:2016) consists of the text of IEC 62717:2014 and
3 IEC 62717:2014/A1:2015 prepared by IEC/TC 34A, Lamps, together with the common modifications
4 prepared by CLC/SR 34A, Lamps.

5 This document is currently submitted to the enquiry.

6 The following dates are proposed:

- latest date by which the existence of this document has to be (doa) dor + 6 months
announced at national level
- latest date by which this document has to be implemented at (dop) dor + 12 months
national level by publication of an identical
national standard or by endorsement
- latest date by which the national standards conflicting with this (dow) dor + 36 months
document have to be withdrawn (to be confirmed or
modified when voting)

7 Clauses, subclauses, notes, tables, figures and annexes which are additional to those in
8 IEC 62717:2014 and IEC62717:2014/A1:2015 are prefixed "Z".

9 For the relationship with EU Directive(s) see informative Annexes ZZ, which are integral parts of this
10 document.

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

15

16

Endorsement notice

17 The text of the International Standard IEC 62717:2014 and IEC62717:2014/A1:2015 was approved by
18 CENELEC as a European Standard with agreed common modifications.

19

COMMON MODIFICATIONS

20 CONTENTS

Add the following annexes:

21 Annex ZA (normative) Normative references to international publications with their
22 corresponding European publications

23 Annex ZZA (informative) Relationship between this European Standard and the
24 requirements of Commission Regulation (EC) No 244/2009

25 Annex ZZB (informative) Relationship between this European Standard and the
26 requirements of Commission Regulation (EU) No 1194/2012

27 Annex ZZC (informative) Relationship between this European Standard and the
28 requirements of Commission Regulation (EU) No 874/2012

29

30 1.0.Z1

Add the following clause before Clause 2

31

1.0.Z1 Overall statement

32 Where a Commission Regulation specifies limits for parameters these limits shall be
33 used instead of the limits specified in this standard.

34 2

Delete CIE 121:1996, The photometry and goniophotometry of luminaires.

35 3.1

Change in Note 1 to entry "given in A.2" into "given in Annex A".

36 3.Z1

After 3.21 **add** new definitions 3.Z1 up to 3.Z4:

37

3.Z1

38

directional LED module

39

LED module having at least 80 % luminous flux within a solid angle of π sr

40

Note 1 to entry: A solid angle of π sr corresponds to a cone with angle of 120° .

41

3.Z2

42

beam angle

43

44 the angle between two imaginary lines in a plane through the optical beam axis, such
45 that these lines pass through the centre of the front face of the lamp and through
46 points at which the luminous intensity is 50 % of the centre beam intensity

[SOURCE: EN 61341:2011, 2.4]

47

3.Z3

48

partial luminous flux (of a light source, within a specified cone angle)

49

49 total luminous flux emitted from a light source within a specified cone angle α ,
50 determined from the luminous intensity distribution $I(\theta, \varphi)$ of the source:

$$\Phi_{\alpha} = \int_{\varphi=0}^{2\pi} \int_{\theta=0}^{\alpha/2} I(\theta, \varphi) \sin \theta \, d\theta \, d\varphi$$

51

(2)

52

Note 1 to entry: Partial luminous flux is expressed in lumen (lm).

53

Note 2 to entry: $(\theta, \varphi)=(0,0)$ is the direction of the cone axis.

54

Note 3 to entry: The cone angle α is the full angle (diameter) of the cone.

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55 [SOURCE: EN 13032-4, 3.41, modified, – Notes 4 and 5 removed]

56 3.Z4

57 useful luminous flux, Φ_{use}

58 partial luminous flux of a LED module falling within the cone used for calculating the
59 LED module's energy efficiency according Annex III, point 1.1 of regulation (EU) No
60 1194/2012

61 Note 1 to entry: Useful luminous flux is expressed in lumen (lm).

62 Note 2 to entry: The regulation specifies 90° or 120° cones according to the product characteristics.

63 Note 3 to entry: Useful luminous flux is similar to partial luminous flux. It is determined with the cone axis
64 coincident with the observed optical beam axis of the light source, the axis about which
65 the luminous intensity is substantially symmetrical.

66 8.2.1 **Add** a new paragraph after the first:

67 Measurements shall be conducted according to Annex A.

68 8.2.2 **Change** “clause A.1” into “Annex A”.

69 8.2.3 **Remove** last sentence of the first paragraph of this subclause

70 8.2.4 **Remove** last sentence of this subclause

71 8.2.5 **Remove** last sentence of this subclause

72 8.3 **Change** “A.3.2” into “Annex A”.

73 9.1 Add the following note after first paragraph:

74 NOTE EN 60081 Annex D defines preferred chromaticity co-ordinates for fluorescent lamps and the
75 corresponding MacAdam ellipses.

76 10.3.2.2.2 In the last paragraph **change** “A.1” into “Annex A”.

77 10.3.2.3 In Note 2 **change** “A.1” into “Annex A”.

78 10.3.3 In the second paragraph **change** “A.1” into “Annex A”.

79 10.3.4 In the first paragraph after the compliance text **change** “A.1” into “Annex A”.

80 11 **Add** to the end of Clause 11 Verification, the following:

81 For market surveillance verification purposes, the minimum sampling size n shall be
82 20 LED modules of the same model from the same manufacturer, where possible
83 obtained in equal proportion from four randomly selected sources.

84 Z1 **Add** the following new clause Z1 and Z2 after Clause 12:

85 Z1 Requirements for directional LED modules

86 Z1.1 Beam angle

87 The requirements of 8.2.5 apply.

Z1.2 Correlated Colour Temperature

Correlated Colour Temperature of a LED module shall be measured in accordance with 7.1, Colorimetric Measurements of EN 13032-4

Z1.3 Useful luminous flux

The useful luminous flux of a directional LED module shall be measured according Annex A together with the following:

- a) useful luminous flux of a directional LED module with a rated beam angle $\geq 90^\circ$ shall be measured in a 120° cone;
- b) otherwise the useful luminous flux of a directional LED module shall be measured in 90° cone.

If no rated beam angle is provided the useful luminous flux shall be measured in a 90° cone.

Z1.4 Energy efficiency requirements

The energy efficiency requirements for a directional LED module is determined by the Energy Efficiency Index, EEI. The energy efficiency index, EEI is calculated as follows and rounded to two decimal places:

$$EEI = P_{cor} / P_{ref} \quad (1)$$

Where:

- a) P_{cor} is the measured power of a LED module corrected in accordance with Table Z1.

Table Z1 – Power correction factors

Scope of the correction	Corrected power (P_{cor})
LED modules operating on direct mains (LEDi Modules, Type 1)	$P_{measured} \times 1,00$
LED modules which require external controlgear (LEDsi and LEDni Modules, Type 2 and Type 3 respectively)	$P_{measured} \times 1,10$

- b) P_{ref} is the reference power obtained from the measured useful luminous flux of the same LED module, Φ_{use} according clause Z1.3.

The LED module with a measured useful luminous flux, $\Phi_{use} < 1\,300$ lumen shall

apply $P_{ref} = 0,88 \cdot \sqrt{\Phi_{use}} + 0,049 \cdot \Phi_{use}$, otherwise $P_{ref} = 0,07341 \cdot \Phi_{use}$

Z1.5 Functionality requirements

Z1.5.1 Lamp start (starting) time

Non integrated LED modules (Type 3) are deemed to fulfil the starting and warm-up times requirements according Commission Regulation (EU) No. 1194/2012.

For Type 1 and Type 2 LED modules the test for starting and warm-up times shall be carried out as follows:

A typical test setup and equipment is shown in Figure Z1.1. Alternatively picoammeters can be used to store sensor values.

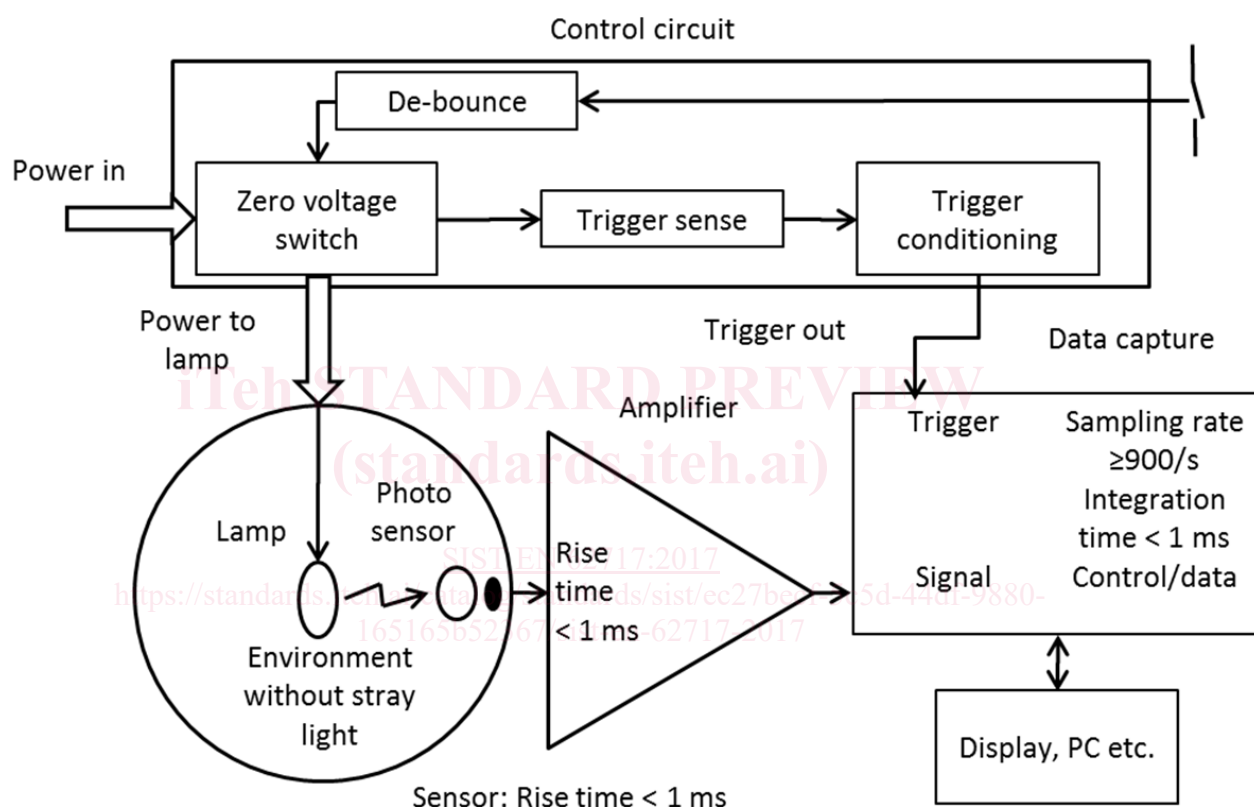


Figure Z1 – Typical setup for starting time test

(1) The test equipment and the measurement device(s) shall be in a state such that the lamp test can immediately be started.

(2) Switch on power to the lamp and triggering equipment as required.

(3) Record ambient temperature and relative humidity.

(4) Record luminous flux over time.

(5) The test shall run until the lamp starts fully and remains alight. If after a reasonable period the lamp does not start, cease the test.

Secretary remark:

Line 119 up to and including 130 are for information only and will be replaced by the sentence in 134/135 in the final publication

The test for starting and warm-up times shall be carried out in accordance with EN 60969:201x, B.3.

Starting time is determined as the period from the start of the test to when the lamp has fully completed the starting sequence (lamp has started and remains alight).

Warm-up time is the time taken from the start of the test to when the lamp achieves the required percentage of its stable luminous flux.

Z1.5.2 Colour rendering (R_a)

Colour rendering, in particular R_a , of a LED module shall be measured in accordance with 7.1, Colorimetric Measurements of EN 13032-4.

Z1.5.3 Power factor

LED modules operating on direct mains (LEDi Modules, Type 1) shall be in accordance with 7.1 and 7.2, the distortion shall be measured according EN 61000-3-2 and the power factor λ be calculated according to the relation given in F.1.

NOTE In view of future regulations, EN 62717 defines - the primary metric displacement factor and its associated measurement method and recommended values – instead of the composite power factor metric. Definitions related to power quantities are given in Table 2 of IEC/TR 61000-1-7 currently in preparation.

Z1.6 Product information requirements for directional LED modules**Z1.6.1 General**

Independent LED modules as defined in EN 62031, shall meet the product information requirements of Z1.6.2, Z1.6.3 and Z1.6.4.

NOTE The information requirements do not apply for LED modules when marketed as part of a luminaire from which they are not intended to be removed by the end-user. Built-in and integrated LED modules are part of the luminaire and are not intended to be removed by the end-user.

Z1.6.2 Information to be displayed on the LED module itself (for independent LED modules)

The useful luminous flux, correlated colour temperature, beam angle shall be displayed on the product itself. If there is room for only one of the three values, the useful luminous flux shall be provided. If there is room for two values, the useful luminous flux and the correlated colour temperature shall be provided.

Z1.6.3 Information to be displayed on the packaging (for independent LED modules)

If the product is placed on the market in a packaging containing information to be visibly displayed to the end-users, prior to their purchase, the information below shall be clearly and prominently indicated on the packaging:

- a) Rated useful luminous flux displayed in a font at least twice as large as any display of the rated LED module power;

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- 171 b) Rated life time of the LED module in hours;
- 172 c) Colour temperature, as a value in Kelvins and also expressed graphically or in
- 173 words;
- 174 d) Number of switching cycles;
- 175 e) Warm-up and starting time expressed as 'instant full light';
- 176 f) A warning if the LED module cannot be dimmed or can be dimmed only on specific
- 177 dimmers; in the latter case a list of compatible dimmers shall be also provided on
- 178 the manufacturer's website;
- 179 g) LED module dimensions in millimetres;
- 180 h) Rated beam angle in degrees;
- 181 i) If the rated beam angle is $\geq 90^\circ$, a warning shall be given that the LED module is
- 182 not suitable for accent lighting.

Z1.6.4 Information to be made publicly available, e.g. on free-access websites (for independent LED modules)

The following information shall be provided:

- 185 a) The information as in Z1.6.3
- 186 b) Rated power (0,1 W precision);
- 187 c) LED module power factor;
- 188 d) Lumen maintenance factor at the end of the rated life;
- 189 e) Colour rendering;
- 190 f) Initial Colour consistency
- 191 g) Rated peak intensity in candela (cd);
- 192 h) If only intended for use in outdoor or industrial applications;
- 193 i) A graphical representation of the spectral power distribution according CIE 63 in
- 194 the range 180-800 nm.
- 195

Z2 Requirements for non-directional LED Modules

Z2.1 Functionality requirements

The requirements of Z1.5 apply.

199 **Annex A** **Replace** Annex A by following text:

200 **Annex A**
201 (normative)

202 **Method of measuring LED module characteristics**
203

204 For general conditions of measurement see EN 13032-4.

205 An independent LED module shall be regarded as a LED light engine defined per 3.16
206 of EN 13032-4:2015, incorporating heat sink(s) designed for ambient temperature.

207 The test voltage, current or power shall be the rated voltage, current or power. In the
208 case of a range, measurements shall be carried out at the input value corresponding
209 to the most adverse effect to the temperature of the LED module.

210 LED modules do not require any ageing prior to testing. However, the manufacturer
211 may define an ageing period of up to 500 h.

212 For temperature measurement, equipment as specified in the informative Annex H
213 may be used.

214 Maintenance (10.2) and supply switching (10.3.3) operation shall be conducted in the
215 temperature interval ($t_{p \text{ rated}}-5$, $t_{p \text{ rated}}$) at a rated maximum ambient temperature
216 specified by the manufacturer, with a tolerance of (+0 K, -5 K). In case there is no
217 rated maximum ambient temperature, the ambient temperature range (20°C to 25°C)
218 shall be used. For the supply switching test, the temperature requirement is applicable
219 only to the ON time. The value of $t_{p \text{ rated}}$ shall not be exceeded. An appropriate heat
220 sink or additional heating may need to be applied to obtain the correct $t_{p \text{ rated}}$ value. For
221 testing purposes, the t_p -point shall be marked easily accessible. Even if the location is
222 different for t_p and t_c , the value of t_c shall not be exceeded.

223 For directional LED modules the useful luminous flux (Z1.3) is obtained by luminous
224 intensity integration according to EN13032-4:2015, 6.3 "Partial luminous flux"

225 For non-directional LED modules (6.4) the total luminous flux shall be measured
226 according to EN13032-4. Also the partial luminous flux within a solid angle of π sr of
227 the LED module shall be evaluated to check the non-directionality.

228 NOTE 1 Once the non-directionality is verified for one module, for modules of the same type, only the total
229 luminous flux has to be measured.

230 Luminous intensity distribution shall be measured in accordance with EN 13032-4 and
231 EN 61341.

232 NOTE 2 EN 13032-4 refers to EN 61341 for beam angle evaluation.

233 Chromaticity coordinates of a LED module shall be measured in accordance with 7.1,
234 Colorimetric Measurements of EN 13032-4:2015.

235 All test results shall be presented as if testing had been executed at the maximum
236 recommended operating temperature ($t_{p \text{ rated}}$) of the LED module. Tests may be
237 performed at different temperatures; for this, the relation between the two
238 temperatures ($t_{p \text{ rated}}$ and a different t_p where this t_p shall be within the range of
239 manufacturer's provided data) has to be established beforehand in an unambiguous
240 manner by data provided by the LED module manufacturer. In case of doubt the
241 reference measurement is performed at $t_{p \text{ rated}}$. Depending on the type of control circuit

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242 the LED module manufacturer is using, the t_p measurement shall be done at the most
 243 onerous condition of operation. The value of $t_{p \text{ rated}}$ shall be reported in Clause 4.

244 The manufacturer shall provide, on request, information on the method used to
 245 reproduce the claimed characteristics declared at t_p -point.

246 Bibliography **Add** the following notes for the standards indicated:

247 IEC 60598-1 NOTE Harmonized as EN 60598-1

248 IEC 62384 NOTE Harmonized as EN 62384

249 IEC 62612 NOTE Harmonized as EN 62612

250 IEC 62707-1 NOTE Harmonized as EN 62707-1

251 IEC 62722-1 NOTE Harmonized as EN 62722-1

252 IEC 62722-2-1 NOTE Harmonized as FprEN 62722-2-1

253 CISPR 15 NOTE Harmonized as EN 55015

254 **Add** the following documents:

255 COMMISSION REGULATION (EC) No 244/2009 of 18 March 2009 implementing
 256 Directive 2009/125/EC of the European Parliament and of the Council with regard to
 257 ecodesign requirements for non-directional household lamps

258 COMMISSION REGULATION (EU) No 874/2012 of 12 December 2012
 259 supplementing Directive 2010/30/EU of the European Parliament and of the Council
 260 with regard to energy labelling of electrical lamps and luminaires

261 COMMISSION REGULATION (EU) No 1194/2012 of 12 December 2012
 262 implementing Directive 2009/125/EC of the European Parliament and of the Council
 263 with regard to ecodesign requirements for directional lamps, light emitting diode lamps
 264 and related equipment

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
		Light and lighting – Measurement and presentation of photometric data of lamps and luminaires – Part 1: Measurement and file format	EN 13032-1 A1	2004 2012
		Light and lighting – Measurement and presentation of photometric data – Part 4: LED lamps, modules and luminaires	EN 13032-4	2015
IEC 60050(845)	-	International Electrotechnical Vocabulary – Lighting	-	-
IEC 60068-2-14	-	Environmental testing – Part 2-14: Tests – Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-3-5	2001	Environmental testing – Part 3-5: Supporting documentation and guidance – Confirmation of the performance of temperature chambers	EN 60068-3-5	2002
IEC 60081	-	Double-capped fluorescent lamps— Performance specification	EN 60081	-
IEC 60969	201x	Self-ballasted compact fluorescent lamps for general lighting services - Performance requirements	FprEN 60969	2013
IEC 61000-3-2 A1 A2	2005 2008 2009	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2 A1 A2	2006 2009 2009
IEC 61000-4-7	-	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/TR 61341	-	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps	EN 61341	-
IEC 61347-2-13	-	Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules	EN 61347-2-13	-
IEC 62031 A1 A2	2008 2012 2014	LED modules for general lighting – Safety specifications	EN 62031 A1 A2	2008 2013 2015
IEC 62504	-	General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions	EN 62504	-

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<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CIE 13.3	1995	Method of Measuring and Specifying Colour Rendering Properties of Light Source	-	-
CIE 177	2007	Colour rendering of white LED light sources	-	-

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Annex ZZA (informative)

Relationship between this European Standard and the requirements of Commission Regulation (EC) No 244/2009

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association to provide a means of conforming to 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*

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 requirements of that and associated EFTA regulations.

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

Requirement of Commission Regulation (EC) No 244/2009	Clauses and subclauses of this EN
Applicable parameter according to Article 1 a) chromaticity b) directional lamps c) luminous flux	Annex A
LED module power	Clause 7.1
Luminous flux	Clause 8.1
Lamp life time	Not covered in the standard
Lumen maintenance at the end of nominal life	Not covered in the standard
Power factor (Only for LED modules operating on direct mains, LEDi Modules, Type 1)	Clause Z1.5.3

WARNING: Other requirements and other EC Directives can be applied to the products falling within the scope of this standard.