



# Recommended Practice for Daylighting Buildings



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**Recommended Practice for  
Daylighting Buildings**

Publication of this Recommended Practice  
has been approved by IES.  
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should be directed to IES.

**Prepared by:  
The Daylighting Committee of the  
Illuminating Engineering Society of North America**

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*Approved by the IES Board of Directors, June 13, 2013, as a Transaction of the Illuminating Engineering Society of North America.*

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Published by the Illuminating Engineering Society of North America, 120 Wall Street, New York, New York 10005.

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ISBN # 978-0-87995-281-5

*Printed in the United States of America.*

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Special thanks to the Public Interest Energy Research (PIER) program of the California Energy Commission (CEC) for supporting the second draft of the Daylighting Chapter (authored by K. Papamichael) of the Advanced Lighting Guidelines Online (developed by the New Buildings Institute) to jump start the development of IES RP-5. Special thanks to Ken Andersen from the California Lighting Technology Center (CLTC) of the University of California, Davis, for his help in managing the editing process for the 90% draft; many thanks also to CLTC staff for their help with RP-5 figures.

Special thanks to Matthew Tanteri (Tanteri + Associates) and Matias Lopez, for help with editorial work and illustrations.

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## FOREWORD

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Unlike electric lighting design recommendations, which depend mostly on space functions, daylighting design recommendations depend on a significantly extended application context, which includes site characteristics, such as latitude (sun paths change significantly as we move from the equator towards the poles), climate (sky conditions depend greatly on location in terms of clouds, fog and smog) and neighboring landscape and structures (external obstructions can significantly block sky view and/or reflect direct sunlight). The application context is further extended in retrofit applications to include all architectural decisions related to orientation, position, shape and size of fenestration.

The strong contextual dependency of daylight performance limits design considerations to very high-level recommendations, such as “block high solar altitudes with horizontal shading elements” and “use higher rather than lower reflectance for interior surfaces”, or highly qualified recommendations, such as “...for this range of latitudes... and ...for this orientation... and... under these sky conditions... do this.” Daylighting recommended practice is effective mostly in the form of **processes**, which require significant understanding of fundamental principles, and **information** about existing and emerging technologies and their effect on daylight performance.

Recommended practice statements in the text of the document are indicated by light blue shading, as they appear in the text.

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## 1.0 INTRODUCTION

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Daylighting refers to the art and practice of admitting beam sunlight, diffuse sky light, and reflected light from exterior surfaces into a building to contribute to lighting requirements and energy savings through the use of electric lighting controls. The role of electric lighting in daylighted spaces should be to complement daylight during daytime and supply the required illumination levels during nighttime.

Daylighting should be the first step of the lighting design process as it is a determinative element of the electric lighting design solution.

Daylighting is a prime consideration in building and space design, and it requires careful planning and analysis from the earliest phases of design, and if not successful, will eliminate some or all of its benefits, and can lead to unhappy and unproductive occupants.

The goal is to provide sufficient, but not excessive, daylight illumination levels for various space activities while minimizing glare. At the same time, the building envelope should be optimized for the orientation, geographic location and climate to maximize energy savings from both lighting and HVAC systems.

Successful daylighting requires balancing the daylight distribution in the space throughout the entire year.

Properly daylighted buildings offer significant benefits that include visual and thermal comfort, occupant satisfaction, a connection to the outdoor environment, and reduced energy consumption, maintenance costs, and greenhouse gas emissions.

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.

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## 2.0 DAYLIGHTING BENEFITS

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In addition to providing quality lighting for visual tasks, daylight offers significant psychological and biological benefits. Energy consumption and associated cost can also be reduced through automatic lighting controls that adjust electric lighting based on available daylight.

### 2.1 Health, Wellness and Human Performance

The presence of daylight generally improves visual and psychological comfort. Related benefits include

improvement in attendance, job satisfaction, attentiveness, performance, and positive long-term health.

A fundamental psychological benefit of daylighting is the connection of building occupants with their exterior environment, which provides vital information about time of the day and weather conditions.

View through vertical apertures offers an additional level of exterior information and is desirable to most occupants. Psychologist Rachel Kaplan of the University of Michigan has found that “office workers with a view of nature liked their jobs more, enjoyed better health, and reported greater life satisfaction”.

Judith Heerwagen, Senior Scientist at the Pacific Northwest National Laboratory in Seattle, is an expert on the psychological effects associated with the daylighting of indoor spaces. The following excerpt is taken from Heerwagen’s “Windowscapes: The Role of Nature in the View from the Window,” at the 1986 International Daylighting Conference:

“In our evolutionary past, information on time of day, seasonal changes in vegetation, weather, and other forms of environmental ‘data’ were likely to have had a pronounced influence on survival and health. Thus, it made sense to pay attention to changes in daylight that provided time cues, or to assess cloud formations for information about future weather conditions. These events influenced our ancestors’ daily decisions, such as where to sleep at night, as well as much more difficult decisions such as where to look for food next week.”<sup>1</sup>

Heerwagen added that it is not surprising that loss of such natural information on time of day has been implicated in the poor recovery of patients in windowless intensive care units.<sup>2</sup>

### 2.2 Environmental Factors

There are many positive environmental benefits that can be ascribed to daylighting. Coal, oil, and natural gas production generally exhibit a variety of adverse environmental impacts on the land, the water, and the atmosphere. Reducing such impacts is a major environmental benefit of daylighting.

Substantial portions of the energy generated today originate from the combustion of fossil fuels such as coal, oil, and natural gas. This combustion emits dangerous gases and can also adversely affect natural water bodies due to power plants, which use such water to condense steam in their power cycles. The combustion also emits greenhouse gases, which