IEC 62722-1

Edition 2.0 2022-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Luminaire performance –
Part 1: General requirements

Performance des luminaires –
Partie 1: Exigences générales

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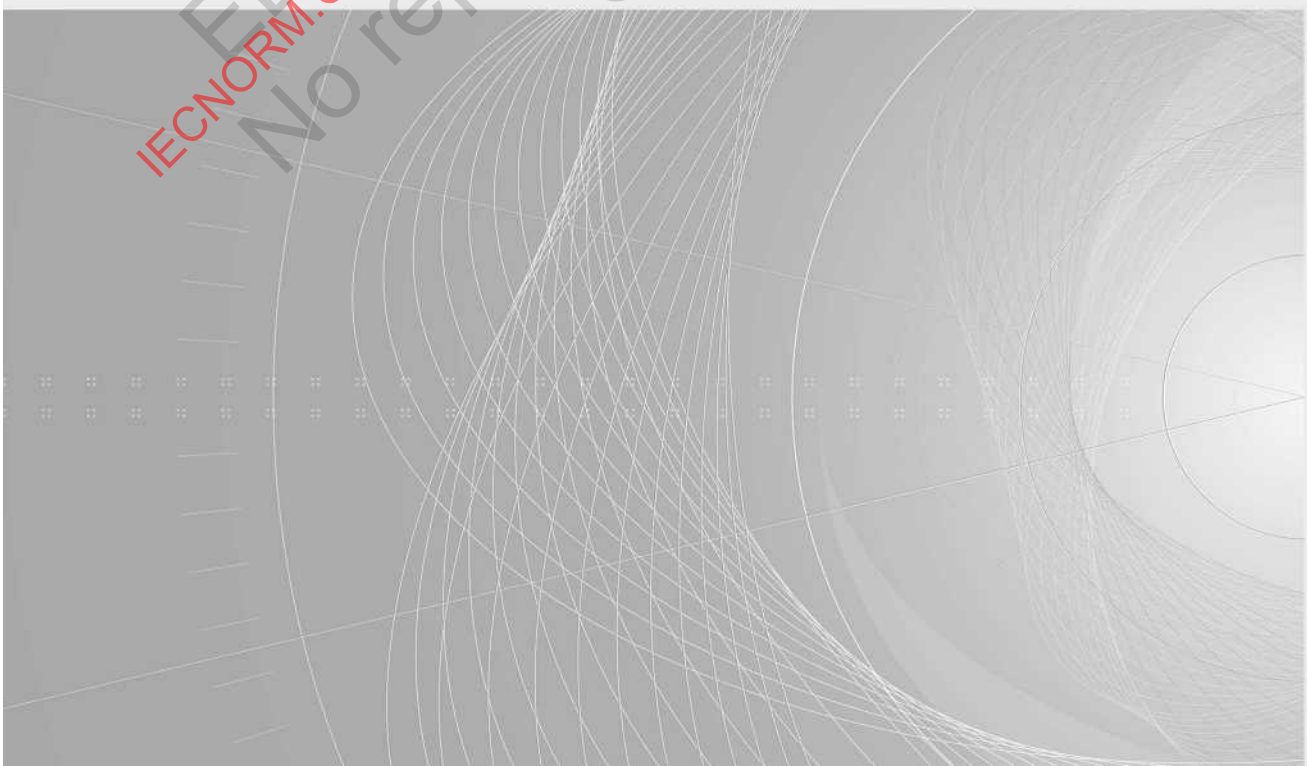

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IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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LUMINAIRE PERFORMANCE –

Part 1: General requirements

FOREWORD

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IEC 62722-1 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lighting. It is an International Standard.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

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

a) The reference to and use of the measurement methods for non-active power consumption in accordance with IEC 63103 have been added.
b) The pictograms of Annex C have been updated to represent modern light sources.

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

Draft	Report on voting
34D/1658/FDIS	34D/1660/RVD

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/standardsdev/publications.

A list of all parts in the IEC 62722 series, published under the general title *Luminaire performance* can be found on the IEC website.

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

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INTRODUCTION

This part of IEC 62722 is a performance standard for luminaires (general requirements) and acknowledges the need for defining performance data to be provided, the presentation of this data, the basis of its measurement, and the associated tolerances that can be reasonably expected. Information to support responsible environmental use is also included. Future Parts 2 of the IEC 62722 series can be introduced where additional performance requirements for specific types of light sources are required. The structure of these performance standards also allows for the possibility of Part 3 of the IEC 62722 series to be introduced in the future should standardization of performance criteria linked to specific luminaire applications be determined as necessary (e.g. floodlighting, street lighting).

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LUMINAIRE PERFORMANCE –

Part 1: General requirements

1 Scope

This part of IEC 62722 covers specific performance and environmental requirements for luminaires, incorporating electric light sources for operation from supply voltages up to 1 000 V. Unless otherwise detailed, performance data covered under the scope of this document are for the luminaires in a condition representative of new manufacture, with any specified initial aging procedures completed.

This document covers requirements for luminaires to support energy efficient use and responsible environmental management to the end of life. The object of this document is to provide a set of requirements which are considered to be generally applicable to most types of luminaires. Where additional performance requirements for specific types of light source are relevant, these are specified in the IEC 62722-2 series. The IEC 62722-2 series can also cover a wider scope of performance aspects appropriate to the particular light source technology.

Semi-luminaires are not covered under the scope of this document.

For some types of luminaires (e.g. decorative or household) the provision of performance data under the scope of this document is not appropriate.

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 60050-845, *International Electrotechnical Vocabulary (IEV) – Part 845: Lighting* (available at http://www.electropedia.org)

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60598-2 (all parts), *Luminaires – Part 2: Particular requirements*

IEC 62722-2 (all parts), *Luminaire performance – Part 2: Particular requirements*

IEC 63103:2020, *Lighting equipment – Non-active mode power measurement*

IEC TS 63105, *Lighting systems and related equipment – Vocabulary*

CIE 034:1977, *Road lighting lantern and installation data: Photometrics, classification and performance*

CIE 043:1979, *Photometry of floodlights*

CIE 121:1996, *The photometry and goniophotometry of luminaires*

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3 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 60598-1, IEC 60050-845 and IEC TS 63105 and the following apply.

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

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

3.1
input power
electrical power from the mains supply consumed by the luminaire including the operation of all electrical components necessary for its intended functioning

3.2
standby mode
<of luminaire> mode when the equipment is connected to a supply voltage with the illumination function off, while capable of being activated by an external trigger not being a trigger from a network

Note 1 to entry: Examples of external triggers are sensing or timing.

[SOURCE: IEC 63103:2020, 3.10, modified – The domain was changed to cover luminaires.]

3.3
networked standby mode
<of luminaire> mode when the equipment is connected to a supply voltage with the illumination function off, while capable of being activated by an external trigger being a trigger from a network

[SOURCE: IEC 63103:2020, 3.11, modified – The domain was changed to cover luminaires.]

3.4
standby power
<of luminaire> average power consumption in the standby mode

3.5
networked standby power
<of luminaire> average power consumption in the networked standby mode

3.6
emergency lighting charging power
electrical power from the mains supply consumed by the charging circuit of emergency luminaires to keep the battery charged

Note 1 to entry: In IEC 63103:2020 the mode reproducing the condition where the emergency lighting charging power is consumed is named "charging maintenance mode" (as defined in 3.13 of that document).

Note 2 to entry: Emergency lighting charging power is only valid for self-contained emergency luminaires.

3.7
luminaire efficacy
ratio of the luminaires total luminous flux versus its input power at rated supply voltage, excluding any emergency lighting charging power

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3.8
LOR
light output ratio
<of luminaire> ratio of the total luminous flux of the luminaire, measured under specified practical conditions with its own light sources and equipment, to the sum of the individual luminous fluxes of the same light sources when operated outside the luminaire with the same equipment, under specified conditions

3.9
rated value
quantitative value for a characteristic of a luminaire for specific operating conditions specified in this document, or in applicable standards, or assigned by the manufacturer or responsible vendor

3.10
test voltage
voltage at which tests are carried out

3.11
BLF
ballast lumen factor
ratio of the luminous flux of the light source when the ballast under test is operated at its rated voltage, to the luminous flux of the same lamp operated with the appropriate reference ballast supplied at its rated voltage and frequency

4 General requirements

4.1 Luminaires shall be tested complete with the light source and controlgear specified by the manufacturer. Except where otherwise specified, the luminaire, light source and controlgear shall be tested as new, and installed as for normal use, in accordance with the manufacturer's installation instructions.

4.2 Luminaires shall meet the requirements of the relevant parts of the IEC 60598-2 series that are appropriate to their design.

4.3 Luminaires shall meet all the requirements of this document and where applicable also the additional requirements of the IEC 62722-2 series appropriate to the type of light source used by the luminaire. Where detailed in the IEC 62722-2 series, alternative methods of measurement or limits to those given in this document may be specified.

4.4 Where it is specified in this document that data is to be provided, this data may be supplied by the manufacturer in printed or electronic formats, via the manufacturer's catalogues, website, or similar, unless otherwise specified in this document.

4.5 Luminaires for tungsten filament lamps can be photometrically rated, electrically rated and efficacy-rated with lamps of any wattage not exceeding the marked maximum, and any technology (e.g. halogen, self-ballasted compact fluorescent or self-ballasted LED), if these lamps are covered by an available IEC safety standard and are shown to comply with that standard. For these luminaires, the number of lamps, their technology and their wattage shall be given in the luminaire manufacturer's catalogue, website or similar.

The use of an international lamp coding system (ILCOS) code according to IEC 61231 is recommended. Further details can be necessary to identify the type of lamp.

The requirements of this document shall be met by the provision of information and data provided by the luminaire manufacturer (or responsible vendor). Compliance is considered to be met by the provision of the requested information. Any verification of data is conducted by the measurement requirements of this document.

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4.6 The luminaire manufacturer shall be prepared to provide information for the specific light source used for the test.

5 Light sources and components of luminaires

Any light sources and components delivered with the luminaire shall comply with the requirements of the IEC performance standards that are appropriate to them.

6 Photometric data

Photometric data shall be available for the luminaire and any optical attachments or accessories that the luminaire has been specified for use with. The following photometric data shall be provided.

a) Light output ratio (LOR) or the total luminous flux of the luminaire

NOTE 1 The relevant part of the IEC 62722-2 series can specify which of these are to be provided.

b) Luminous intensity distribution

Photometric data shall be provided for luminaires in accordance with an established international or regional format as appropriate for the type of luminaire, and with luminous intensity distribution data according to the luminaire's intended application. Data shall be available in electronic file format to facilitate its use by lighting design software.

NOTE 2 Information regarding acceptable regional standards for photometric data formats is given in Annex A.

When the LOR is provided it shall be measured in accordance with CIE 121 and the LOR of the luminaire shall not be more than 10 % (relative) below the rated value.

When a total luminous flux is provided it shall be measured in accordance with CIE 121 and shall not be more than 10 % below the rated value.

The distribution of luminous intensity, measured in accordance with CIE 121, shall be in accordance with that declared by the manufacturer. The method of comparison for the distribution shape, and limits for acceptance are given in Annex D.

The allowed photometric variations detailed shall take account of manufacturing tolerances. When measurements are made, additional allowance for laboratory measurement uncertainty shall also be considered.

All photometric data shall be declared for the luminaire operating at its rated supply voltage.

For the photometric performance and measurement of emergency luminaires when operating in emergency mode, see also IEC 60598-2-22 and CIE 121-SP1.

7 Electrical data

Electrical supply data shall be provided for the luminaire and shall include the following:

a) rated supply voltage;
b) rated input power;
c) rated standby power if applicable;
d) rated networked standby power if applicable;
e) rated emergency lighting charging power if applicable.

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Power values shall be reported in W with the minimum following resolution:

- ≥ 10 W: whole number;
- > 1 W and < 10 W: first decimal digit;
- ≤ 1 W: two decimal digits.

When measured at its rated supply voltage, under conditions specified in Annex B, the electrical values shall not exceed the rated values declared by the manufacturer by more than 10 %.

8 Luminaire efficacy data

Where luminaire efficacy data is provided this shall be with reference to rated light source performance data published by the light source manufacturer. The luminaire manufacturer shall be prepared to provide information of the specific light source data that has been used.

Luminaire efficacy data shall be based on the rated photometric and electrical characteristics of the luminaire. For production light source and luminaire combinations, variations in accordance with parameters stated in IEC standards for light sources, controlgear, and luminaire standards can occur.

NOTE Luminaire efficacy data can be derived from LOR × (rated light source lumens × BLF)/Input power in watts at rated supply voltage.

9 Environmental data

9.1 Materials information

The manufacturer is responsible for checking that materials used for the construction of the luminaire and its components are not in breach of local regulations restricting the use of specific substances considered to be hazardous to the user or environment.

NOTE Local regulations are those in force for the region of manufacture, sale and use of the luminaire.

9.2 Maintenance instructions

To assist good performance through life, the manufacturer shall provide details of the recommended maintenance operations that should be carried out.

NOTE In some countries, specific requirements according to local regulations can apply.

9.3 End of life dismantling instructions

To assist end of life recycling, the manufacturer shall provide instructions to assist the disassembly of the luminaire and segregation of material types.

NOTE 1 In some countries, specific requirements according to local regulations can apply.

NOTE 2 Symbols to assist the communication of instructions for maintenance through life and end of life recycling are given in Annex C.

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Annex A
(informative)

Use of regional standards

In some regions the use of local standards, as alternatives to those detailed in the text of this document may be preferred. Details of those that have been made known by national committees are as follows:

Europe

EN 13032-1:2004	Light and lighting – Measurement and presentation of photometric data of lamps and luminaires – Part 1: Measurement and file format
EN 13032-2:2017	Light and lighting – Measurement and presentation of photometric data of lamps and luminaires – Part 2: Presentation of data for indoor and outdoor work places
EN 13032-3:2007	Light and lighting – Measurement and presentation of photometric data of lamps and luminaires – Part 3: Presentation of data for emergency lighting of work places

Canada, Mexico and USA

IES-LM-75-19	Goniophotometer Types and Photometric Coordinates
IES-LM-63-19	Standard File Format for the Electronic Transfer of Photometric Data and Related Information
IES-LM-58-20	Spectroradiometric Measurement Methods for Light Sources
IES-LM-77-20	Intensity Distribution Measurement of Luminaires and Lamps Using Digital Screen Imaging Photometry
ANSI/IES- LS-1-21	Lighting Science: Nomenclature and Definitions for Illuminating Engineering

Japan

JIS C 8105-5:2011	Luminaires – Part 5: Gonio-photometric methods

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Annex B
(normative)

Measurement method of total power of luminaires and associated powers

B.1 General

Annex B provides details of the measurement for luminaire supply power, standby power, networked standby power and emergency lighting charging power.

Electrical measurements shall be made at the luminaire supply terminals.

For production light sources and controlgear used in luminaires, variations in accordance with parameters stated in IEC standards can occur. Measurements of luminaire electrical characteristics performed under the scope of this document should be made with lamps and controlgear that are representative of their rated values, or with corrections made to take account for any variation from these.

B.2 Test measurement of luminaire power during normal operation

The object of the test is to measure the luminaire total input power during normal operation with any associated standby power, networked standby power and emergency lighting charging power at standard reproducible conditions that are close to the conditions of service for which the luminaire is designed. Ideally, these luminaire electrical measurements should be made during photometric tests.

B.3 Standard test conditions

Test conditions for photometric measurements shall be in accordance with CIE 121:1996, Clause 4.

B.4 Electrical measuring instruments

Voltmeters, ampere meters and wattmeters shall comply with the requirements for Class Index 0,5 or better (precision grade).

B.5 Test luminaires

Tests are made on a single sample. The luminaire shall be representative of the manufacturer's regular product. The luminaire should be mounted in the position in which it is designed to operate.

B.6 Test voltage

The test voltage at the supply terminals to the luminaire shall be the rated voltage. In the case of luminaires with a voltage range, the manufacturer shall declare the value at which the test shall be made.

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B.7 Luminaire power

The luminaire power shall be the value obtained in accordance with Clauses B.1 to B.6. The value shall include the power of all light source(s), controlgear and other component(s), for normal full output operating mode or at maximum light output if the luminaire includes a dimming controlgear. Measurements shall be made at the luminaire input terminals.

B.8 Luminaire standby power

The measurement of standby power of a luminaire shall be performed according to IEC 63103:2020.

B.9 Luminaire networked standby power

The measurement of networked standby power of a luminaire shall be performed according to IEC 63103:2020.

B.10 Emergency lighting charging power

For self-contained emergency luminaires, the measurement of the emergency lighting charging power shall be performed according to IEC 63103 in charging maintenance mode as defined in IEC 63103:2020, 3.13. The test shall be performed according to IEC 63103:2020, 5.3.2 following full charging of the emergency lighting batteries.

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Annex C
(informative)

Pictograms to assist the communication of instructions for maintenance through life and end of life recycling

The pictograms given in Figure C.1, Figure C.2 and Figure C.3 may be used to assist the communication of instructions for maintenance through life and end of life recycling.

NOTE For all pictograms showing a light source, the shape of the light source can be changed to be representative of the actual light source being used.

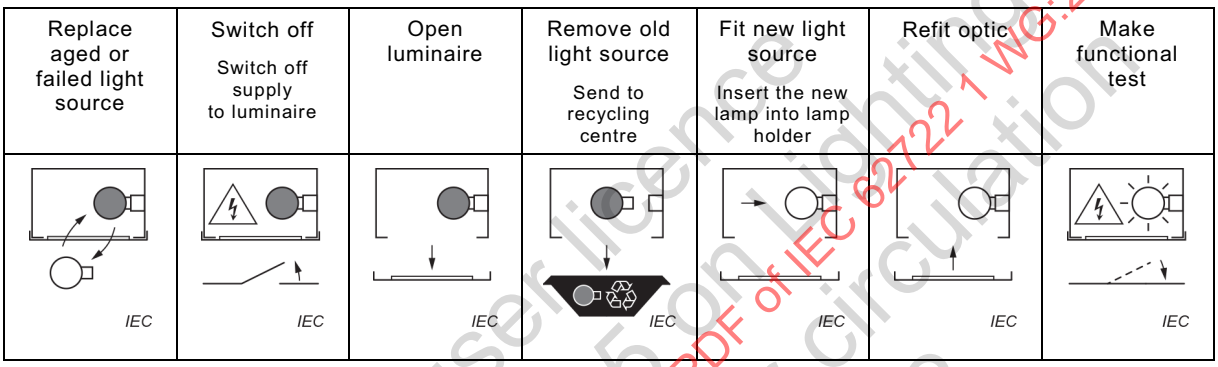

Figure C.1 – Instructions for luminaire servicing

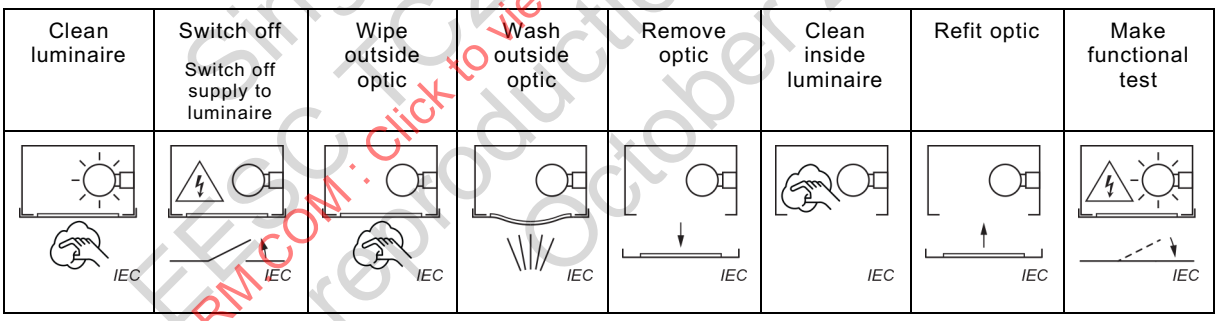

Figure C.2 – Instructions for luminaire cleaning

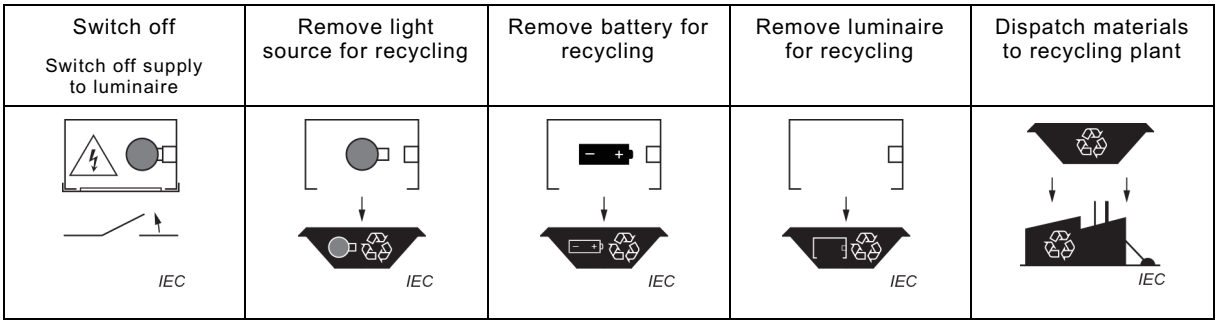

Figure C.3 – Instructions for end of life dismantling

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