

INTERNATIONAL STANDARD



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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LIGHTING EQUIPMENT –
NON-ACTIVE MODE POWER MEASUREMENT**
FOREWORD

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

FDIS	Report on voting
34/698/FDIS	34/709/RVD

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

The first edition of this document specifies uniform requirements for measuring non-active mode power consumption for all lighting equipment. Present performance standards for controlgear (IEC 62442 (all parts)) and luminaires (IEC 62722-1), already include some descriptions for measuring standby power. It is expected that these standards will be amended, accordingly.

In addition to an illumination function, today's lighting equipment can execute a variety of additional non-illumination functions, for example through integrated surveillance cameras, noise detectors, occupancy counters, vehicular and pedestrian traffic detection, weather detection, smoke detection, visible light communication and proximity or location devices. During the execution of these functions, the (multi-function) lighting equipment can operate in many different (active and non-active) modes. Non-active mode power consumption of (multi-function) lighting equipment, i.e. the power consumed when the illumination function is off, is an important aspect of lighting equipment and is becoming more important with the emergence of connected lighting.

This document defines and describes methods of measurement of electrical power consumption in non-active mode(s) for lighting equipment. The document is organized into two main clauses: Clause 4 "General test conditions" and Clause 5 "Measurements".

Clause 4 contains specifications on the general conditions for making the measurements. Subclauses 4.1 through 4.4 cover conditions for setting up the laboratory, selecting a supply voltage and suitable instruments for the power measurement. Subclause 4.5 covers aspects which should be considered when the lighting equipment is connected to a network to work properly. Subclause 4.5.2 is for wired networks and 4.5.3 and 4.5.4 give setups for wireless networks using conducted or radiated connections, respectively. These setups for wireless networks are harmonized with ETSI Standard EN 300 328 and modified for lighting equipment.

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Clause 5 details the procedures for making measurements of the equipment under test (EUT). Subclause 5.1 gives general instructions for setting the EUT into the possible non-active mode(s). Subclause 5.2 details the large variety of EUTs. These EUTs can be placed into two categories: illumination-only (5.2.2) and multi-function (5.2.3) lighting equipment. Traditional lighting equipment with an illumination-only function is summarized in 5.2.2, Table 1. Multi-function lighting equipment having additional non-illumination functions is addressed in 5.2.3. A standardized form for reporting the measured result according to the functions and modes of the multi-function lighting equipment under test is specified in 5.2.3, Table 2. Table 2 is a central feature of this document that will enable all users to report their non-active power results in a consistent manner.

Subclause 5.3 specifies procedures for preparing the EUT to make measurements of the input power. Instructions for EUTs containing battery charging functions are found in 5.3.2. Subclause 5.3.3 gives procedures for EUTs having no network provision and 5.3.4 covers networked EUTs whether wired or wireless.

The measurement procedure is specified in 5.4 and offers three alternative methods and the specific stability conditions required for each. These methods are adapted for lighting equipment from IEC 62301:2011. The direct meter method specified in 5.4.2 has the most limited applicability. It can only be used when the power reading is stable. In cases of discrepancy, the average reading method (5.4.3) or sampling method (5.4.4) have precedence. The average reading method is suitable only for EUTs having stable modes whereas the sampling method is suited for cyclic or unstable modes and if the mode is of limited duration.

Informative annexes are included to illustrate various measurement setups (Annex B and Annex C) and Annex D provides practical examples of controlgear, for example involving lighting equipment having a digital addressable lighting interface network in accordance with IEC 62386 (all parts), and of luminaires.

The methods defined and described in this document are not intended to be used to measure power consumption of (multi-function) lighting equipment during active mode(s) (also called "on mode(s)"), as these are generally covered by IEC standards or other product standards.

This document provides methods of measurement for lighting equipment. However, the methods specified in this document could also be used to measure lighting system models. A system model is a full-size portion of the lighting system containing specific functions and can set every mode of a portion of the system. The system models should be scalable to the entire lighting system additively. Thus, the total non-active mode power consumption of the system should equal the summation of power measured in each system model.

Using an adaptive roadway and pedestrian lighting system as an example for illustration, the following three system models could be present:

- (A) five luminaires connected to one daylight sensor; illuminate to compensate daylight;
- (B) a luminaire with a pedestrian sensor, a daylight sensor, connected to a crosswalk illumination; illuminate the crosswalk upon sensing a pedestrian when needed;
- (C) a dimmable luminaire with a vehicle detector; illuminate upon sensing a vehicle when needed.

Assume the lighting system comprises 50 A-, 10 B-, and 20 C-system models, then the total power consumption for a specified mode of the system would be $\text{Power}(\text{mode}) = 50 \times \text{power}(\text{A}) + 10 \times \text{power}(\text{B}) + 20 \times \text{power}(\text{C})$. Table 2 (5.2.3) could be used to specify the measurement of a system model set in various combinations of modes. In this way, the system is evaluated in measurable pieces (system models) set to function interactively as the entire system is intended for each mode.

LIGHTING EQUIPMENT – NON-ACTIVE MODE POWER MEASUREMENT

1 Scope

This document specifies methods of measurement of electrical power consumption in non-active mode(s), as applicable for electrical lighting equipment. This includes electrical lighting equipment incorporating non-illumination components.

This document specifies neither performance requirements nor limits on power consumption.

This document applies to lighting equipment connected to a supply voltage up to 1 500 V DC or up to 1 000 V AC.

This document is intended to be referenced by lighting equipment product standards for the measurement of non-active mode power consumption. Details for the non-active mode power consumption measurement and data presentation are specified in the product standards.

NOTE Annex A provides guidance on details specified in product standards.

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 – Part 845: Lighting* (available at <http://www.electropedia.org>)

IEC 62504, *General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

IEC TS 63105, *Lighting systems and related equipment – Vocabulary*¹

ETSI EN 300 328 V2.1.1 (2016-11), *Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU*

3 Terms and definitions

For the purposes of this document the terms and definitions given in IEC 60050-845, IEC 62504 and IEC TS 63105 and the following apply.

ISO and IEC maintain terminological 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>

¹ Under preparation. Stage at the time of publication IEC CDTS 63105:2020.

3.1 lighting equipment

assembly of components used for the primary function of providing illumination, or any component thereof

EXAMPLE Integrated lamp, non-integrated lamp plus controlgear, luminaire, controlgear, luminaire with camera.

Note 1 to entry: Lighting equipment can also include non-illumination components that offer non-illumination functions.

Note 2 to entry: Within the primary function of illumination, applications like horticultural, UV disinfection, etc. are included.

3.2 component

constituent part which cannot be physically divided into smaller parts without losing its function

EXAMPLE Light source, power supply, control unit.

[SOURCE: IEC 60050-151:2001, 151-11-21, modified – "of a device" and "particular" deleted.]

3.3 supply voltage

SV

<of lighting equipment> voltage applied by electric connection to provide electric energy

EXAMPLE 110 V AC, 230 V AC, 24 V DC, power over Ethernet.

[SOURCE: IEC 61347-1:2015, 3.5, modified – Definition adapted for lighting and examples added.]

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3.4 network

communication infrastructure with a topology of links, an architecture, including the physical components, organizational principles, communication procedures and formats (protocols)

3.5 function

<of equipment> predetermined operating characteristic

EXAMPLE Illuminating, battery charging, wireless routing, auxiliary power output.

Note 1 to entry: Functions can be either on, off, in standby or networked standby.

Note 2 to entry: Typically, instructions for use specify which functions can be turned off and how.

3.6 mode

<of lighting equipment> distinct configuration of the status of functions

3.7 active mode

<of lighting equipment> mode with the illumination function on

3.8 non-active mode

<of lighting equipment> mode with the illumination function off

EXAMPLE Standby mode, networked standby mode, off mode, no-load mode.

3.9 off mode

<of lighting equipment> mode with all functions off

Note 1 to entry: An indicator that only shows the user that the lighting equipment is in the off state is included within the classification of off mode.

3.10 standby mode

<of lighting equipment> 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.

3.11 networked standby mode

<of lighting equipment> 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

3.12 no-load mode

<of lighting equipment> mode when the equipment is connected to a supply voltage where the illumination function is switched off or disconnected at the output circuit of the controlgear

3.13 charging maintenance mode (standards.iteh.ai)

mode to maintain the battery in a fully charged condition

Note 1 to entry: Power consumption of emergency lighting equipment is called emergency lighting charging power.

3.14 instructions for use

information that is provided by the manufacturer or responsible vendor for users of the equipment

Note 1 to entry: Instructions for use would include a user manual and may be in paper or electronic form. Instructions for use do not include any special directions provided by the equipment supplier to the test laboratory especially for testing purposes.

[SOURCE: IEC 62301:2011, 3.12, modified – "by the manufacturer or responsible vendor" added and "product" replaced with "equipment".]

3.15 equipment under test

EUT

equipment as specified in the scope of this document subjected to non-active mode power consumption assessment

EXAMPLE Illumination-only lighting equipment or multi-function lighting equipment.

3.16 power boundary

perimeter surrounding the equipment under test through which all forms of energy flow and at which the sum of power is measured