TECHNICAL REPORT

ISO/CIE TR 3092

First edition
2023-09

Light and lighting — Energy performance of lighting in buildings — Explanation and justification of ISO/CIE 20086

Reference number
ISO/CIE TR 3092:2023(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 274, *Light and lighting*, in cooperation with CIE Joint Technical Committee 6.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

It is important that lighting schemes are designed appropriately to provide the right light in the right place at the right time, while being energy efficient and conforming to local, regional, and/or national regulations. It is also important that the lighting systems are operated energy efficiently and managed by suitable lighting control systems.

Carrying out a comprehensive lighting design (daylight and electric lighting) for new or refurbished buildings will yield both effective and energy efficient lighting solutions that fulfil the lighting criteria specified in the lighting application standards. The lighting design process will show how much daylight will be available and how much electric lighting is needed and what scheme solutions will satisfy the required lighting conditions during the occupied and unoccupied periods.

ISO/CIE 20086 gives a procedure to estimate the required energy and the energy efficiency of the electric lighting scheme.

There is a risk that the purpose and limitations of ISO/CIE 20086 will be misunderstood, unless the background and context to its content is explained in some detail to users. If this information would have been placed in ISO/CIE 20086, the standard would be overloaded with informative content; and the result is likely to be confusing and cumbersome, especially if ISO/CIE 20086 is referenced in local, regional, or national building codes.

Therefore, this document accompanies ISO/CIE 20086 and provides informative content to support the correct understanding, use and national implementation of the lighting standard. It also provides explanation of the lighting energy calculation methodology and working calculation example of integrated lighting control options. ISO/CIE 20086 defines the methods for estimating or measuring the amount of energy required or used for lighting in buildings. The method of separate metering of the energy used for lighting will also give regular feedback on the effectiveness of the lighting control. The methodology of energy estimation not only provides values for the Lighting Energy Numeric Indicator (LENI) but it will also provide input for the heating and cooling load estimations for the combined total energy performance of building indicator.

LENI represents the absolute amount of energy required for a lighting scheme and does not directly provide indications on the efficiency of the lighting technology employed. Therefore, a concept of expenditure factors intending to render energy flows in lighting systems more transparent is introduced in ISO/CIE 20086:2019, 6.5 and Annex E to complement LENI.

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Light and lighting — Energy performance of lighting in buildings — Explanation and justification of ISO/CIE 20086

1 Scope

This document is a technical report supporting ISO/CIE 20086.

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.

ISO/CIE 20086:2019, *Light and lighting — Energy performance of lighting in buildings*

CIE S 017, *ILV: International Lighting Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/CIE 20086, CIE S 017 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

CIE maintains a terminology database for use in standardization at the following address:

— e-ILV: available at https://cie.co.at/e-ilv

3.1
useful floor area
total gross floor area of all enclosed spaces, measured to the internal face of the external walls

Note 1 to entry: The total useful floor area can have a different value than the total floor area in the building.

4 Symbols and abbreviations

4.1 General

As given in CIE S 017, considering that LED technology has mostly replaced the conventional form of lamps, the term “lamp” should be replaced with the more general term “light source” to follow changes already introduced in some definitions of terms. However, as this document intends to accompany ISO/CIE 20086, the terms and definitions used in this document are consistent with ISO/CIE 20086 by using the term “lamp”. Still, whenever the term “lamp” is used in this document, it also refers to the term “light source”.

4.2 Symbols and abbreviations

For the purposes of this document, the symbols given in ISO/CIE 20086 and the specific symbols listed in Table 1 apply.

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