

INTERNATIONAL STANDARD



Lighting equipment – Non-active mode power measurement



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
4 General test conditions.....	11
4.1 General.....	11
4.2 Laboratory and environmental conditions	11
4.3 Supply voltage	11
4.3.1 Supply voltage and frequency.....	11
4.3.2 Supply voltage waveform.....	11
4.4 Power measurement accuracy and uncertainty	11
4.5 Network aspects	12
4.5.1 General	12
4.5.2 Wired networks.....	12
4.5.3 Wireless networks: conducted connection for testing	12
4.5.4 Wireless networks: radiated connection for testing.....	13
5 Measurements.....	15
5.1 General.....	15
5.2 Equipment under test (EUT).....	15
5.2.1 General	15
5.2.2 Illumination-only lighting equipment.....	15
5.2.3 Multi-function lighting equipment	19
5.3 Preparation of EUT	20
5.3.1 General	20
5.3.2 Measurement of input power.....	20
5.3.3 EUT with no network provision.....	22
5.3.4 EUT with network provision (wired or wireless)	22
5.4 Measuring procedure	22
5.4.1 General	22
5.4.2 Direct meter reading method.....	23
5.4.3 Average reading method.....	23
5.4.4 Sampling method.....	24
Annex A (informative) Guidance for product standards.....	26
Annex B (normative) Measurement setup schemes for illumination-only lighting equipment.....	27
Annex C (normative) Measurement setup schemes for multi-function lighting equipment.....	30
Annex D (informative) Application examples	31
Bibliography.....	33
Figure 1 – Test setup for non-active mode power consumption measurement of conducted connected EUT	13
Figure 2 – Test setup for non-active mode power consumption measurement of connected EUT with integral antennas (RF path symbolically shown).....	14

Figure 3 – Calibration setup for non-active mode power measurement of connected EUT with integral antennas	14
Figure 4 – Components present within illumination-only EUT	15
Figure 5 – Component representing an additional function (AF) of multi-function EUT	19
Figure 6 – Configuration of multi-function lighting equipment: example including one additional function.....	19
Figure B.1 – Key to symbols used in figures of Annex B.....	27
Figure B.2 – Measurement setup for determining the input power supplied to the power supply	27
Figure B.3 – Measurement setup (with optional network provision) for determining the input power supplied to the control unit.....	28
Figure B.4 – Measurement setup (with optional network provision) for determining the input power supplied to the combined power supply and control unit.....	28
Figure B.5 – Measurement setup for determining the input power supplied to the combined light source and power supply	28
Figure B.6 – Measurement setup (with optional network provision) for determining the input power supplied to the combined light source and control unit	28
Figure B.7 – Measurement setup (with optional network provision) for determining the input power supplied to illumination-only lighting equipment	29
Figure C.1 – Key to symbols used in figures of Annex C	30
Figure C.2 – Measurement setup (with optional network provision) for determining the input power to multi-function lighting equipment.....	30
Figure D.1 – General measurement setup scheme for controlgear examples	31
Figure D.2 – Networked standby mode measurement setup for the "basic" controlgear.....	32
Figure D.3 – Networked standby mode measurement setup for controlgear with an integrated auxiliary/bus power supply function	32
Table 1 – Configurations and examples of illumination-only equipment and reference to the measurement setup	17
Table 2 – Template for reporting non-active mode power	18
Table 3 – Example of using the template of Table 2 for reporting measured standby power for an illumination-only luminaire with integrated presence sensor.....	18
Table 4 – Example of using the template of Table 2 for reporting measured standby power for a (multi-function) luminaire with an integrated presence sensor and an integrated camera	20

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**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.

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