C405.2 Mandatory Lighting Controls – shall comply with one of the following:

**Lighting Controls Sections C405.2.1 through C405.2.5**

**Scope:** Lighting controls for interior and exterior. Alterations of greater than or equal to 50% of luminaire replacements or greater than 10% of new lighting system luminaires.

**Exceptions:** Lighting controls are not required in areas:

- Dwelling units
- Designated as security or emergency areas that require continued lighting
- Interior exit stairways, ramps and passageways
- Emergency egress lighting that is normally off

### Automatic off controls

<table>
<thead>
<tr>
<th><strong>C405.2.1</strong></th>
<th><strong>Occupy sensors controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|              | Auto off within 30 min (C405.2.1.1.1) | • Dwelling units  
• Designated as security or emergency areas that require continued lighting  
• Interior exit stairways  
• Interior exit ramps and passageways  
• Emergency egress lighting that is normally off |

<table>
<thead>
<tr>
<th><strong>C405.2.1.1</strong></th>
<th><strong>Manual or partial Auto ON</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|                | Manual or Auto ON to < 50% power | • Public corridors, stairways, restrooms, primary building entrance, lobbies  
• Where manual on would endanger the safety or security of occupants |

<table>
<thead>
<tr>
<th><strong>C405.2.1.2</strong></th>
<th><strong>Occupant sensors in warehouses</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|                | Automatically reduce power by > 50% when unoccupied  
• Independent aisle controls |

<table>
<thead>
<tr>
<th><strong>C405.2.2</strong></th>
<th><strong>Time-Switch controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|              | Requires manual override (C405.2.2.2)  
• Override for less than 2hrs  
• Override not larger than 5,000 sq ft |

<table>
<thead>
<tr>
<th><strong>C405.2.2.2</strong></th>
<th><strong>Manual Light-reduction controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manually reduce lighting uniformly &gt;50%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>C405.2.2.3</strong></th>
<th><strong>Manual controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|                | Occupants have ready access  
• Controlled lighting is visible |

### Manual controls

<table>
<thead>
<tr>
<th><strong>C405.2.3</strong></th>
<th><strong>Daylight responsive controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|              | Continuously dim lighting in offices, classrooms, laboratories, library reading rooms  
• All other spaces may use automatic dimming or ON / OFF control  
• Configured to completely shut off controlled lighting  
• Must have calibration access within the controlled space |

<table>
<thead>
<tr>
<th><strong>C405.2.4</strong></th>
<th><strong>Specific application controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Controlled separately from general lighting in the space</td>
<td></td>
</tr>
</tbody>
</table>

### Daylight responsive controls

<table>
<thead>
<tr>
<th><strong>C405.2.3</strong></th>
<th><strong>Daylight-responsive controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|              | Spaces where patient care is directly provided  
• Dwelling units and sleeping units  
• Specific application lighting (C405.2.4)  
• Sidelit zones on 1st floor above grade in Group A-2 and Group M occupancies |

<table>
<thead>
<tr>
<th><strong>C405.2.3.2</strong></th>
<th><strong>Spaces with &gt;150W of general lighting within primary daylight zone</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|                | All spaces where required by this code  
Choose between switching or dimming manual controls |

### Specific application controls

<table>
<thead>
<tr>
<th><strong>C405.2.4</strong></th>
<th><strong>Specific application controls</strong></th>
<th><strong>Primary exceptions:</strong></th>
</tr>
</thead>
</table>
|              | Controlled separately from general lighting in the space | • None  
• Display and accent  
• Lighting in display cases  
• Supplemental task lighting  
• Under cabinet / shelf lighting  
• Lighting equipment for sales  
• Lighting education or demonstration  
• Plant growth  
• Food warming |
C405.6.1 (ASHRAE 90.1, 8.4.2)
Automatic receptacle control
• At least 50% of receptacles and 25% of feeders to modular furniture shall auto off by either:
  • Time schedule <= 2hr override, control area <= 5,000 ft²
  • Occ sensor with 20 min off delay
  • Automated signal that shall auto off receptacles within 20 min

Primary exceptions:
• Equipment operating 24 / 7
• Where auto control would endanger safety or security

Required in:
• Private offices
• Print / copy rooms
• Individual workstations
• Conference rooms
• Break rooms
• Classrooms

Exterior lighting controls
C405.2.5
Exterior lighting controls
• Exterior lighting automatically turn off when daylight is present
• Façade or landscape lighting shall have automatic off controls based on dawn / dusk and a set open / close time
• All other lighting must be automatically reduced by >= 30% by:
  • No later than midnight to 6AM
  • 1hr after business close to 1hr before open
  • When unoccupied for 15 minutes
• Shall include exterior time-switch control functions

Primary exceptions:
• Emergency lighting that is normally off
• Lighting for health and safety
• Covered vehicle entrances
• Where required for safety, security or eye adaption

Required in:
• Parking lot
• Area lighting
• Site lighting

Additional efficiency options
C406.1
Additional efficiency packages
Comply with one or more of the following:
• More efficient HVAC (C406.2)
• Reduce lighting power density (C406.3)
  • Reduce lighting to 90% of Table C405.2.1(1)
• Enhanced Lighting Controls (C406.4)
• Onsite supply of renewable energy (C406.5)
• Dedicated outdoor air system (C406.6)
• High-efficiency water heating (C406.7)

C406.4
Enhanced digital lighting controls
• Luminaires shall be continuous dimming
• Luminaires shall be individually addressable
• Not more than four luminaires in a group allowed
• Not more than eight luminaires in a daylight zone
• Reconfigured by digital addressability
• Load shedding and individual user control in open offices
• Occupancy sensors shall be reconfigured digitally
• Construction documents include sequence of operations
• Functional testing (C408.3)

Functional testing
C408.3
Functional testing
A registered design professional must provide evidence that the lighting control system has been tested, calibrated, adjusted and is in proper working order with the construction documents.

Test requirements:
• Occupant sensor controls (C408.3.1.1)
• Time-switch controls (C408.3.1.2)
• Daylight responsive controls (C408.3.1.3)
• Documentation requirements (C408.3.2)


<table>
<thead>
<tr>
<th>C405.2.1</th>
<th>C405.2.1.1</th>
<th>C405.2.1.2</th>
<th>C405.2.2</th>
<th>C405.2.2.2</th>
<th>C405.2.2.3</th>
<th>C405.2.3</th>
<th>C405.2.4</th>
<th>C405.6.1</th>
<th>C405.2.5</th>
<th>C405.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLVP</td>
<td>Room Controller</td>
<td>WaveLinx</td>
<td>iLumin Plus</td>
<td>Fifth Light</td>
<td>LumaWatt Pro</td>
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</tbody>
</table>

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