

STEP ONE Determine if Lighting Controls are required

Do any of the following criteria apply?

- 1) Is the area designated as security or emergency, requiring continuous light?
- 2) Is the area an interior exit stairway, ramp, or passageway?
- 3) Is the lighting emergency egress lighting that is normally off?

YES → Lighting control is not required

NO → Lighting controls are required
Continue to Step 2

STEP TWO Specific Applications

Display, Accent, Display Case, Supplemental Task Lighting, Lighting for Sale or Demonstration, Displays in Gallery Exhibits	YES →	Continue to Step 4 OR 5A Provide separate *Manual Control from general lighting
Sleeping Units (Except Patient Care)	YES →	Provide master control device that is capable of automatically switching off all installed luminaires within 20 minutes after all occupants leave the room
Dwelling Units	YES →	Provide lamp efficacy >65 lm/w or luminaire efficacy >45 lm/w OR continue to Step 4 OR 5B
Non-Visual (Grow-Lights & Food Warming)	YES →	Continue to Step 5A Provide separate *Manual Control from general lighting
Medical/Dental Task Lighting	YES →	Provide manual control
Parking Garages	YES →	Continue to Step 8

NO → Continue to Step 3

STEP THREE OPTION 1 Determine Lighting Control requirements

Do any of the following criteria apply?

Classroom	Lounge	Storage Room
Lecture Room	Corridors	Locker Room
Training Room	Breakrooms	Open Plan Office Areas
Conference Room	Enclosed Office	Enclosed (F-T-C) room < 300sf
Meeting Room	Copy/Print Room	Warehouse Storage Areas
Multipurpose Room	Restroom	

YES → Occupant sensor controls are required
Continue to Step 4

NO → Lighting controls are required
Continue to Step 5

STEP THREE OPTION 2 Provide Luminaire Level Lighting Controls

Specify integrated luminaire controls which comply with the following:

- 1) Monitor occupant activity to brighten or dim lighting when occupied or unoccupied
- 2) Monitor and maintain desired light level by dimming electric lighting
- 3) Provide configurable occupancy and daylight strategies for setpoints, timeouts, fade rates, sensitivity and zoning

Additional controls not required

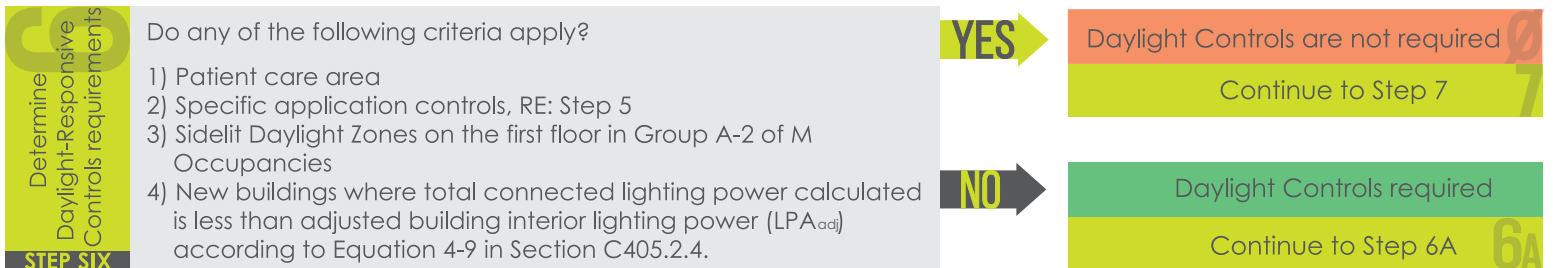
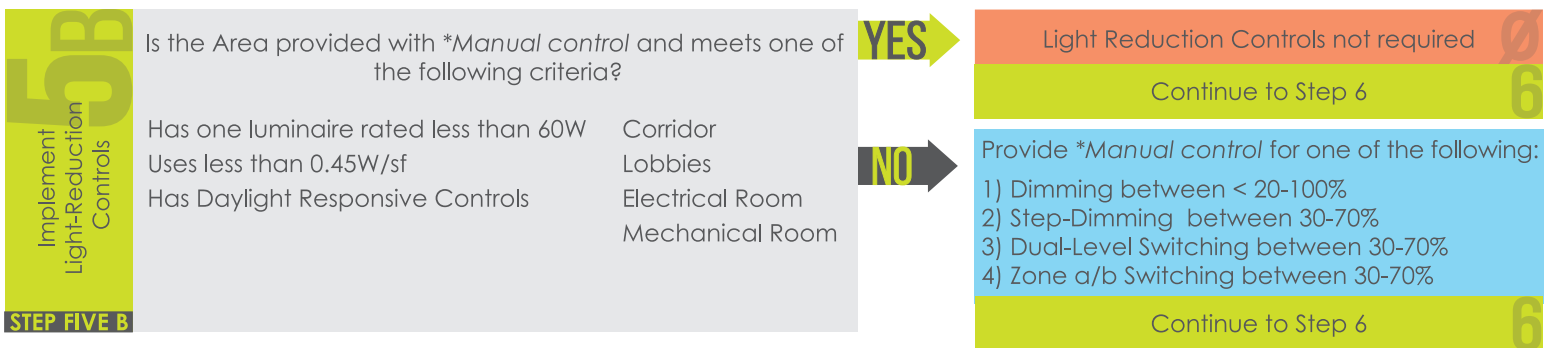
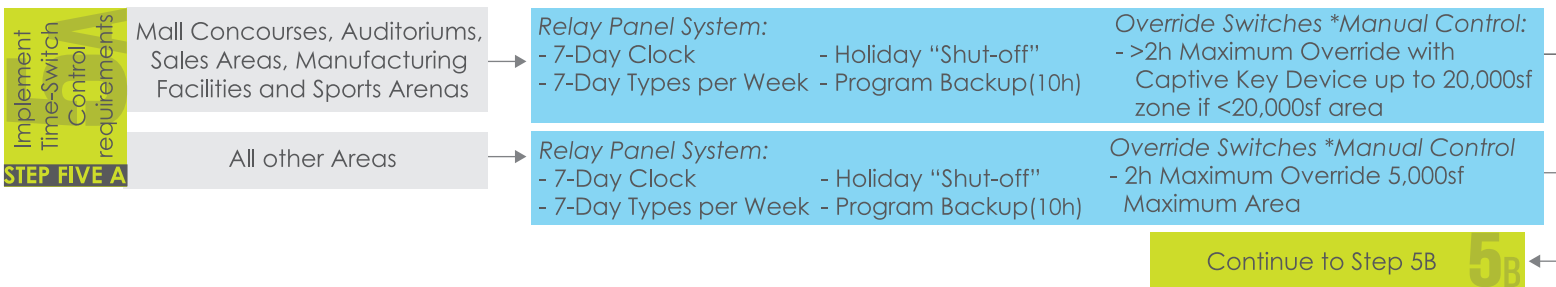
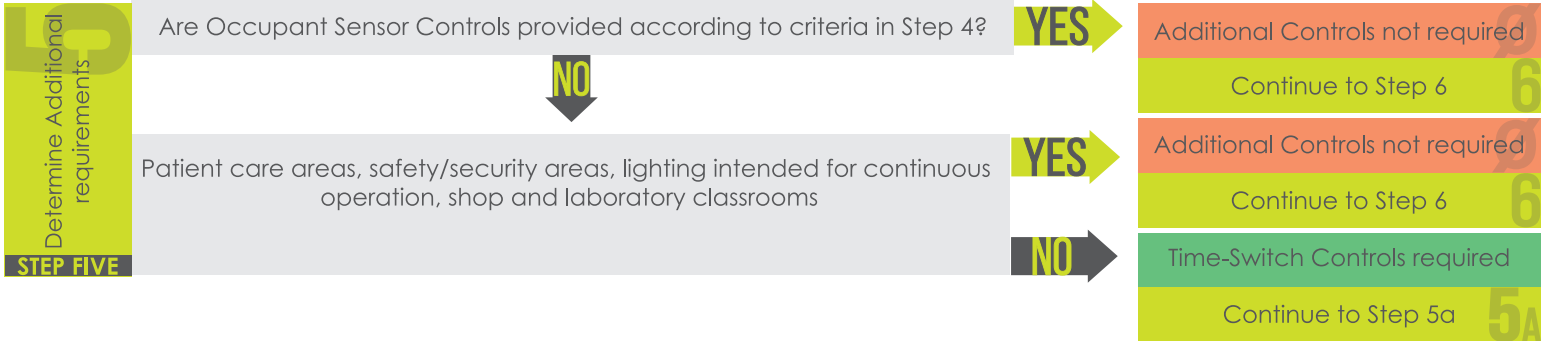
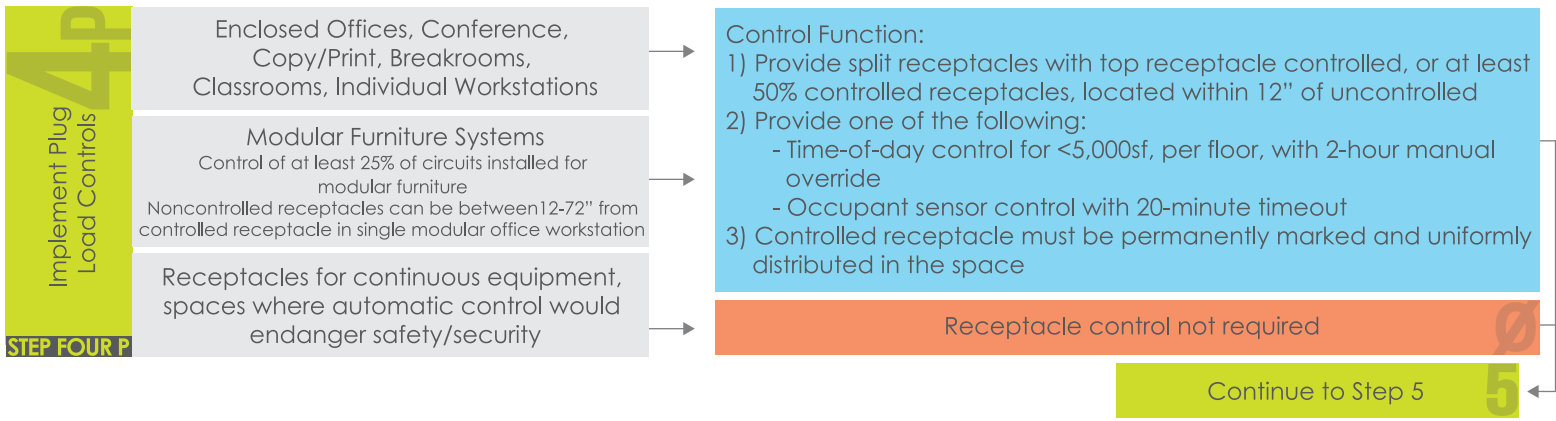
LLC must comply with Step 2, Step 4 and have Manual Control

STEP FOUR Determine Occupant Sensor Control requirements (20 min max time-out)

Enclosed Offices, Conference, Copy/Print, Breakrooms, Classrooms, Individual Workstations	Auto-On to 50% OR Vacancy Sensor *Manual control required
Open Plan Office Areas > 300sf	- Max 600sf control zones - Control zones must be reduced to <20% within 20 min of vacancy - Auto-on to 100% permitted in control zone where occupancy is detected
Public Corridors, Stairways, Restrooms, Primary Entrances, Lobbies, Interior Parking Areas, Locker Rooms, Library Stacks	Auto-On to 100% permitted. *Manual control not required
Warehouses (Aisles and Open Areas)	50% Max Unoccupied Level, each aisle to be independent. *Manual control required
Corridors	Reduce to < 50% within 20-mins of vacancy Except if corridors have less than 2FC with all lights at 100%
All Other Spaces	Auto-On to 50% OR Vacancy Sensor *Manual control required

Continue to Step 4P

Continue to Step 5

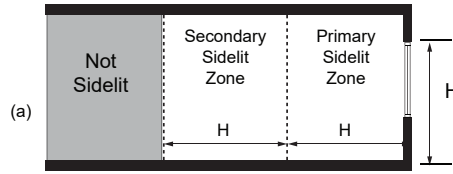


Sidelit Daylight Zone

Conditions:

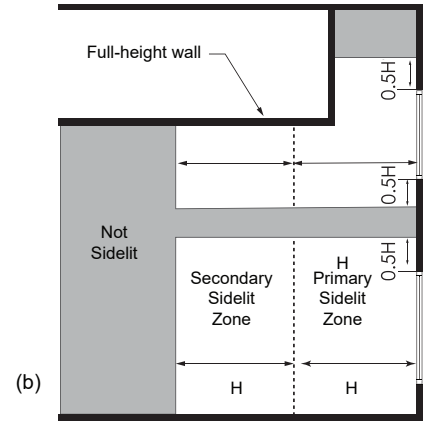
- 1) General Lighting must exceed 150W within primary daylight zone or 300W within in sidelit daylight zones
- 2) Up to 150W within secondary daylight zone can be controlled with primary
- 3) Fenestration must have a visible transmittance of not less than 0.20 and be >24sf
- 4) Adjacent building and geological formations should be considered

SECTION VIEW



(a) Section view
(b) Plan view of Primary Sidelit Zone and Secondary Sidelit Zone

PLAN VIEW

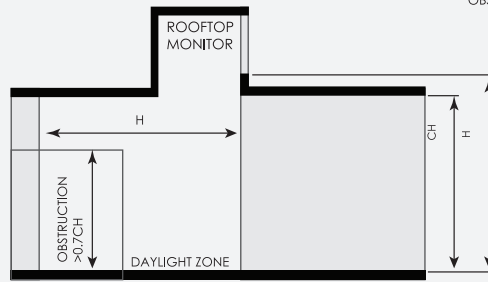


Monitor-lit and Toplit Daylight Zone

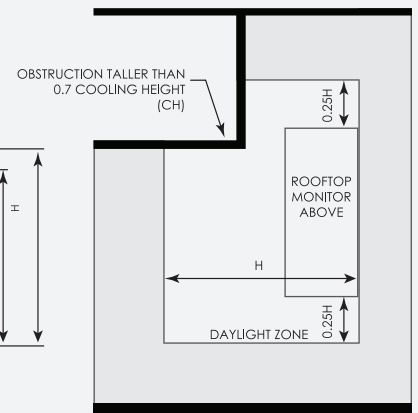
Conditions:

- 1) General Lighting must exceed 150W
- 2) Direct sunlight is not blocked from hitting fenestration at peak solar angle on the summer solstice by buildings/ geological formations
- 3) (Visible transmittance x area of rough opening) / area of the toplit zone > 0.008

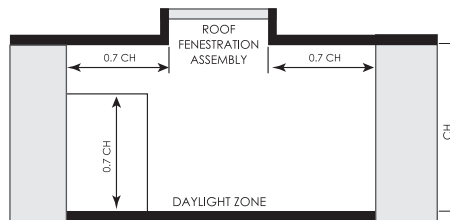
SECTION VIEW



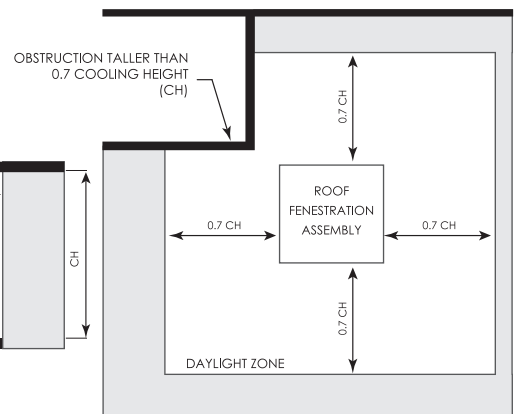
PLAN VIEW



SECTION VIEW



PLAN VIEW



Continue to Step 6B

Implement Daylight-Responsive Controls

STEP SIX B

- 1) Toplit and Sidelit Zones must be controlled independently
- 2) Lights in primary sidelit daylight zone must be controlled independently from secondary zone
- 3) Calibration mechanism must be readily accessible
- 4) Dim continuously from 100% to 15% (or lower)
- 5) Daylight Controls must be capable of complete shutoff
- 6) Sidelit Zones facing different cardinal orientations (N/S/E/W) must be controlled independently (*Exception: 150W or less*)
- 7) Daylight zones at atrium spaces shall be established at the top floor and at the floor of the atrium space, and not on intermediate floors

→ Daylight Sensor Dimming Ballast/Drivers

Continue to Step 7A

Exterior Lighting Controls

STEP SEVEN A

Do any of the following criteria apply?

- 1) Lighting for covered vehicle entrances & parking structures, where required for eye adaption
- 2) Lighting controlled from within dwelling units

YES → Exterior Lighting Controls not required

NO → Exterior Lighting Controls are required

Continue to step 7B

Implement Exterior Lighting Control requirements

STEP SEVEN B

Facade & Landscape Lighting → Automatic shutoff 1-hour after business closing to 1-hour before business open

All other Exterior Lighting → Automatic shutoff via TC/PC and > 50% reduction:

- 1) Midnight to 6AM
- 2) One hour after close to one hour before open
- 3) Fifteen minutes of vacancy

Parking Luminaires >78W & <24ft mounting Height → >50% reduction 15-minutes of vacancy. No more than 1,500W controlled together.

Implement Parking Garage Controls

STEP EIGHT

Parking Garage lighting controlled via occupant sensor OR time-switch controls →

Control Function:

- 1) Dim fixture by >30% upon vacancy with 20-minute timeout. Lighting zones shall be <3,600sf.
Exception: Zones <1.5fc at the darkest point with all lights on
- 2) Separate control zone at vehicle entries/exits for lighting adaptation capable of reducing output by >50% from sunset to sunrise
- 3) Daylight harvesting capable of reducing output by >50% for luminaires within 20ft of perimeter wall openings
Exception: Opening-to-wall ratio <40%, daylight blocking obstruction per C405.8.2-3

2021 IECC LIGHTING CONTROLS DESIGN FLOWCHART



**NEED HELP WITH YOUR DESIGN? HAVE QUESTIONS ABOUT HOW TO APPLY THE CODE TO YOUR PROJECT?
WE ARE HERE TO HELP! CALL US AT 720.590.6773 OR EMAIL US AT CONTROLS@VISUALINTEREST.COM**

Lighting Controls are required per the following code sections:

- | | | |
|------------------------------------|---|--|
| C405.1.1 Dwelling Units | C405.2.4: Daylight-Response Controls | C405.2.7: Exterior Lighting Controls |
| C405.2.1: Occupant Sensor Controls | C405.2.5: Specific Application Controls | C405.2.8: Parking Garage Lighting Controls |
| C405.2.2: Time-Switch Controls | C405.2.6: Manual Controls | C405.11: Automatic Receptacle Control |
| C405.2.3: Light Reduction Controls | | |

***Manual Control:** Dimmer, Switch or Keypad that is located in a readily accessible location, and where the controlled lights are visible or where the device identifies the area served with indicated status