

Lighting Controls For IECC 2015

Code Changes & Control Strategies



MH[®] CONTROLS

AGENDA



IECC 2015 Summary



Occupancy Sensor Controls



Time-Based Controls



Light Reduction Controls



Daylighting Controls



Special Application Controls



Exterior Lighting Controls



Functional Testing

IECC 2015 Lighting Controls

Lighting Controls – Mandatory (Exceptions: Exits & EM Egress)

Occupancy Sensors – Required in Most Spaces (Must Be Manual On)**

Time Based Control – Required Where Occ Sensors are Not Provided**

Light Reduction Controls – Reduce Lighting Load By 50%

Daylighting – Required in All Daylight Zones with more than 150W

Accent/Display Lighting – Provide Dedicated/Independent Control

Hotel Rooms - Provide Auto-Off of All Lights/Receptacles Within 20 min

Exterior Lighting – Automatic Off During Daylight Hours**

Exterior Lighting - Reduce by 30% During Unoccupied Times **

Functional Testing & Documentation - for all Lighting Controls

** Exceptions Apply

Lighting Control Design Strategies

Light control strategies to Meet IECC 2015:

- 💡 Occupant-based sensing for Manual-On/Auto-Off
- 💡 Dimming and/or switching systems
- 💡 Manual control of lighting in addition to automatic
- 💡 Automatic daylight harvesting
- 💡 Astronomical timeclock scheduling
- 💡 Provide means for light reduction control
- 💡 Specify functional operation and testing



OCCUPANCY SENSORS

Occupancy Sensor Requirements

LOCATIONS WHERE REQUIRED

- Class/Training Rooms, Conference/Meeting Rooms, Multipurpose Rooms, Copy Rooms, Lounges, Break Rooms, Private Offices, Restrooms, Storage Rooms, Janitor Closets, Locker Rooms, Other Spaces 300 Sqft or less, Warehouses

FUNCTIONALITY REQUIRED

- Manual-On OR Auto-On to 50%
- Auto-Off within 30 Minutes
- Shall provide manual control to allow occupants to turn lights off
- Warehouses – Sensors to control each aisle way independently

EXCEPTIONS

- Auto-On allowed in Corridors, Restrooms, Stairways, Entrances, and Lobbies
- Warehouses – Sensors shall reduce lighting by 50% when unoccupied

DESIGN CONSIDERATIONS

- High Ceilings
- Gymnasiums
- Hazardous Environments



TIME-BASED CONTROLS

Time-Based Control Requirements

LOCATIONS WHERE REQUIRED

- Time-Based (Time Clock) Control is required where Occupancy Sensors are not provided
- Typically found in open office areas, atriums, lobbies, corridors, etc.

FUNCTIONALITY REQUIRED

- Time-Based Control spaces must also be provided with Manual Controls
- System must provide: 7-Day Clock with Holiday Auto-Off & 10 Hour Battery Backup
- Override switches provided for every 5000 Sqft with not more than 2 Hour Override

EXCEPTIONS

- Automatic Control NOT required for: Sleeping Rooms, Patient Care Areas, Spaces where Auto-Off would endanger safety, Areas of continuous operation, Shop & Laboratory Areas
- Special Exceptions for Malls, Arcades, Auditoriums, Single Tenant Retail, & Industrial

DESIGN CONSIDERATIONS

- Central control system needed (in most cases) to meet design requirements

LIGHT REDUCTION CONTROLS



Light Reduction Control Requirements

LOCATIONS WHERE REQUIRED

- Required in areas that have Time-Based Controls

FUNCTIONALITY REQUIRED

- Provide Manual Control that allows occupant to reduce light level by at least 50%
- Methods include: Controlling ALL Luminaires, Dual-Level Switching, Dimming
- Manual Controls must be readily accessible
- Manual Controls must be located where controlled lights are visible or be labeled and indicate status of controlled lights

EXCEPTIONS

- Not Required in areas with Daylight Harvesting Controls
- Not Required in areas with Occupancy Sensors

DESIGN CONSIDERATIONS

- Override switches tied to central control panel are needed versus manual switches to avoid occupant dissatisfaction and inconvenience



DAYLIGHTING CONTROLS

Daylighting Control Requirements

LOCATIONS WHERE REQUIRED

- Sidelight Daylight Zones with more than 150W of General Lighting
- Toplight Daylight Zones with more than 150W of General Lighting

FUNCTIONALITY REQUIRED

- Sidelight and Toplight zones must be controlled independently
- Must be configured and calibrated from within the space
- Calibration mechanism must be readily accessible (have to access without a ladder)
- Daylight Dimming required for offices, classrooms, laboratories, and library/reading areas
- Daylighting Controls must provide complete shutoff of controlled lights
- Sidelight Daylight Zones facing in two different directions must be controlled independently
- Specific daylighting area sizes for Sidelight and Toplight Daylighting Zones (See Code)

EXCEPTIONS

- Not required in Patient Care Areas
- Not required in Dwelling Units and Sleeping Areas
- Not required in Specific Application Areas

DESIGN CONSIDERATIONS

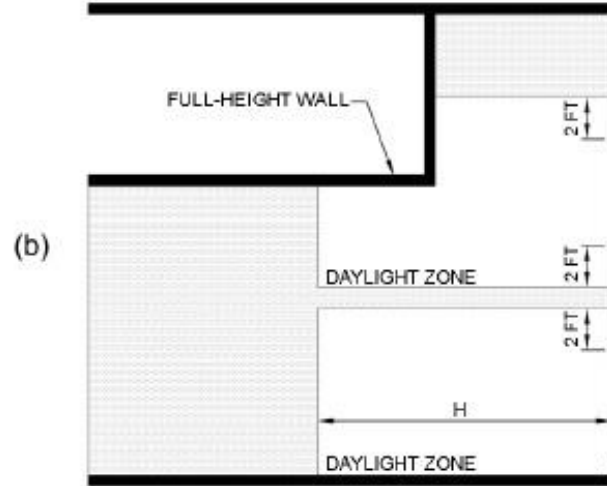
- Drives design toward the use of dimming LED lighting
- Requires the use of more sophisticated daylighting control equipment

Daylighting Control Requirements

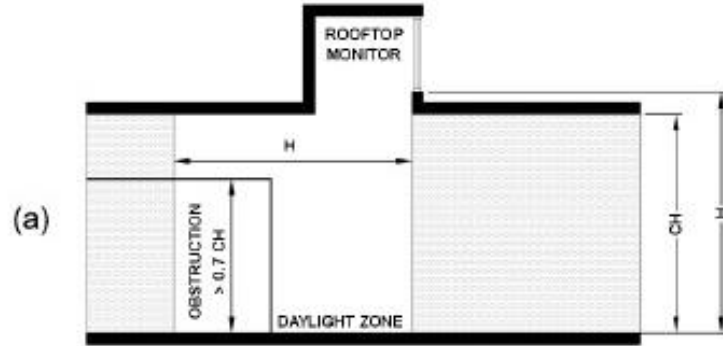


(a) Section view

(b) Plan view of daylight zone under a rooftop monitor

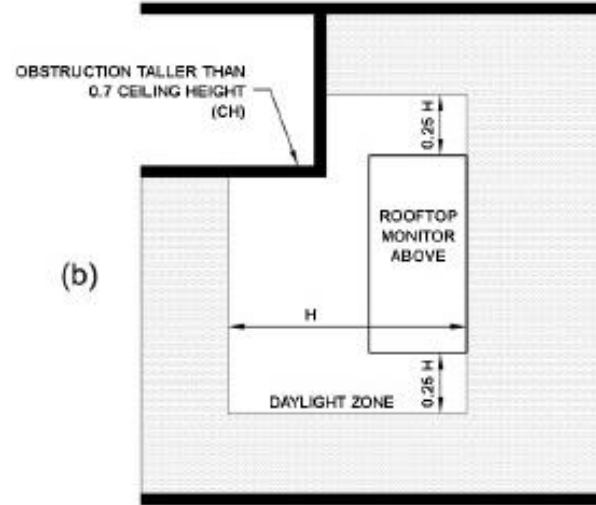


Daylighting Control Requirements

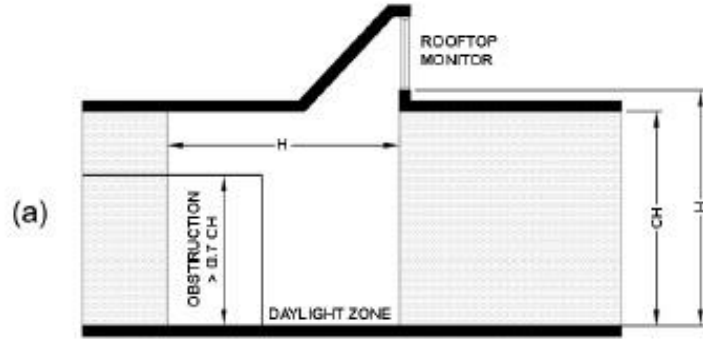


(a) Section view

(b) Plan view of daylight zone under a rooftop monitor

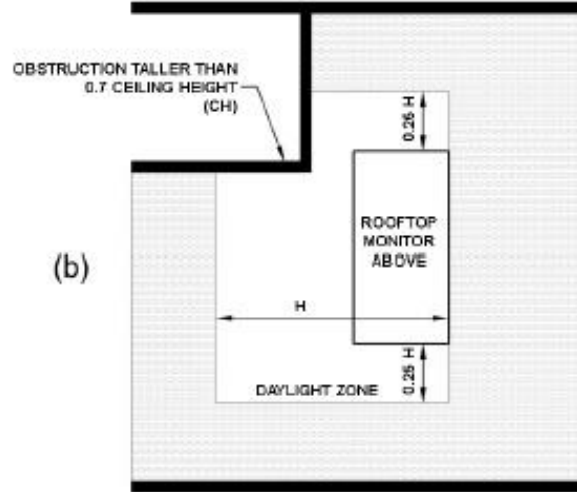


Daylighting Control Requirements

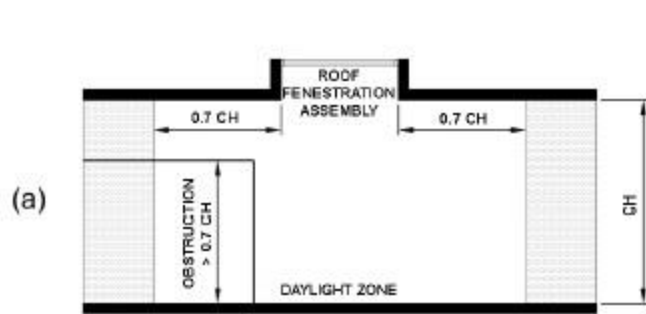


(a) Section view

(b) Plan view of daylight zone under a rooftop monitor

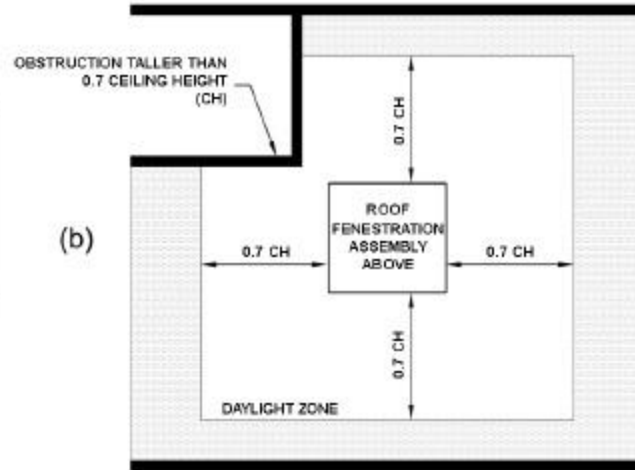


Daylighting Control Requirements



(a) Section view

(b) Plan view of daylight zone under a roof fenestration assembly





SPECIALTY LIGHTING CONTROLS

Specialty Control Requirements

LOCATIONS WHERE REQUIRED

- Display walls and accent lighting
- Display Cases
- Hotel and Motel Sleeping Units

FUNCTIONALITY REQUIRED

- Display/Accent Lighting must have controls that are independent of other lighting controls within the space
- Hotel rooms must have control to automatically sweep off all lights and switched receptacles within 20 Min
- Task lighting requires integral or wall-mounted control device
- Lighting for “Non-Visual” applications must have independent control

EXCEPTIONS

- Lighting and Switched receptacles that are controlled by a “keyed” switch are exempt

DESIGN CONSIDERATIONS

EXTERIOR
LIGHTING
CONTROLS



EXTERIOR LIGHTING CONTROLS

Exterior Lighting Control Requirements

LOCATIONS WHERE REQUIRED

- Exterior lighting loads including Building-Mounted Lighting, Area Lighting, and Landscape Lighting

FUNCTIONALITY REQUIRED

- Automatic off based on daylight (i.e. Photocell control)
- Automatic off based on dawn/dusk and Building hours for façade and landscape lighting
- For loads other than façade/landscape: must provide ability to automatically reduce the load by 30% from midnight to 6am OR when unoccupied for 15 Min.

EXCEPTIONS

- Emergency lighting that is off during building operation
- Lighting required to meet life safety requirements
- Covered vehicle entrances or building/parking structure entry/exits

DESIGN CONSIDERATIONS

- Brings in to play the use of outdoor occupancy sensors and dimming fixtures for exterior applications
- Simple photocell control will not meet code

ADDITIONAL EFFICIENCY PACKAGE OPTIONS

Additional Efficiency Package Options

LOCATIONS WHERE REQUIRED

- Commercial projects must meet one of six additional efficiency package options
- More efficient HVAC, Reduced lighting power density, **Enhanced lighting controls**, On-site renewable energy, Additional outside air, High efficiency water heating

LIGHTING CONTROL FUNCTIONALITY REQUIRED

- Continuous dimming required
- Individually addressed luminaires
- No more than 8 luminaires in a daylight zone
- Digital lighting control system

EXCEPTIONS

- Where individual addressability is not available, groups of 4 fixtures are allowed

DESIGN CONSIDERATIONS

- There are currently only a few options for individually addressed fixtures

TESTING



LIGHTING CONTROL TESTING

Lighting System Functional Testing

WHEN REQUIRED

- ALL Lighting Controls Must be tested prior to final inspection
- Evidence of testing to be provided by the “Registered Design Professional”

REQUIREMENTS

- Specific testing procedures required for:
 - Occupancy Sensors
 - Time-Based Controls
 - Daylighting Controls

DOCUMENTATION

- Testing documents that certify that the installed lighting controls meet the performance criteria must be provided to the building owner within 90 days of occupancy

CONSIDERATIONS

- Functional testing meeting the specific code testing requirements is not typically provided by MH.
- These services can be provided

Questions? Comments?

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