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Measure BLD-4 Added Requirement for Motion (Occupant) Sensing Controls for Lighting in Certain Rooms

2008 California Building Energy Efficiency Standards

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Overview

Description	Both the Seattle Energy Code and ASHRAE/IESNA 90.1 have more demanding requirements for classrooms, conference and meeting rooms, and similar spaces than Title 24-2005. Upon investigation and as recommended by John Hogan at the Commission hearing May 19, 2006, changes are proposed to Title 24 to have similar requirements.
Type of Change	The Change affects the requirements stated in Section 131 (d), and will add another specific exception.
Energy Benefits	The energy savings benefits are obvious and not studied further. It is agreed that time based automatic shut off systems are inferior for controlling lighting in spaces with widely varying occupancies and schedules. Both energy use and demand are reduced.

Non-Energy Benefits	There are no other apparent benefits.
Environmental Impact	There are no known adverse impacts.
Technology Measures	This proposal assumes modern motion sensor technology with the possibility of integration into a more complex system including the PIER Classroom Lighting System.
Performance Verification	No field performance verification required.
Cost Effectiveness	The Measure is cost effective as any alternative lighting control system regardless of inherent technology costs the same or more.
Analysis Tools	Standard analysis tools can be used to analyze this measure.
Relationship to Other Measures	None.

Methodology

The implications of motion (occupant) lighting controls were evaluated for all of the following combinations:

- Conventional multi-level switching
- Multi-level switching with daylight zone
- Integrated classroom lighting controls as developed in PIER
- Mixture of dimming and switching
- Multiple scene lighting control system

Analysis and Results

The applicability of motion sensing to each of the control wiring types was reviewed based on the analyst's experience as a lighting designer and electrical engineer. Standard 90.1's reference to employee lunch and break rooms was not addressed as no comparable space type is listed in Table 146-C.

Recommendations

A following changes are recommended.

(d) Shut-off Controls.

1. For every floor, all indoor lighting systems shall be equipped with a separate automatic control to shut off the lighting. This automatic control shall meet the requirements of Section 119 and may be an occupant sensor, automatic time switch, or other device capable of automatically shutting off the lighting.

EXCEPTIONS to Section 131 (d) 1:

1. Where the system is serving an area that must be continuously lit, 24 hour per day/365 days per year.
2. Lighting in corridors, guestrooms, and lodging quarters of high-rise residential buildings and hotel/motels.
3. Up to one-half watt per square foot of lighting in any area within a building that must be continuously illuminated for reasons of building security or emergency egress.
4. Classrooms of any size; lecture, training, or vocational rooms of less than 1000 square feet; and in hotels and convention, conference, multipurpose and meeting centers, classrooms, conference rooms, meeting rooms and multipurpose rooms of less than 1000 square feet shall be equipped with occupant sensor(s) to shut off lighting. In addition, control device(s) shall be provided that permit lights to be manually shut off regardless of sensor status. A device achieving a temporary “on” override of up to 60 minutes may also be installed in these spaces.

Material for Compliance Manuals

These requirements should be highlighted in the manual, and the PIER classroom lighting control system explained.

Bibliography and Other Research

Technical data as follows:

Finelite Inc., “Integrated Classroom Lighting System (ICLS)” Technical documents

Lutron, Inc. “Grafik Eye System” Technical and Installation Documents

ASHRAE/IESNA Standard 90.1-2004 Section 9.4.1.2

Appendices

None