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Illuminating
ENGINEERING SOCIETY

LIGHTING PRACTICE:
DESIGNING AND SPECIFYING DAYLIGHTING FOR BUILDINGS

AN AMERICAN NATIONAL STANDARD

Approved American National Standard
ANSI

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Prepared by
The IES Daylighting Committee

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1.1 Introduction

Daylighting refers to the art and practice of admitting beam sunlight, diffuse sky light, and reflected light from exterior surfaces into a building to provide ambient and/or task lighting to meet the visual and biological needs of the occupants. The role of electric lighting in daylit spaces should be to complement daylight during daytime and supply the required illumination levels during nighttime, with energy savings acquired through the use of electric lighting controls. The design of a daylit building is a challenging task demanding an integrated design approach to simultaneously address occupant comfort, lighting quality, and energy efficiency across a wide range of daylight and weather conditions. Properly daylit buildings offer additional benefits that include occupant health and satisfaction, connection to the outdoor environment, and reductions in maintenance costs and greenhouse gas emissions.

Daylighting design requires a thorough understanding of the sources of daylight and the role that architectural design, space planning, material selection, envelope loads, and systems integration play in daylight system performance and occupant comfort.

It is important that daylighting be addressed early in the architectural design process; it should be a primary consideration in the development of the lighting design solution for a space. If not successfully addressed, poor performance will eliminate some or all of the potential benefits and can lead to unhappy and unproductive occupants.

The general goal is to provide sufficient, but not excessive, daylight illumination levels for various space activities while minimizing glare and, in some cases, providing a view to the outdoors. At the same time, the building siting, configuration, and envelope should be optimized for the orientation, geographic location, and climate to maximize energy savings from both lighting and HVAC systems. Successful daylighting requires managing the daylight distribution in the space across the wide-ranging sun and sky conditions that are present throughout the year.

The dynamic nature of daylight makes it a complex light source. The continuous apparent movement of the sun, coupled with changes in atmospheric conditions, causes the solar beam and sky-dome luminance distribution to vary in intensity and spectral content.

Daylighting involves the delivery and distribution of light from the sun and sky to a building interior. Daylight delivery systems include all elements that collect, transmit, reflect, control and distribute daylight to building interiors, which include the aperture, its glazing material, exterior and/or interior shading devices of all types, and any optical devices that help to direct or control daylight transmission or distribution to the interior while alleviating glare. The goal of most daylight delivery systems is to provide useful daylight to the visual tasks and room surfaces for a significant portion of the year, in an aesthetically pleasing, comfortable and energy efficient manner.

1.2 Scope

This document provides detailed discussions and guidelines on the design and performance of these systems. The contents of this document are of value to architects, electrical and mechanical engineers, interior designers, landscape architects, contractors, equipment and material manufacturers, as well as end users such as developers, building owners, and facility managers. Each of these individuals plays a role in defining how a daylight system will perform over its lifetime.