

## IECC 2021 CODE SUMMARY

CODE SECTION	CODE REQUIREMENTS	SUMMARY
<p><b>General Lighting</b></p>	<p>Lighting system controls, the maximum lighting power for interior and exterior applications, and electrical energy consumption shall comply with this section. Sleeping units shall comply with Section C405.2.4 and with either Section C405.1.1 or C405.3.</p> <p><b>General lighting shall consist of all lighting included when calculating the total connect interior lighting power in accordance with Section C405.3.1, and which does not require specific application controls in accordance with Section C405.2.4.</b></p>	<p>With few exceptions, lighting controls systems (stand alone or networked) are required in all sized buildings in nearly all areas of the building.</p>
<p><b>Lighting Controls</b></p>	<p><b>Lighting systems shall be provided with controls that comply with one of the following.</b></p> <ol style="list-style-type: none"> <li>Lighting controls as specified in Sections C405.2.1 through C405.2.7.</li> <li>Luminaire level lighting controls (LLLC) and lighting controls as specified in Sections C405.2.1, C405.2.5 and C405.2.6. The LLLC luminaire shall be independently capable of:           <ul style="list-style-type: none"> <li>Monitoring occupant activity to brighten or dim lighting when occupied or unoccupied, respectively.</li> <li>Monitoring ambient light, both electric light and daylight, and brighten or dim artificial light to maintain desired light level.</li> <li>For each control strategy, configuration and reconfiguration of performance parameters including; bright and dim setpoints, timeouts, dimming fade rates, sensor sensitivity adjustments, and wireless zoning configurations.</li> </ul> </li> </ol> <p><i>Exceptions: Lighting controls are not required for the following:</i></p> <ol style="list-style-type: none"> <li>Areas designated as security or emergency areas that are required to be continuously lighted.</li> <li>Interior exit stairways, interior exit ramps and exit passageways</li> <li>Emergency egress lighting that is normally off.</li> </ol>	



<p><b>Occupant Sensor Controls</b></p>	<p><b>Occupant sensor controls shall be installed to control lights in the following space types:</b></p> <ol style="list-style-type: none"> <li>1. Classrooms/lecture/training rooms</li> <li>2. Conference/meeting/multipurpose rooms</li> <li>3. Copy/print rooms</li> <li>4. Lounges/Breakrooms</li> <li>5. Enclosed Offices</li> <li>6. Open plan office Areas</li> <li>7. Restrooms</li> <li>8. Storage rooms</li> <li>9. Locker rooms</li> <li>10. Corridors</li> <li>11. Warehouse storage areas</li> <li>12. Other spaces 300 square feet or less that are enclosed by floor-to-ceiling height partitions.</li> </ol>	<p>Areas that require occupancy sensor controls has expanded to include corridors in IECC 2021.</p>
<p><b>Occupant Sensor Control Function</b></p>	<p><b>Occupant sensor controls in warehouses shall comply with Section C405.2.1.2. Occupant sensor controls in open plan office areas shall comply with Section C405.2.1.3. Occupant sensor controls in corridors shall comply with Section C405.2.1.4. Occupant sensor controls for all other spaces specified in Section C405.2.1 shall comply with the following:</b></p> <ol style="list-style-type: none"> <li>1. They shall automatically turn off lights within 20 minutes after all occupants have left the space.</li> <li>2. They shall be manual on or controlled to automatically turn on the lighting to not more than 50 percent power.</li> <li>3. They shall incorporate a manual control to allow occupants to turn off lights.</li> </ol> <p><i>Exception: Full automatic-on with no manual control shall be permitted in corridors, interior parking areas, stairways, restrooms, locker rooms, lobbies, library stacks and areas where manual operation would endanger occupancy safety or security.</i></p>	<p>Within the required space types, occupancy sensor controls shall have manual on/vacancy function unless an exception is met for full power automatic-on in certain areas. The auto turn-off timing has also changed from 30 min to 20 min for further energy conservation.</p>
<p><b>Occupant Sensor Control Function: Warehouses</b></p>	<p><b>Lighting in warehouse storage areas shall be controlled as follows:</b></p> <ol style="list-style-type: none"> <li>1. Lighting in each aisleway shall be controlled independently of lighting in all other aisleways and open areas.</li> <li>2. Occupancy sensors shall automatically reduce lighting power within each controlled area to an occupied setpoint of not more than 50 percent within 20 minutes after all occupants have left the controlled area.</li> <li>3. Lights that are not turned off by occupant sensors shall be turned off by time-switch control complying with Section C405.2.2.1.</li> <li>4. A manual control shall be provided to allow occupants to turn off lights in the space.</li> </ol>	<p>Warehouses must use occupancy sensors with a partial-off function that reduces lighting to 50% when aisleways or open areas are not in use. A local switch is now also required for occupant control.</p>
<p><b>Occupant Sensor Control Function: Open Office Spaces</b></p>	<p><b>Occupant sensor controls in open plan office spaces less than 300 square feet (28 m2) in area shall comply with Section C405.2.1.1 Occupant sensor controls in all other open plan office spaces shall comply with all of the following:</b></p> <ol style="list-style-type: none"> <li>1. The controls shall be configured so that general lighting can be controlled separately in control zones with floor areas not greater than 600 square feet (55 m2) within the open plan office space.</li> <li>2. General lighting in each control zone shall be permitted to automatically turn on upon occupancy within the control zone. General lighting in other unoccupied zones within the open plan office space shall be permitted to turn on not more than 20 percent of full power or remain unaffected.</li> <li>3. The controls shall automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space.</li> </ol> <p><i>Exception: Where general lighting is turned off by time-switch control complying with Section C405.2.2.1.</i></p> <ol style="list-style-type: none"> <li>4. General lighting in each control zone shall turn off or uniformly reduce lighting power to an unoccupied setpoint of not more than 20 percent of full power within 20 minutes after all occupants have left the control zone.</li> </ol>	<p>When and occupant enters a lighting control zone within an open office space (larger than 300sqft) other unoccupied lighting zones may only turn on to no more than 20% power. Once all occupants have left all control zones, all general lighting shall turn off after 20 min. Lighting control zones cannot exceed 600sqft.</p>
<p><b>Occupant Sensor Control Function: Corridors</b></p>	<p>Occupant sensor controls in corridors shall uniformly reduce lighting power to not more than 50 percent of full power within 20 minutes after all occupants have left the space.</p> <p><i>Exception: Corridors provided with less than two footcandles of illumination on the floor at the darkest point with all lights on.</i></p>	<p>Corridors now require occupancy sensors that reduce lighting to 50% power or less when unoccupied for 20 min.</p>

<p><b>Time Switch Controls</b></p>	<p>Each area of the building that is not provided with occupant sensor controls complying with Section C405.2.1.1 shall be provided with time-switch controls complying with Section C405.2.2.1.</p> <p><i>Exceptions:</i></p> <ol style="list-style-type: none"> <li>1. Luminaires that are required to have specific application controls In accordance with Section C405.2.4.</li> <li>2. Spaces where patient care is directly provided.</li> <li>3. Spaces where an automatic shutoff would endanger occupant safety or security.</li> <li>4. Lighting intended for continuous operation.</li> <li>5. Shop and laboratory classrooms.</li> </ol>	<p>With few exceptions, any areas that are not covered by use of occupancy controls will need to include time-based controls to turn off lights when a space is scheduled to be unoccupied.</p>
<p><b>Time Switch Control Function</b></p>	<p><b>Time-switch controls shall comply with all of the following:</b></p> <ol style="list-style-type: none"> <li>1. Automatically turn off lights when the space is scheduled to be unoccupied.</li> <li>2. Have a minimum 7-day clock.</li> <li>3. Be capable of being set for seven different day types per week.</li> <li>4. Incorporate an automatic holiday “shutoff” feature, which turns off all controlled lighting loads for not fewer than 24 hours and then resumes normally scheduled operations.</li> <li>5. Have program backup capabilities, which prevent the loss of program and time settings for not fewer than 10 hours if power is interrupted.</li> <li>6. Include an override switch that complies with the following: <ul style="list-style-type: none"> <li>• 6.1. The override switch shall be a manual control.</li> <li>• 6.2. The override switch, when initiated, shall permit the controlled lighting to remain on for not more than 2 hours.</li> <li>• 6.3. Any individual override switch shall control the lighting for an area not larger than 5,000 square feet</li> </ul> </li> </ol> <p><i>Exceptions: Within mall concourses, auditoriums, sales areas, manufacturing facilities and sports arenas:</i></p> <ol style="list-style-type: none"> <li>1. The time limit shall be permitted to be greater than 2 hours, provided that the switch is a captive key device.</li> <li>2. The area controlled by the override switch shall not be limited to 5,000 square feet (465 m2) provided that such area is less than 20,000 square feet (1860 m2).</li> </ol>	<p>Time switch controls must include manual override (with a 2-hour max override limit), have the capability of scheduling 7 different day types per week, have a holiday “shutoff” feature, and control an area no larger than 5,000sqft.</p>
<p><b>Light Reduction Controls</b></p>	<p>Where not provided with occupant sensor controls complying with Section C405.2.1.1, general lighting shall be provided with light-reduction controls complying with Section C405.2.3.1</p> <p><i>Exceptions:</i></p> <ol style="list-style-type: none"> <li>1. Luminaires controlled by daylight responsive controls complying with Section C405.2.4.</li> <li>2. Luminaires controlled by special application controls complying with Section C405.2.5.</li> <li>3. Where provided with manual control, the following areas are not required to have light-reduction control: <ul style="list-style-type: none"> <li>• 3.1. Spaces that have only one luminaire with a rated power of less than 60 watts.</li> <li>• 3.2. Spaces that use less than 0.45 watts per square foot (4.9 W/m2).</li> <li>• 3.3. Corridors, lobbies, electrical rooms and/or mechanical rooms.</li> </ul> </li> </ol>	<p>Areas that are not covered by use of occupancy sensor or time switch controls, shall be provided with light-reduction controls.</p>
<p><b>Light Reduction Control Function</b></p>	<p><b>Spaces required to have light-reduction controls shall have a manual control that allows the occupant to reduce the connected lighting load by not less than 50 percent in a reasonably uniform illumination pattern with an intermediate step in addition to full on or off, or with continuous dimming control, using one of the following or another approved method:</b></p> <ol style="list-style-type: none"> <li>1. Continuous dimming of all luminaires from full output to less than 20 percent of full power.</li> <li>2. Switching all luminaries to a reduced output of not less than 30 percent and not more than 70 percent of full power.</li> <li>3. Switching alternate luminaires or alternate rows of luminaires to achieve a reduced output of not less than 30 percent and not more than 70 percent of full power.</li> </ol>	<p>Light reduction can be achieved by dimming, lamp switching, or fixture control as it is executed in a reasonably uniform illumination pattern.</p>

<p style="text-align: center;"><b>Daylight Responsive Controls</b></p>	<p><b>Daylight-responsive controls complying with Section C405.2.3.1 shall be provided to control the electric lights within daylight zones in the following spaces:</b></p> <ol style="list-style-type: none"> <li>1. Spaces with a total of more than 150 watts of general lighting within the primary sidelit daylight zones complying with Section C405.2.3.2.</li> <li>2. Spaces with a total of more than 300 watts of general lighting within sidelit daylight zones complying with Section C405.2.3.3.</li> <li>3. Spaces with a total of more than 150 watts of general lighting within toplit daylight zones complying with Section C405.2.4.3.</li> </ol> <p><i>Exceptions: Daylight responsive controls are not required for the following:</i></p> <ol style="list-style-type: none"> <li>1. Spaces in health care facilities where patient care is directly provided.</li> <li>2. Sidelit zones on the first floor above grade in Group A-2 and Group M occupancies. (this means restaurants and retail)</li> <li>3. New buildings where the total connected lighting power calculated in accordance with Section C405.3.1 is not greater than the adjusted interior lighting power allowance (LPAadj) calculated in accordance with Equation 4-9.</li> </ol>	<p>Daylight-responsive controls are required within spaces with more than 150 watts of general lighting located within sidelit and toplit daylight zones. The secondary sidelit daylight zone has been added to IECC 2021.</p>
<p style="text-align: center;"><b>LPAadj Equation</b></p>	<p><b>Equation 4-9:</b></p> $\text{LPAadj} = [\text{LPAnorm} \times (1.0 - .4 \times \text{UDZFA/TBFA})]$ <ul style="list-style-type: none"> <li>• <b>LPAadj</b> - Adjusted building interior lighting power allowance in watts.</li> <li>• <b>LPAnorm</b> - Normal building lighting power allowance in watts calculated in accordance with Section C405.3.2 and reduced in accordance with Section C406.3 where Option 2 of Section C406.1 is used to comply with the requirements of Section C406.</li> <li>• <b>UDZFA</b> - Uncontrolled daylight zone floor area is the sum of all sidelit and toplit zones, calculated in accordance with Sections C405.2.4.2 and C405.2.4.3, that do not have daylight responsive controls.</li> <li>• <b>TBFA</b> - Total building floor area is the sum of all floor areas included in the lighting power allowance calculation in Section C405.3.2.</li> </ul>	<p>An exception may be made for new buildings where the total connected lighting power is less than the adjusted interior lighting power allowance. This can be calculated using the following equation.</p>
<p style="text-align: center;"><b>Daylight Responsive Control Function</b></p>	<p><b>Where required, daylight-responsive controls shall be provided within each space for control of lights in that space and shall comply with all of the following:</b></p> <ol style="list-style-type: none"> <li>1. Lights in toplit daylight zones in accordance with Section C405.2.4.3 shall be controlled independently of lights in sidelit daylight zones in accordance with Section C405.2.4.2.</li> <li>2. Lights in primary sidelit daylight zone shall be controlled independently of lights in the secondary sidelit daylight zone.</li> <li>3. Daylight responsive controls within each space shall be configured so that they can be calibrated from within that space by authorized personnel.</li> <li>4. Calibration mechanisms shall be in a location with ready access.</li> <li>5. Daylight responsive controls shall dim lights continuously from full light output to 15 percent of full light output or lower. (all areas – not just offices, classrooms, laboratories and library reading rooms)</li> <li>6. Daylight responsive controls shall be capable of a complete shutoff of all controlled lights.</li> <li>7. When occupant sensor controls have reduced the lighting power to an unoccupied setpoint in accordance with Sections C405.2.1.2 through C405.2.1.4., daylight responsive controls shall continue to adjust electric light levels in response to available daylight, but shall be configured to not increase the lighting power above the specified unoccupied setpoint.</li> <li>8. Lights in sidelit daylight zones in accordance with Section C405.2.4.2 facing different cardinal orientations [within 45 degrees (0.79 rad) of due north, east, south, west] shall be controlled independently of each other.</li> </ol>	<p>Lighting must be independently controlled within each type of daylight zone (primary, secondary, and toplit) to 15% of full light output or lower. During daylight hours, controls must be capable of continuous dimming to complete shutoff when target illuminance is met.</p>

## Sidelit Daylight Zone

The sidelit daylight zone is the floor area adjacent to vertical fenestration that complies with all of the following:

1. Where the fenestration is located in a wall, the sidelit daylight zone shall extend laterally to the nearest full-height wall, or up to 1.0 times the height from the floor to the top of the fenestration, and longitudinally from the edge of the fenestration to the nearest full-height wall, or up to 0.5 times the height from the floor to the top of the fenestration, whichever is less, as indicated in Figure C405.2.4.2(1).
2. Where the fenestration is located in a rooftop monitor, the sidelit daylight zone shall extend laterally to the nearest obstruction that is taller than 0.7 times the ceiling height, or up to 1.0 times the height from the floor to the bottom of the fenestration, whichever is less, and longitudinally from the edge of the fenestration to the nearest obstruction that is taller than 0.7 times the ceiling height, or up to 0.25 times the height from the floor to the bottom of the fenestration, whichever is less, as indicated in Figures C405.2.4.2(2) and C405.2.4.2(3).
3. The secondary sidelit daylight zone is directly adjacent to the primary sidelit daylight zone and shall extend laterally to 2.0 times the height from the floor to the top of the fenestration or to the nearest full height wall, whichever is less, and longitudinally from the edge of the fenestration to the nearest full height wall, or up to 2 feet, whichever is less, as indicated in Figure C405.2.4.2(1). The area of secondary sidelit zones shall not be considered in the calculation of the daylight zones in Section C402.4.1.1.
4. The area of the fenestration is not less than 24 square feet (2.23 m<sup>2</sup>).
5. The distance from the fenestration to any building or geological formation that would block access to daylight is greater than one-half of the height from the bottom of the fenestration to the top of the building or geologic formation.
6. The visible transmittance of the fenestration is not less than 0.20.
7. The projection factor (determined in accordance with Equation 4-5) for any overhanging projection that is shading the fenestration is not greater than 1.0 for fenestration oriented 45 degrees or less from true north and not greater than 1.5 for all other orientations.

For fenestrations with an area larger than 24 square feet and a visible transmittance of no less than 0.20, a sidelit daylight zone may be required. In order to find the daylight zone, first find the height from the floor to the top of a fenestration. The primary daylight zone is defined as 0.5 times the height on either side of the fenestration and extends to 1.0 times the height laterally. The secondary daylight zone is directly adjacent to the primary zone and extends to 2.0 times the height laterally.

## Primary, Secondary, and Toplit Daylight Zones

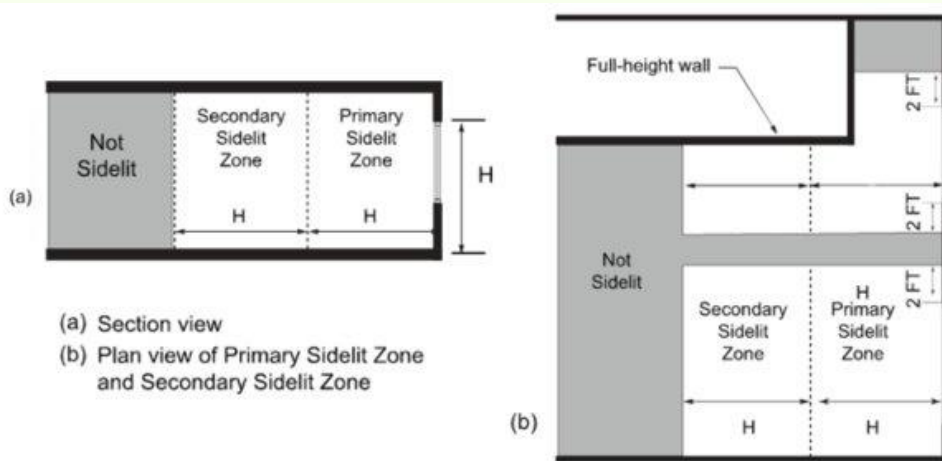
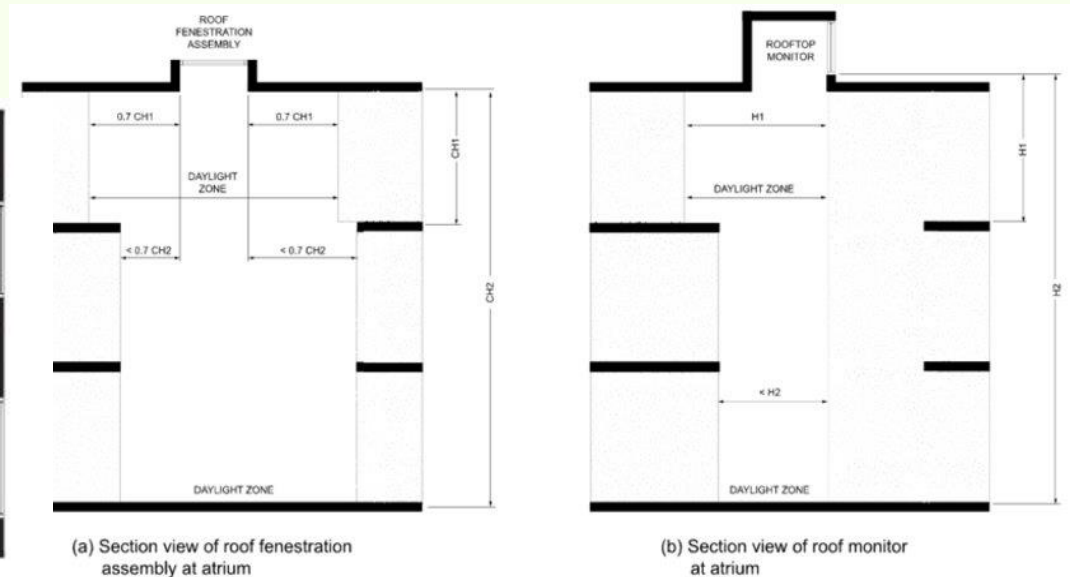


FIGURE C405.2.4.2(1)  
PRIMARY AND SECONDARY SIDELIT DAYLIGHT ZONES



C405.2.4.4  
DAYLIGHT ZONES AT A MULTISTORY ATRIUM

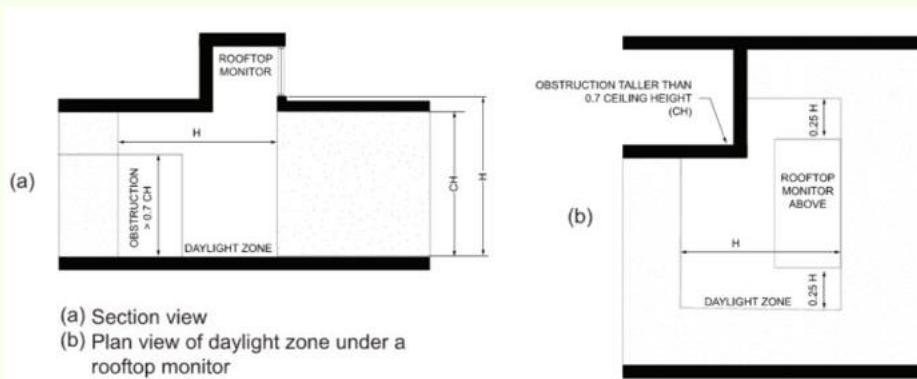


FIGURE C405.2.4.2(2)  
DAYLIGHT ZONE UNDER A ROOFTOP MONITOR

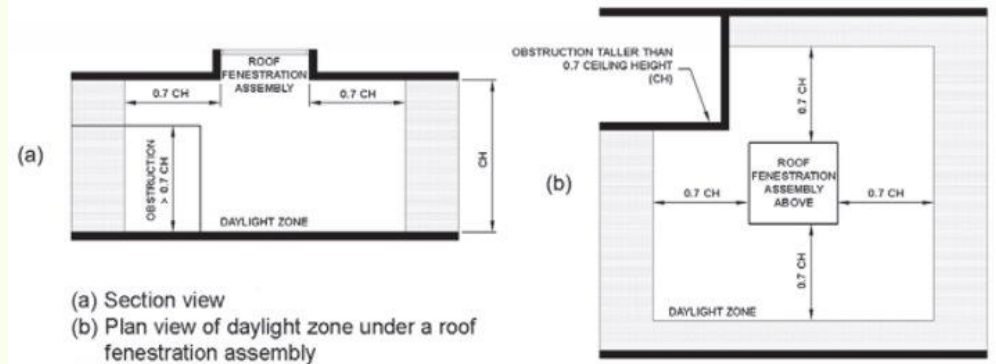


FIGURE C405.2.3.3(1)  
TOPLIT ZONE

### Specific Application Controls

#### Specific application controls shall be provided for the following:

1. The following lighting shall be controlled by an occupant sensor complying with Section C405.2.1.1 or a time-switch control complying with Section C405.2.2.1. In addition, a manual control shall be provided to control such lighting separately from the general lighting in the space:
  - 1.2 Luminaires for which additional lighting power is claimed in accordance with Section C405.3.2.2.1.
  - 1.2. Display and accent.
  - 1.3. Lighting in display cases.
  - 1.4. Supplemental task lighting, including permanently installed under shelf or under-cabinet lighting.
  - 1.5. Lighting equipment that is for sale or demonstration in lighting education.
  - 1.6. Display lighting for exhibits in galleries, museums and monuments that is in addition to general lighting.
2. Sleeping units shall have control devices or systems that are configured to automatically switch off all permanently installed luminaires and switched receptacles within 20 minutes after all occupants have left the unit.

#### Exceptions:

1. Lighting and switched receptacles controlled by card key controls.
2. Spaces where patient care is directly provided.
3. Permanently installed luminaires within dwelling units shall be provided with controls complying with Section C405.2.1.1 (occupant sensor) or C405.2.3.1 (light-reduction control function).
4. Lighting for nonvisual applications, such as plant growth and food warming, shall be controlled by a time switch control complying with Section C405.2.2.1 that is independent of the controls for other lighting within the room or space.
5. Task lighting for medical and dental.

Further lighting controls may be required for the supplemental lighting in these specific areas. These listed applications shall be controlled by an occupant sensor or time-switch control as well as a manual control that is separate from the general lighting in the space.

### Manual Controls

#### Where required by this code, manual controls for lights shall comply with the following:

1. They shall be in a location with ready access to occupants.
2. They shall be located where the controlled lights are visible or shall identify the area served by the lights and indicate their status.

In most applications, an accessible local switch must be installed so occupants may turn off lighting when not in use.

<p><b>Exterior Lighting Controls</b></p>	<p><b>Exterior lighting systems shall be provided with controls that comply with Sections C405.2.7.1 through C405.2.7.4.</b></p> <p>C405.2.7.1 Daylight shutoff. Lights shall be automatically turned off when daylight is present and satisfies the lighting needs. C405.2.7.2 Building façade and landscape lighting (previously labeled Decorative Lighting). Building façade and landscape lighting shall automatically shut off from not later than 1 hour after business closing to not earlier than 1 hour before business opening. C405.2.7.3 Lighting setback. <b>Lighting that is not controlled in accordance with Section C405.2.7.2 shall comply with the following:</b></p> <ol style="list-style-type: none"> <li>1. Be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent by selectively switching off or dimming luminaires at one of the following time. <ul style="list-style-type: none"> <li>• 1.1 From not later than midnight to not earlier than 6am.</li> <li>• 1.2 From not later than one hour after business opening to not earlier than one hour before business opening.</li> <li>• 1.3 During any time where activity has not been detected for 15 minutes or more.</li> </ul> </li> <li>2. Luminaires serving outdoor parking areas and having a rated input wattage of greater than 78 watts and a mounting height of 24 feet (7315 mm) or less above the ground shall be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent during any time where activity has not been detected for 15 minutes or more. Not more than 1,500 watts of lighting power shall be controlled together.</li> </ol> <p><i>Exceptions:</i></p> <ol style="list-style-type: none"> <li>1. Lighting for covered vehicle entrances and exits from buildings and parking structures where required for eye adaptation.</li> <li>2. Lighting controlled from within dwelling units.</li> </ol>	<p>Exterior lighting must be capable of daylight shutoff by use of time clock and photosensor from no later than 1 hour after business closing and no earlier than 1 hour before business opening. All other lighting must be capable of scheduled turn off or occupancy detection. Outdoor parking areas with an input wattage of 78w or more and 24ft above ground require occupancy controls to reduce lighting to 50% when activity is detected for 15 minutes.</p>
<p><b>Exterior Lighting Control Function</b></p>	<p><b>Time-switch controls for exterior lighting shall comply with the following:</b></p> <ol style="list-style-type: none"> <li>1. They shall have a clock capable of being programmed for not fewer than 7 days.</li> <li>2. They shall be capable of being set for seven different day types per week.</li> <li>3. They shall incorporate an automatic holiday setback feature.</li> <li>4. They shall have program backup capabilities that prevent the loss of program and time settings for a period of not less than 10 hours in the event that power is interrupted.</li> </ol>	<p>Exterior time-switch controls must be capable of 7 uniquely programmable days that can be run on a weekly basis, a holiday setback feature, and program backup capabilities to prevent loss of settings.</p>
<p><b>Parking Garage Lighting Controls</b></p>	<p><b>Parking garage lighting controls shall be controlled by an occupant sensor complying with Section C405.2.1.1 or a time-switch control complying with Section C405.2.2.1. Additional lighting controls shall be provided as follows:</b></p> <ol style="list-style-type: none"> <li>1. Lighting power of each luminaire shall be automatically reduced by not less than 30 percent when there is no activity detected within a lighting zone for 20 minutes. Lighting zones for this requirement shall not be larger than 3,600 square feet (334.5m<sup>2</sup>). <ul style="list-style-type: none"> <li>• <i>Exception: Lighting zones provided with less than 1.5 footcandles of illumination on the floor at the darkest point with all lights on are not required to have automatic light-reduction controls.</i></li> </ul> </li> <li>2. Where lighting for eye adaptation is provided at covered vehicle entrances and exits from building and parking structures, such lighting shall be separately controlled by a device that automatically reduces lighting power by at least 50 percent from sunset to sunrise.</li> <li>3. The power to luminaires within 20 feet (6096 mm) of perimeter wall openings shall automatically reduce in response to daylight by at least 50 percent.</li> </ol> <p><i>Exceptions:</i></p> <ol style="list-style-type: none"> <li>1. Where the opening-to-wall ratio is less than 40% as viewed from the interior and encompassing the vertical distance from the driving surface to the lowest structural element.</li> <li>2. Where the distance from the opening to any exterior daylight blocking obstruction is less than one-half the height from the bottom of the opening or fenestration to the top of the obstruction.</li> <li>3. Where openings are obstructed by permanent screens or architectural elements restricting daylight entering the interior space.</li> </ol>	<p>Parking garage lighting shall be controlled by occupancy sensors or time-switch control. Additional requirements include reducing power to no less than 30% when no activity is detected in a lighting zone (20 min), reducing eye adaptation lighting to 50% at entrances/exits from sunset to sunrise, and reducing lighting within 20ft of perimeter walls in response to daylight by 50%.</p>

<p><b>Automatic Receptacle Controls</b></p>	<p>The following shall have automatic receptacle control complying with Section C405.11.1:</p> <ol style="list-style-type: none"> <li>1. At least 50 percent of all 125V, 15- and 20-amp receptacles installed in enclosed offices, conference rooms, rooms used primarily for copy or print functions, breakrooms, classrooms and individual workstations, including those installed in modular partitions and module office workstation systems.</li> <li>2. At least 25 percent of branch circuit feeders installed for modular furniture not shown on the construction documents.</li> </ol>	<p>IECC 2021 now requires automatic shut off of 50% of all receptacles in the following specified areas for further energy savings.</p>
<p><b>Automatic Receptacle Control Function</b></p>	<p>Automatic receptacle controls shall comply with the following:</p> <ol style="list-style-type: none"> <li>1. Either split controlled receptacles shall be provided with the top receptacle controlled, or a controlled receptacle shall be located within 12 inches (304.8mm) of each uncontrolled receptacle.</li> <li>2. One of the following methods shall be used to provide control: <ul style="list-style-type: none"> <li>• 2.1. A scheduled basis using a time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. The control device shall be configured to provide an independent schedule for each portion of the building of not more than 5,000 square feet (464.5m<sup>2</sup>) and not more than one floor. The occupant shall be able to manually override an area for not more than 2 hours. Any individual override switch shall control the receptacles of not more than 5,000 feet (1524 m).</li> <li>• 2.2 An occupant sensor control that shall turn off receptacles within 20 minutes of all occupants leaving a space.</li> <li>• 2.3 An automated signal from another control or alarm system shall turn off receptacles within 20 minutes after determining that the area is unoccupied.</li> </ul> </li> <li>3. All controlled receptacles shall be permanently marked in accordance with NFPA 70 and be uniformly distributed throughout the space.</li> <li>4. Plug-in devices shall not comply.</li> </ol> <p><i>Exceptions: Automatic receptacle controls are not required for the following:</i></p> <ol style="list-style-type: none"> <li>1. Receptacles specifically designated for equipment requiring continuous operation (24 hours per day, 365 days per year)</li> <li>2. Spaces where an automatic control would endanger the safety or security of the room or building occupants.</li> <li>3. Within a single modular office workstation, noncontrolled receptacles are permitted to be located more than 12 inches (304.8mm), but no more than 72 inches (1828mm) from the controlled receptacles serving that workstation.</li> </ol>	<p>Receptacle turn-off shall be controlled by time-switch in relation to business hours or occupancy sensor (20 min.). Split controlled receptacles are permitted with the top receptacle controlled or a controlled receptacle shall be located withing 12 in. of an uncontrolled receptacle.</p>



**Additional Efficiency Requirements**

New Buildings shall achieve a total of 10 credits from Tables C406.1(5) where the table is selected based on the use group of the building and from credit calculations as specified in relevant subsections of Section C406. Where a building contains multiple-use groups, credits from each use group shall be weighted by floor are of each group to determine the weighted average building credit. **Credits from the tables or calculation shall be achieved where a building complies with one or more of the following:**

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.
7. Enhanced envelope performance in accordance with Section C406.8.
8. Reduced air infiltration in accordance with Section C406.9.
9. Where not required by Section C405.12, include an energy monitoring system in accordance with Section C406.10.
10. Where not required by Section C403.2.3, include a fault detection and diagnostics (FDD) system in accordance with Section C406.11.
11. Efficient kitchen equipment in accordance with Section C406.12.

**Additional Efficiency Requirements: Tenant Spaces**

Tenant spaces shall comply with sufficient options from tables C406.1(1) through C406.1(5) to achieve a minimum number of (5) credits, where credits are selected from Section C406.2, C406.3, C406.4, C406.6, C406.7 or C406.10. Where the entire building complies using credits from Section C406.5, C406.8 or C406.9, tenant spaces shall be deemed to comply with this section.  
*Exception: Previously occupied tenant spaces that comply with this code in accordance with Section C501.*

**TABLE C406.1(5)  
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR OTHER\* OCCUPANCIES**

SECTION	CLIMATE ZONE																
	0A & 1A	0B & 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
C406.2.1: 5% heating efficiency improvement	NA	NA	NA	NA	1	1	1	1	1	2	1	2	1	2	2	3	3
C406.2.2: 5% cooling efficiency improvement	5	5	4	4	3	3	2	2	2	1	1	2	1	1	1	1	1
C406.2.3: 10% heating efficiency improvement	NA	NA	NA	1	1	1	1	2	2	3	3	3	3	4	3	5	5
C406.2.4: 10% cooling efficiency improvement	8	9	8	7	5	5	3	4	4	2	2	3	2	2	2	2	2
C406.3: Reduced lighting power	8	8	9	9	9	9	10	8	9	9	7	8	8	8	8	8	7
C406.4: Enhanced digital lighting controls	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	1
C406.5: On-site renewable energy	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7
C406.6: Dedicated outdoor air system	3	4	3	3	4	3	2	5	3	3	5	4	3	7	5	7	6
C406.7.2: Recovered or renewable water heating <sup>b</sup>	10	9	11	10	13	12	15	14	14	15	14	14	16	14	15	15	15
C406.7.3: Efficient fossil fuel water heater <sup>b</sup>	5	5	6	6	8	7	8	8	8	9	9	9	10	10	9	10	11
C406.7.4: Heat pump water heater <sup>b</sup>	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
C406.8: Enhanced envelope performance	3	6	3	4	3	4	1	5	4	3	5	5	4	7	6	9	10
C406.9: Reduced air infiltration	3	2	2	4	4	2	NA	6	2	2	6	4	1	10	5	7	4
C406.10: Energy monitoring	3	3	3	3	3	3	3	3	3	3	2	3	2	2	2	3	2
C406.11: Fault detection and diagnostics system	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1

NA = Not Applicable.

a. Other occupancy groups include all groups except Groups B, E, I, M and R.

b. For occupancy groups listed in Section C406.7.1.

## Enhanced Digital Lighting Controls

Interior general lighting in the building shall have the following enhanced lighting controls that shall be located, scheduled and operated in accordance with Sections C405.2.1 through C405.2.3.

1. Luminaires shall be configured for continuous dimming.
2. Luminaires shall be addressed individually. Where individual addressability is not available for the luminaire class type, a controlled group of not more than four luminaires shall be allowed.
3. Not more than eight luminaires shall be controlled together in a daylight zone.
4. Fixtures shall be controlled through a digital control system that includes the following function:
  - 4.1 Control reconfiguration based on digital addressability.
  - 4.2 Load shedding.
  - 4.3 Occupancy sensors shall be capable of being reconfigured through the digital control system.(Individual user control of overhead general illumination in open office – REMOVED)
5. Construction documents shall include a submittal of a Sequence of Operations, including a specification outlining each of the functions in Item 4.
6. Functional test of lighting controls shall comply with Section C408.

Interior general lighting must be scheduled and operated by an enhanced digital control system that is capable of control reconfiguration, load shedding, and digital addressability. Luminaires shall be addressed individually or no more than 4 when addressability is not available for fixture type. No more than 8 luminaires shall be controlled together within a daylight zone. Construction documents shall include a Sequence of Operations that include the functionality of controlled luminaires.

## Residential Electrical Power and Lighting Systems

R404.1 Lighting Equipment. All permanently installed lighting fixtures, excluding kitchen appliance lighting fixtures, shall contain only high-efficiency lighting sources.

R401.1. Exterior lighting. Connected exterior lighting for residential buildings shall comply with Section C405.4.

*Exceptions:*

1. *Detached one- and two- family dwellings*
2. *Townhouses*
3. *Solar-powered lamps not connected to any electrical service.*
4. *Luminaires controlled by a motion sensor.*
5. *Lamps and luminaires that comply with Section R404.1*

R401.2. Fuel gas lighting equipment. Fuel gas lighting systems shall not have continuously burning pilot lights.

R404.2 Interior lighting controls. Permanently installed lighting fixtures shall be controlled with either a dimmer, an occupant sensor control or other control that is installed or built into the fixture.

*Exception: Lighting controls shall not be required for the following:*

1. *Bathrooms*
2. *Hallways*
3. *Exterior lighting fixtures.*
4. *Lighting designed for safety or security.*

R404.3 Exterior lighting controls. Where the total permanently installed exterior lighting power is greater than 30 watts, the permanently installed exterior lighting shall comply with the following:

1. Lighting shall be controlled by a manual on and off switch which permits automatic shut-off actions.
  - *Exception: Lighting serving multiple dwelling units.*
2. Lighting shall be automatically shut off when daylight is present and satisfies the lighting needs.
3. Controls that override automatic shut-off actions shall not be allowed unless the override automatically returns automatic control to its normal operation within 24 hours.

In residential buildings, lighting controls may be required for interior and exterior applications. On the interior, permanent lighting must be controlled by a dimmer, occupant sensor, or other form of control that is installed or built into the fixture with some exceptions. For exterior lighting that is over 30 watts and is not serving multiple dwelling units, a manual switch and an automatic shut-off function must be implemented.