



2010 Code Change Training

The Oregon Energy Efficiency Specialty Code Module 4 - Lighting

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BH Engineering



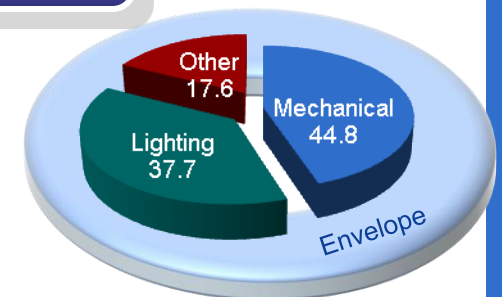
Section 505 Power & Lighting Systems

Overview of Recent Changes

Interior Lighting Power Allowances

Lighting and Daylight Controls

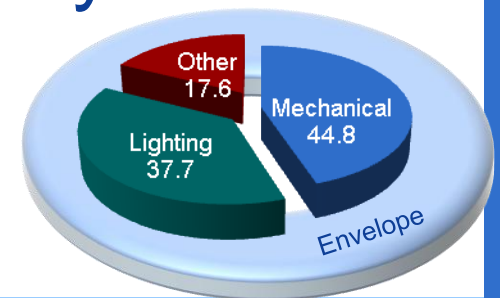
Exterior Lighting Requirements



Lighting – Questions

By the end of the lighting section you should be able to answer:

- 1) How many methods are offered for determining LPD?
- 2) What is the daylight zone ft² trigger for requiring daylight controls?
- 3) Exterior lighting regulated by this code is powered by what?



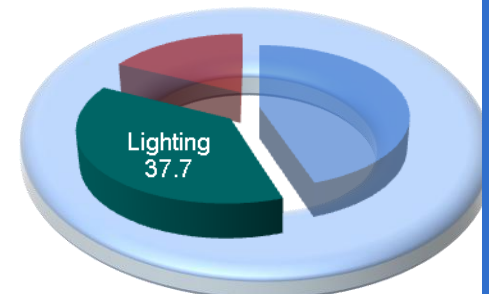
National Lighting Changes

EPACT 2005

Mercury Vapor Lamp Ballasts

Mercury Vapor Lamp Ballasts OR Luminaires containing such ballasts for general illumination applications may not be manufactured, marketed, sold or imported into the United States

Effective January 1, 2008

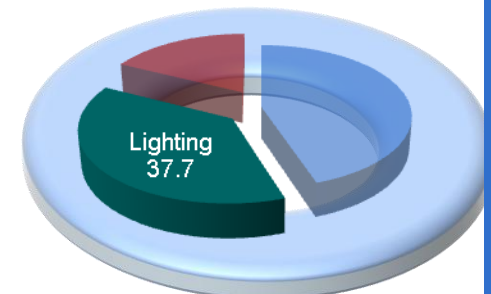


National Lighting Changes

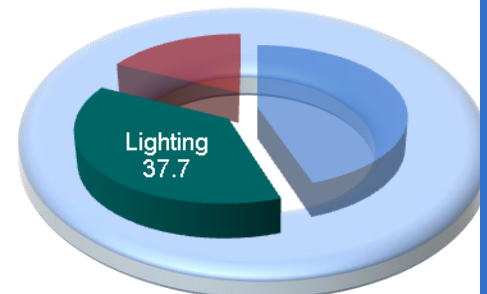
EPACT 2005

Ballasts Operating Energy Saver T12 Fluorescent Lamps

- *Standards aimed at eliminating magnetic ballasts*
 - *Move toward T8 lamps resulting need for newer ballasts*
- Effective July 1, 2009**

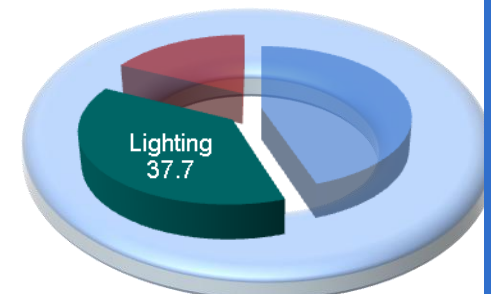


INTERIOR LIGHTING



Interior Lighting Power Method

- Two approaches remain (2007 & 2010)
 - Whole Building Approach
 - Space by Space
- LPD's reduced in both methods (2010)
- LPD's calculated to 1/100th of a watt (2010)



Interior Lighting Power Method(s)

Lighting Power Density Reductions in Both Methods

Whole Building Method

Building Area Type	(W/ft ²)
Automotive Facility	0.9 <u>.79</u>
Convention Center	1.2 <u>1.16</u>
Court House	1.2 <u>1.08</u>
Dining: Bar Lounge/Leisure	1.3 <u>1.19</u>
Dining: Cafeteria/Fast Food	1.4 <u>1.34</u>
Dining: Family	1.6 <u>1.5</u>
Dormitory	1.0
Exercise Center	1.0 <u>.92</u>

etc . . .

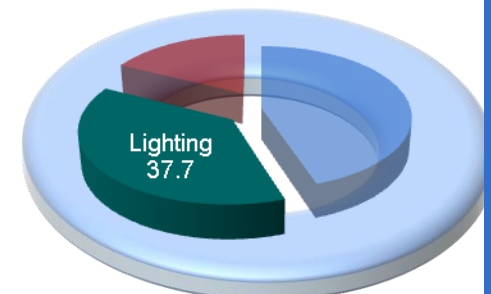
Space by Space Method

Common Space Types	LPD (W/ft ²) ¹
Office – Enclosed ²	1.1 <u>0.97</u>
Office – Open Plan ²	1.1 <u>0.93</u>
Conference/Meeting ³	1.3 <u>1.11</u>
Lobby	1.3 <u>1.28</u>
For Hotel	1.1
Performing Arts Theater	3.3 <u>3.24</u>
Motion Picture Theater	1.1 <u>1.01</u>
Audience / Seating Area	0.9 <u>0.84</u>

etc . . .

Additional lighting power for retail displays

- Lighting that is designed and directed to highlight merchandise
 1. 0.6 watts per square foot of sales floor area not listed in 2 or 3 below, or
 2. 1.4 watts per square foot of furniture, clothing, cosmetics or artwork floor area, or
 3. 2.5 watts per square foot of jewelry, crystal, or china floor area



Examples

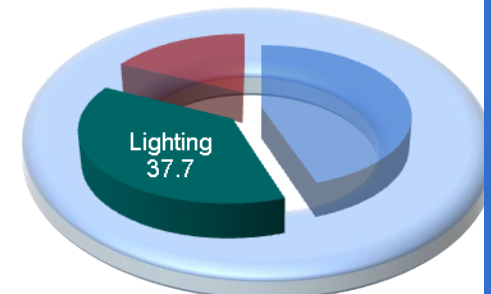


Interior Lighting Power Method(s)

Space by Space Method Max. Allowable LPD

1. W/ft² may be increased by:

2% per foot of ceiling height above **20** feet unless specified differently by another footnote

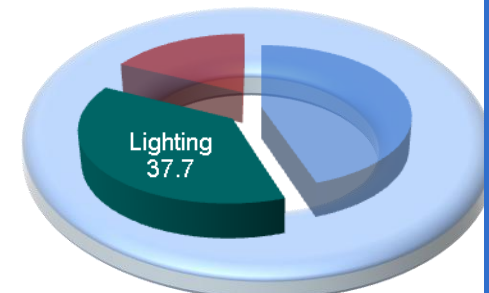


Interior Lighting Power Method(s)

Space by Space Method Max. Allowable LPD

2. Enclosed and open offices & Dining Areas:

W/ft² of room may be increased by 2% per foot of ceiling height above **9** feet

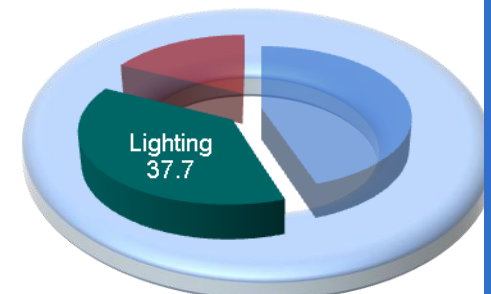


Interior Lighting Power Method(s)

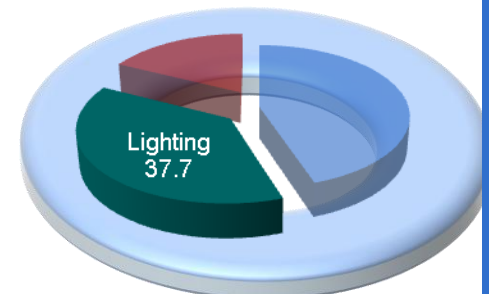
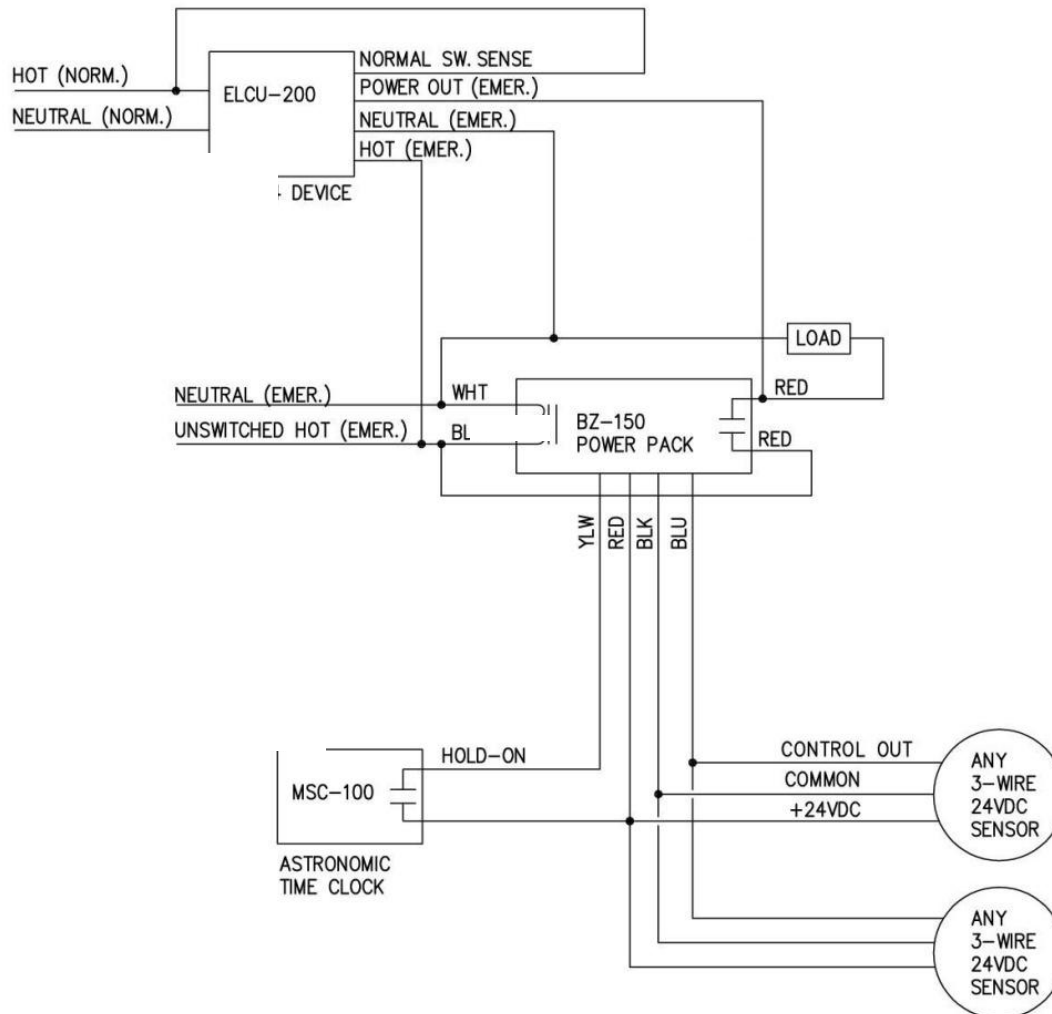
Space by Space Method Max. Allowable LPD

3. Hotel banquet rooms, conference rooms, or exhibit halls:

W/ft² of room may be increased by 2% per foot of ceiling height above **12 feet**

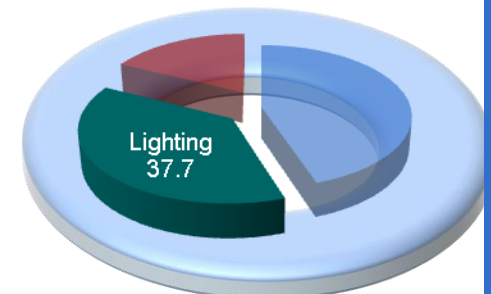


LIGHTING CONTROLS



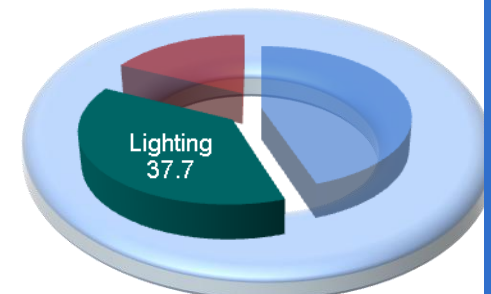
505.2.1 Interior Lighting Controls

- At least one local shutoff lighting control for every 2000 ft² of lit floor area
(2007 & 2010)



505.2.1.1 Egress Lighting

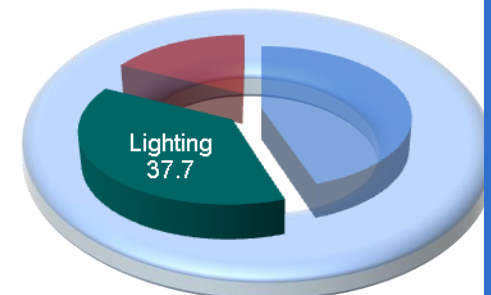
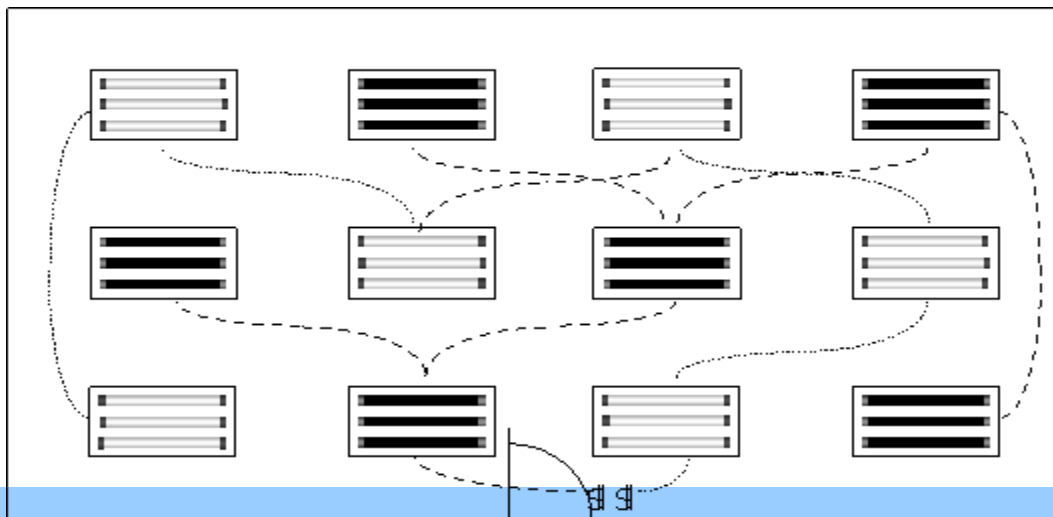
- Egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors to shut off during periods that the building space served by the means of egress is unoccupied.
- Exception: Building exits as defined by section 1002 of the OSSC.



505.2.2 Additional Controls

505.2.2.1 Light Reduction Controls

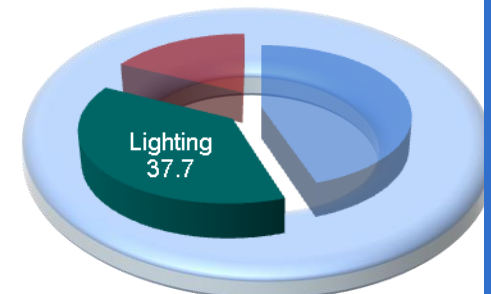
- Each area with manual control shall also reduce connected lighting load in a reasonably uniform illumination pattern by at least 50%



505.2.2.1 Light Reduction Controls

Exceptions:

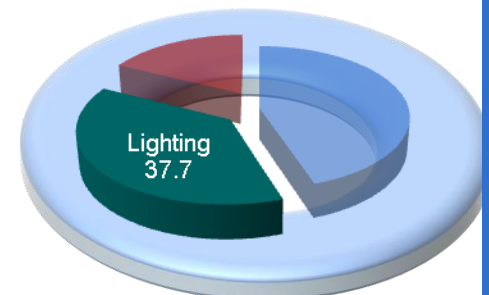
- Controlled by Occupancy Sensors ←
- Areas with one luminaire
- Corridors, storerooms, restrooms or lobbies
- Sleeping units
- Spaces with $< 0.6W/ft^2$
- Electrical and mechanical rooms *new*



505.2.2.2 Automatic Lighting Shutoff

- All buildings larger than ~~5,000~~ 2,000 square feet require automatic control
- Automatic controls include:
 - Time of day controls for areas no larger than ~~25,000~~ 10,000 square feet (one floor only)
 - Occupancy sensor(s)
 - A signal from another control or alarm system

Must incorporate holiday scheduling unless single zone or multi-scene preset device



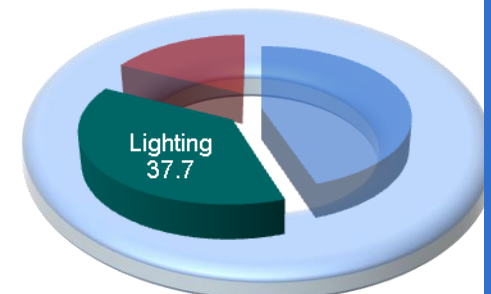
505.2.2.2 Automatic Lighting Shutoff

- Occupancy sensors are required to shut off lights within 30 minutes in:
 - Classrooms and lecture halls (2007 & 2010)
 - Conference meeting and training rooms (2007 & 2010)
 - Employee lunchroom and break rooms (2010)
 - Copy and print rooms (2010)
 - Restrooms (2010)
 - Dressing and locker rooms (2010)

Exception: Spaces with multi-scene control

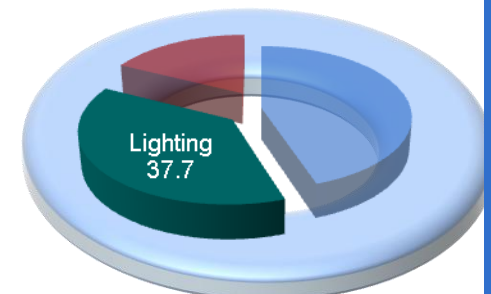
505.2.2.2 Automatic Lighting Shutoff

- Occupancy sensors in rooms with daylight zones required to have 'manual on' function
- Occ. Sensors or automatic time switches required for storage rooms up to 1000 ft.²



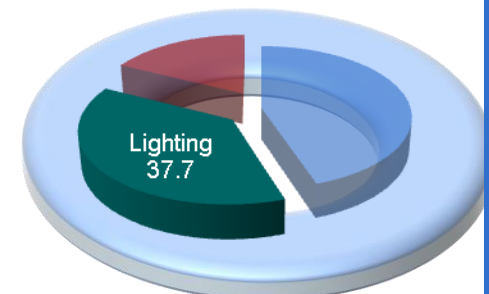
505.2.2.2.1 Occupant Override

- Where an automatic time switch device is installed, override switching required
 - Controls an area not exceeding ~~5,000~~ 2000 ft²
 - Allows no more than 2 hour override
 - Located within a view of the area controlled
 - Readily accessible
 - Manually operated



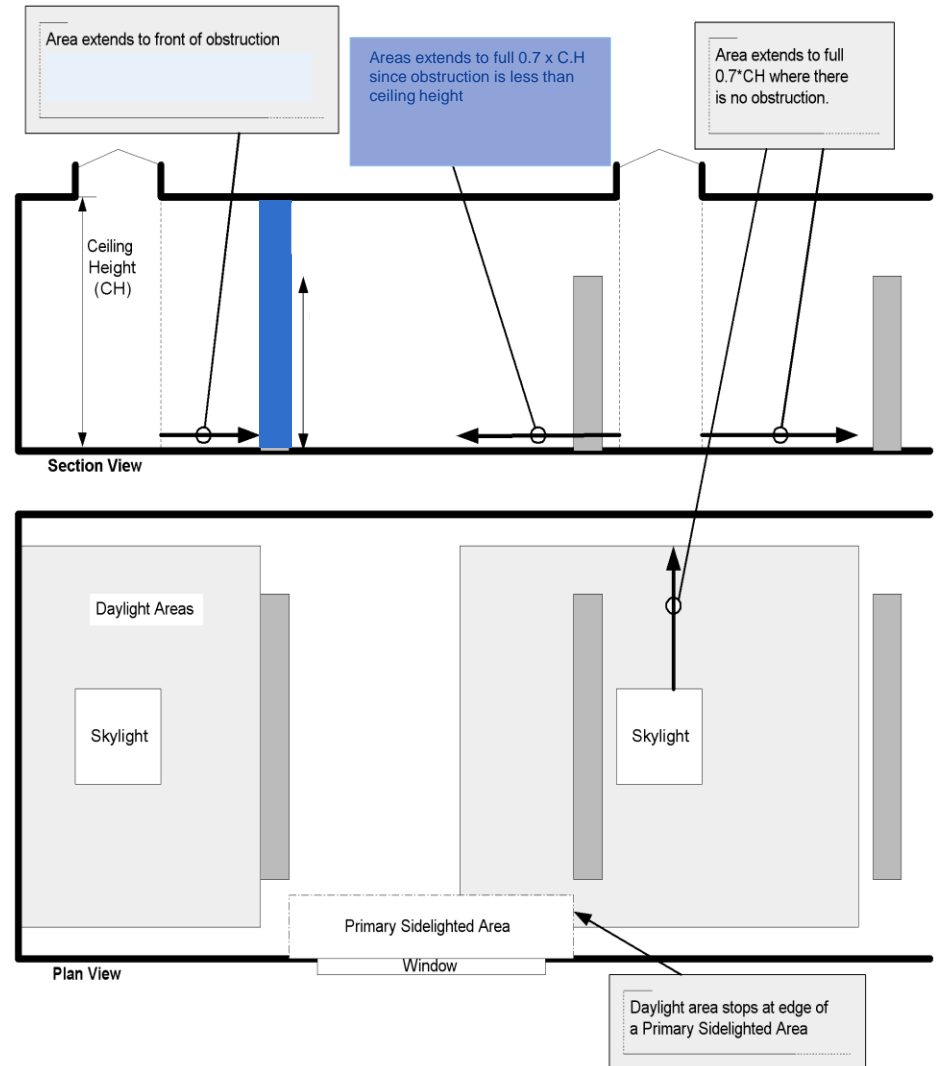
505.2.2.3 Daylight Zone Control

- Lights in daylight zones controlled independently of other lighting zones
- Individual daylight zones $> 350 \text{ ft}^2$ shall employ automatic daylight controls
- Automatic controls shall reduce output at least 50%



Daylight Zone – Skylights

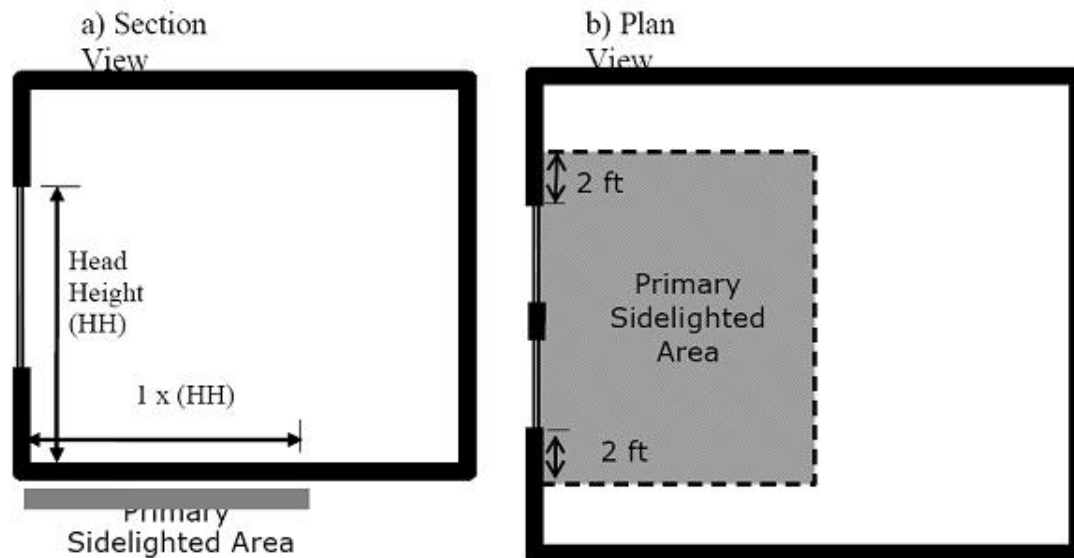
- The area under skylights +
 - 70% of floor-to ceiling height, or;
 - To a ceiling height partition, or
 - $\frac{1}{2}$ distance to the next skylight or window



Graphic courtesy of ASHRAE 90.1
Lighting Subcommittee

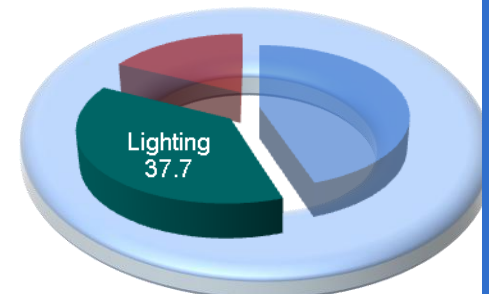
Daylight Zone – Windows

- Unless a more detailed analysis is performed
 - Depth = head height of the window
 - Width = window + 2-feet on each side
 - Both zone depth and width stop at nearest ceiling height partition or next daylight zone



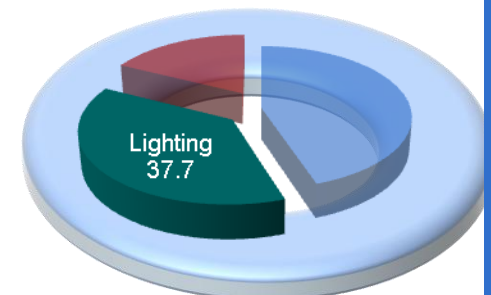
505.2.2.3 Daylight Zone Control

- Exempt from automatic controls:
 - Retail spaces adjacent to vertical glazing
 - Display, exhibition and specialty lighting
 - Hid lamps 150 watts or less
 - Spaces required to have occupancy sensors



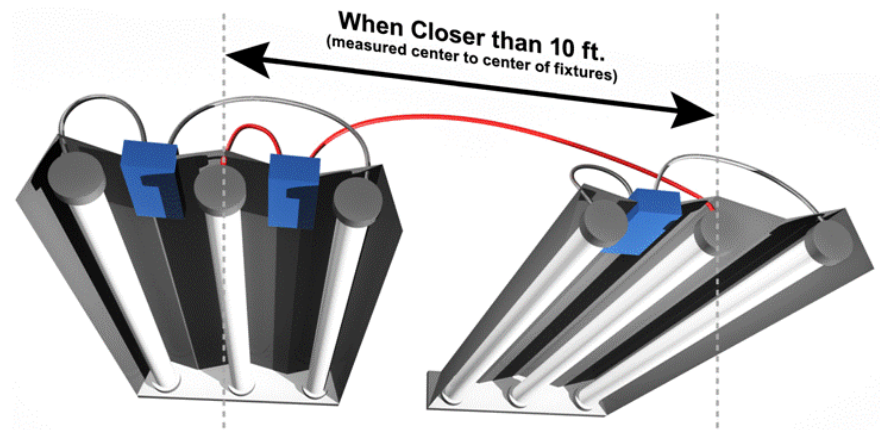
505.2.3 Sleeping Unit Controls

- Master switch at main entry that controls all permanently wired luminaires and switched receptacles (bathroom exempt)

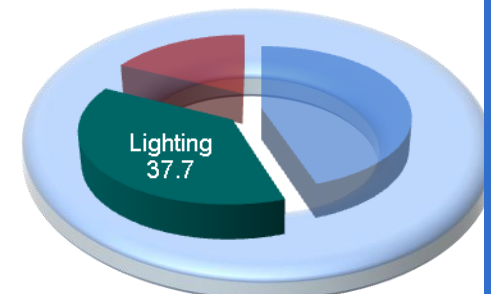
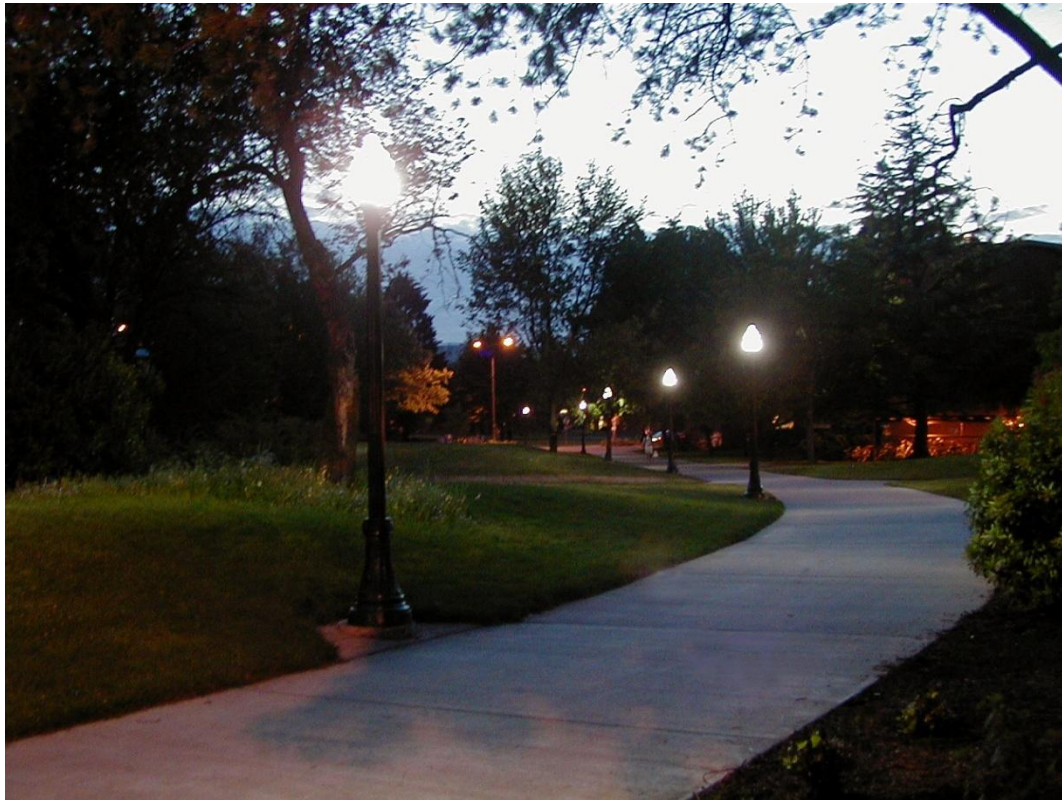


505.3 Tandem Wiring (mandatory)

- Fluorescent luminaires with 1 or 3 lamps within 10 ft of each other
- *Exceptions*
 - Electronically ballasted fixtures
 - Luminaires on emergency circuits
 - Where no available pair exists



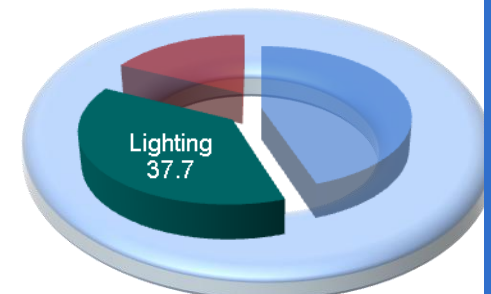
EXTERIOR LIGHTING



Exterior Lighting

- No incandescent or mercury vapor lighting sources shall be used for exterior lighting (2007)
- No incandescent or mercury vapor lighting sources shall be used for exterior building lighting (2010)
- Exception: *Incandescent luminaires < 150 watts on motion sensors*

Note: New MV luminaires banned 1/01/08



Exterior Lighting Zones

Lighting Zone	Description
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas
4	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority

Exterior Lighting Power Allowances

- **The total exterior lighting power allowance is the sum of the individual lighting power densities [LPD]....**
- **....plus an additional base allowance of 500 W - 1,300 W depending on lighting zone. Trade-offs are allowed only among “Tradable Surfaces” applications.**
- **Exemptions:**
 - **“Special signage” and transportation directional lighting**
 - **Advertising signage**
 - **Lighting integral to equipment installed by manufacturer**
 - **Theatrical and production lighting**



The image features the words "THANK YOU" in a large, 3D, blue, sans-serif font. The letters are rendered with a slight perspective, giving them a three-dimensional appearance. They are set against a solid black rectangular background. The lighting on the letters creates highlights and shadows, emphasizing their depth. The overall composition is clean and modern.

Alan Seymour

Reid Hart

Glenn Hansen

Mike Rosenberg

Greg Hansen

2010 OEESC

The 2010 OEESC has been adopted and takes effect on July 1, 2010. There is a grace period in place from July 1 to September 30, 2010. During the grace period the builder/owner can elect to use either the 2007 OSSC Chapter 13 or the 2010 OEESC.

Other Classes Available

Classes	Dates	Audience	Location
COMcheck for Jurisdictions	July 22 & 23 - OBOA Annual Business Meeting	Jurisdictions who will be receiving COMcheck forms	River House in Bend
BCD OEESC Web based Training	August 3 & 5	Those who could not come to one of the live BCD trainings	Online 10 a.m. to noon
Oregon Specific Web based Training for COMcheck Users	August 19	Anyone who will be using COMcheck for compliance reporting	Online 10 a.m. to noon

Future Questions

You can contact BCD with your OEESC questions. The following contact information is available in your workbook.

BCD's Green Building Services

Mark Heizer – mark.r.heizer@state.or.us
503-373-0205

COMcheck Information

WWW.EnergyCodes.gov

Find out more about COMcheck at this website. There is information about all the states participating in the COMcheck program . Plus there are tutorials to take that will help you learn to use the software.

Evaluations

Please detach the evaluation at the end of the workbook and fill it out.

You will receive a **certificate** when you turn the evaluation in to us.

Thank you for participating in this training on the Oregon Energy Efficiency Specialty Code.

The End