AGENDA

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** Exceptions Apply
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
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 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 independantly
• 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
(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

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Daylighting Control Requirements

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