DRAFT International Standard

ISO/CIE DIS 15469

Spatial distribution of daylight — CIE standard general sky

Répartition spatiale de la lumière du jour — Ciel général normalisé CIE

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Foreword

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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 documents 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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This document was prepared by International Commission on Illumination (CIE) Technical Committee 3-15, *Spatial Distribution of Daylight*, in cooperation with Technical Committee ISO/TC 274, *Light and lighting*.

This third edition cancels and replaces the second edition (ISO 15469:2004/CIE S 011:2003), which has been technically revised.

The main changes are as follows:

— normative references updated;

— Clause 3 updated;

— text added to Clauses 5 and 7;

— keys written for Figures 2, 3 and 4;

— Bibliography updated;

— other minor editorial changes.

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

The luminance distribution of the sky depends on weather and climate, and it changes during the course of a day with the position of the sun. This standard lists a set of luminance distributions, which model the sky under a wide range of conditions, from the heavily overcast sky to cloudless weather. It is intended for two purposes:

i. to be a universal basis for the classification of measured sky luminance distributions;

ii. to give a method for calculating sky luminance in daylighting design procedures.

The Standard defines relative luminance distributions: the luminance of the sky at any point is given as a function of the zenith luminance. For daylighting calculation purposes, it may be used with values of zenith luminance or of horizontal illuminance to obtain absolute luminance distributions.

The Standard incorporates both the CIE Standard Clear Sky and the CIE Standard Overcast Sky, which are treated as particular cases of the General Sky. The Overcast Sky is retained as a separate formula because there are many calculation procedures that embody the mathematical formulation of this particular distribution.

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Spatial distribution of daylight — CIE standard general sky

1 Scope

This Standard defines a set of outdoor daylight conditions linking sunlight and skylight for theoretical and practical purposes.

The luminance distributions given have the following characteristics:

i. They are symmetrical about the solar meridian and are functions of the angular distance, Z_s, between the sun and the zenith.

ii. They are defined by smooth continuous functions. Such distributions are typical of cloudless skies and of those where the cloud cover is homogeneous. They provide an approximation to skies of broken cloud that is sufficiently accurate for many practical daylight calculation purposes.

iii. The relative luminance at any point in the sky depends on the angle, χ, between that sky element and the sun, and on the angle, Z, between the sky element and the zenith. It is given in terms of two functions: the relative scattering indicatrix, $f(\chi)$, and the luminance gradation between horizon and zenith, $\varphi(Z)$.

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.

CIE S 017, *ILV: International Lighting Vocabulary*

ISO 80000-7, *Quantities and units — Part 7: Light and radiation*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

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 terminological database for use in standardization at the following address:

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

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3.2 Symbols and abbreviated terms

For the purposes of this Standard, the following symbols apply:

a, b	luminance gradation parameters
α	azimuth of a sky element (clockwise from north) [rad]
α_s	azimuth of the sun (clockwise from north) [rad]
c, d, e	scattering indicatrix parameters
χ	shortest angular distance between a sky element and the sun [rad]
$f(\chi)$	scattering indicatrix function
$\varphi(Z)$	luminance gradation function
γ	angle of elevation of a sky element above the horizon [rad]
γ_s	angle of elevation of the sun above the horizon [rad]
L_a	luminance of a sky element [cd/m^2]
L_z	zenith luminance [cd/m^2]
Z	angular distance between a sky element and the zenith [rad]
Z_s	angular distance between the sun and zenith [rad]

For quantities and units, CIE S 017 and ISO 80000-7 shall apply.

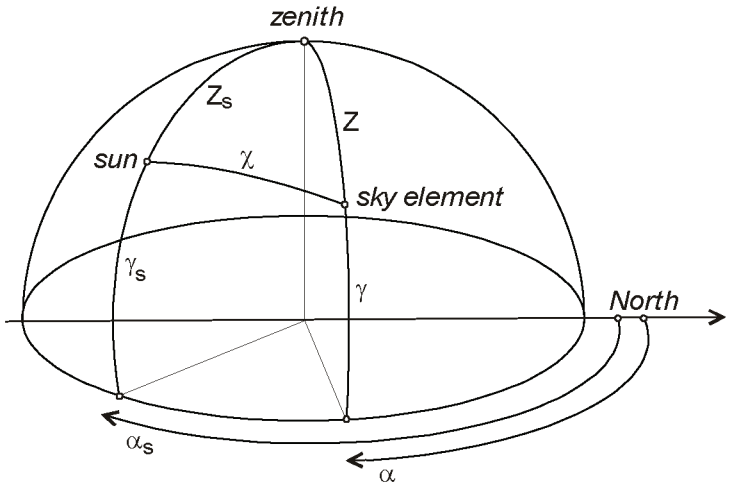


Figure 1 — Angles defining the position of the sun and sky element

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