



Designers Lighting Forum

## Stretch Codes Putting a Squeeze? Energy Code Yoga and Updates



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Wednesday, August 19, Noon – 1:30pm



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**Marty Salzberg, IALD, IES**  
NYSID  
Educator

Marty Salzberg worked as an architectural lighting consultant for more than thirty years. Her work was honored with multiple industry awards for design and energy efficiency. As a member of the Illuminating Engineering Society, Marty has been a member of the Library Lighting Committee since 2003 and is currently the committee Chair. Marty is a Professional Member of the IALD, where she is an active member of the Energy & Sustainability Committee and serves as the IALD representative to the ASHRAE/IES 90.1 energy standard development committee. She serves on the IALD Global Policy Committee and is teaching lighting design at the New York School of Interior Design.



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**Harold Jepsen P.E. WELL-AP**  
**Legrand/Wattstopper**  
 VP Standards & Relations

For over 20 years, Harold has led various roles in product development, engineering, operations, standards and industry relations for Legrand's Wattstopper, Vantage and lighting brands. He has been a product design and applications engineer in the energy, lighting and building automation industry for over 30 years. As a member of the ASHRAE/IES 90.1 standard lighting committee, chair of NEMA's Codes and Standards Review Committee, and active participant in both the IECC and Title 24 development processes, he is a specialist in energy efficiency code compliance. He is a regular presenter on energy code lighting and controls at local and national levels and leads Legrand's Energy Code Education Programs.

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**NEW YORK CITY SECTION**

**LEDUCATION 2020  
PRESENTATIONS SPONSOR**

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.





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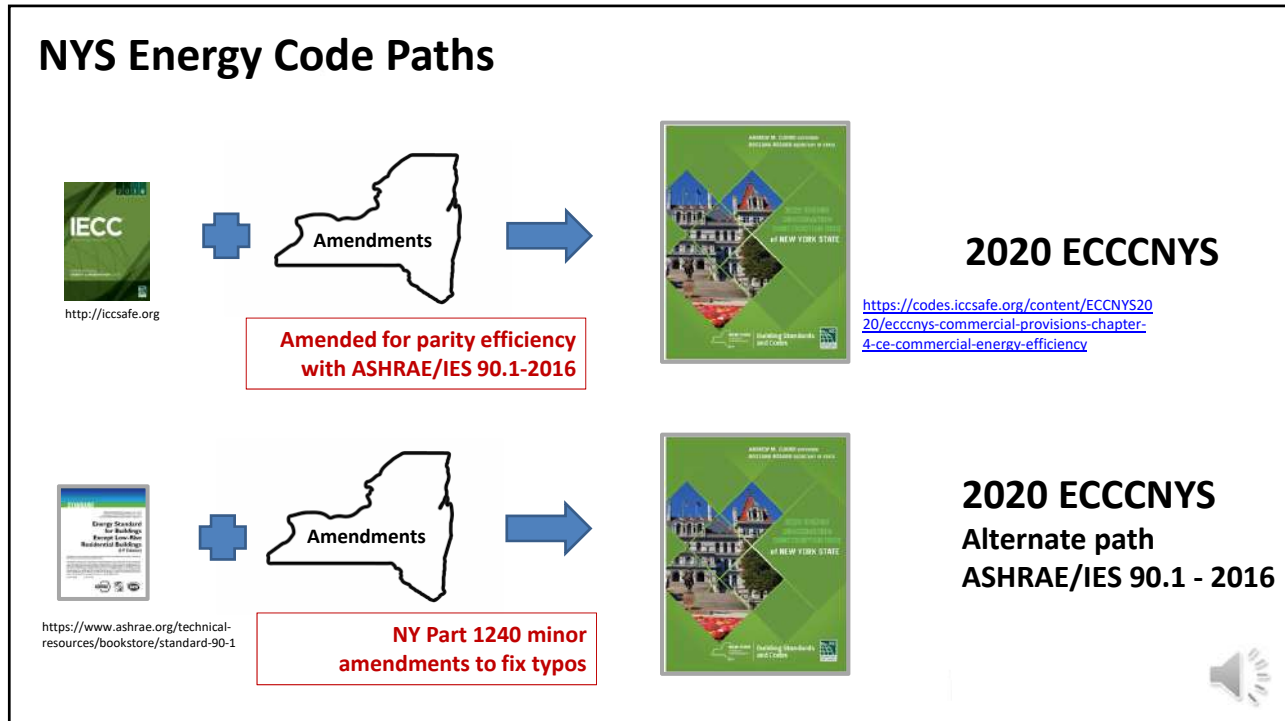
### Learning Objectives

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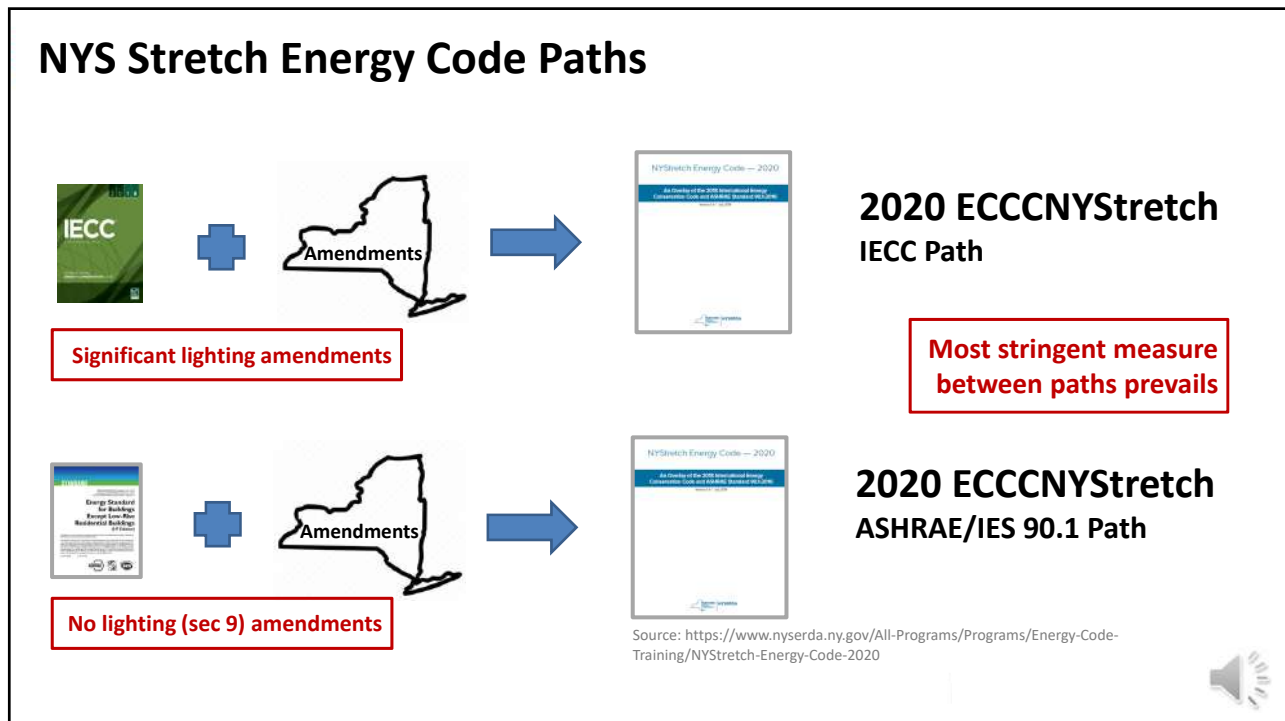
1. What needs to be done differently? Learn how changes to energy codes affects lighting and lighting control project design and applications.
2. How do individual codes stack up? Recognize model code differences and when each is best applied to your project.
3. How are new lighting technologies integrated? Understand application examples as codes adopt to new and changing lighting technologies.
4. Why are the NYC local laws the drivers that are moving the code?



6



7



8

## NYC Energy Code

### Greener, Greater Building Plan(GGBP)

#### Local Law 32 of 2018

- Must meet minimum of 2019 & 2022 NYS Stretch Code
- Performance Based: Must require energy use targets for buildings over 25,000 SqFt

#### Sustainability Targets

- 50% renewable by 2030
- Reduce emissions 80% by 2050 (compared to 2005 levels)



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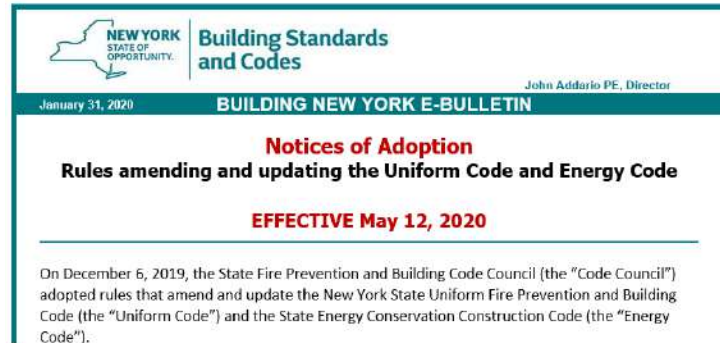
## NYC Energy Code – Two Paths



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## Adoption / Effective Timing

- Adoption Dec 6, 2019
- Published Feb 12, 2020
- **Effective May 12, 2020**
- NYC must adopt with state energy code



Source: <https://www.dos.ny.gov/DCEA/noticadopt.html#codebooks>



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## Commercial Energy Efficiency Increase

### 2020 ECCCNY



~8% more efficient than 2016 ECCCNY

Source: Future Changes to the NYC Energy Code, Build Safe | Live Safe Conference 2019

### 2020 ECCCNYStretch



~13% increase over 2016 ECCCNY

(~5% more efficient than 2020 ECCCNY)

Source: Future Changes to the NYC Energy Code, Build Safe | Live Safe Conference 2019

### 2020 NYCECC



~11% more efficient than 2016 NYCECC?



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### Top Lighting Requirement Changes #1-10

#	Requirement Update	ECCCNYS	ECCCNYSstretch	NYCECC
1	Dwelling & sleeping unit paths, efficacy	✓	✓	✓
2	Luminaire level lighting control path	✓	✓	✓
3	Emergency, egress, exit exemption	Exempt	Exempt	✓
3	Egress illumination controls		✓	✓
3	0.02W/SqFt egress lighting exempt		✓	✓
4	Occupancy sensor delay	20 min	20 min	15 min
4	Corridor/transition, dining area		✓	✓ + janitor closet
5	Sensor 600Ft <sup>2</sup> zone control - open office	✓	✓	✓ +cafeteria, fast food
6	Daylight-responsive control alterations	10% & 50%	10%	10%
6	Daylight-responsive continuous dim	✓	✓	✓
6	Daylight-responsive threshold	150W	100W	100W
6	Daylight sidelit access definition	< 1 x height	> 0.5 x height <b>ERROR</b>	< 1 x height

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## Top Lighting Requirement Changes

#	Requirement Update	ECCCNYS	ECCCNYSStretch	NYCECC
7	Daylight-responsive LPD trade-off	✓	✓	✓
8	Total connected interior lighting power	✓	✓	✓
8	Lower LPD	✓	Lower yet	Some even lower
8	Unfinished space LPD			0.2W/Ft <sup>2</sup>
9	Exterior lighting setback	30%	50%	50%
9	Parking area sensor control ≤24ft	✓	✓	✓
10	Additional Efficiency Options	✓	✓	✓
APX	Other changes of note	✓	✓	✓



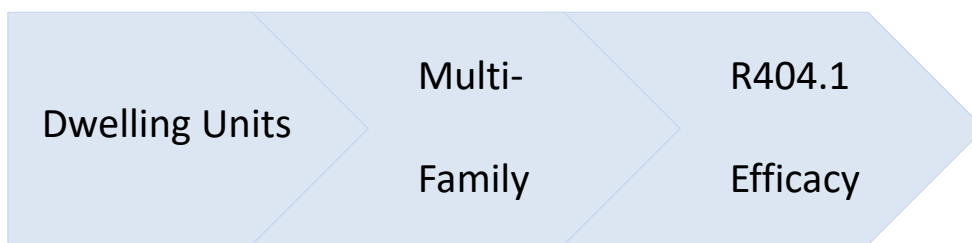
15

## C405.1 Dwelling Unit Paths

#1

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

**Clarification: Dwelling Units in Multi-family – Must comply with R404.1 – Residential Efficacy**



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## C405.1 Dwelling Unit Paths

#1

Clarification: Dwelling Units in Multi-family -  
Must comply with R404.1 – Residential  
Efficacy

Multi -  
Family



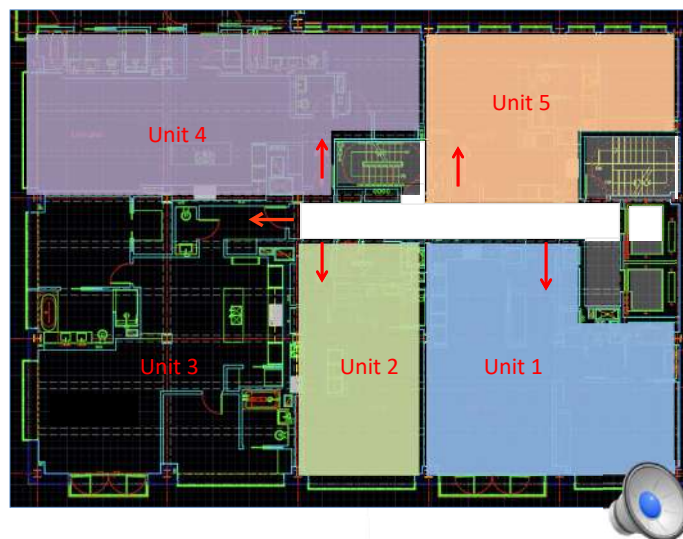
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## C405.1 Dwelling Unit Paths

#1

Dwelling-Unit

**Definition:** A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.




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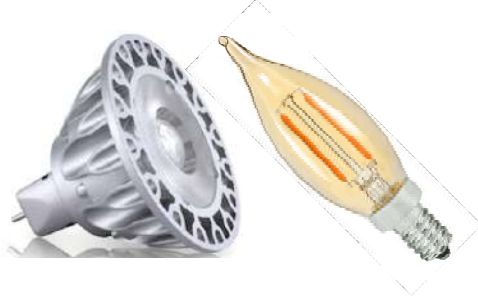
## #1

### R404.1 Lighting Efficacy

**R404.1 NYCECC & NYStretch  
not the same as NYS 2020**

- Increased stringency from 75% high efficacy to 90%

NYS – High Efficacy – Residential Definitions	NYC & Stretch Efficacy in Dwelling Units
... lamps with an efficacy of not less than the following:	<p><b>Luminaires to use <u>lamps</u> with an efficacy <math>\geq 65</math> lm/watt, or</b></p> <p><b>Total luminaire efficacy of <math>\geq 45</math> lm/watt</b></p> 
60 lumens per watt for lamps over 40 watts.	
50 lumens per watt for lamps over 15 watts to 40 watts.	
40 lumens per watt for lamps 15 watt or less.	




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## #1

### R404.1 Lighting Efficacy

**R404.1 NYCECC & NYStretch  
not the same as NYS 2020**

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60 lumens per watt for lamps over 40 watts.	
50 lumens per watt for lamps over 15 watts to 40 watts.	
40 lumens per watt for lamps 15 watt or less.	




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## C405.1 Dwelling Unit Paths #1


ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

All other Dwelling Units – non-Multi-family - EXAMPLES

Hotel Suite



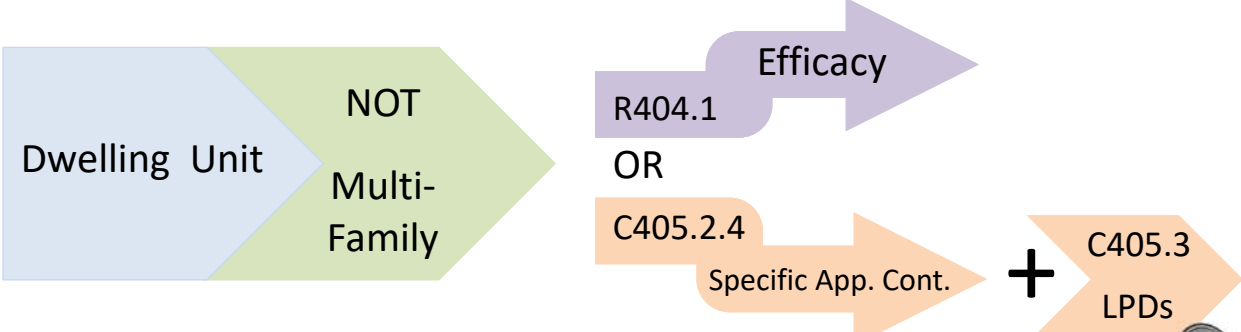
College Dorm Suite



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## C405.1 Dwelling Unit Paths #1

All other Dwelling Units – non-Multi-family:  
Comply with R404.1, or with C405.2.4 and C405.3



**Clearest route to compliance: Choose R404.1**

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## #1

### C405.1 Dwelling Unit Paths


**All other Dwelling Units – non-Multi-family:  
Comply with R404.1, or with C405.2.4 and C405.3**

**C405.2.4 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:
  - 1.1. Display and accent.
  - 1.2. Lighting in display cases.
  - 1.3. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting.
  - 1.4. Lighting equipment that is for sale or demonstration in lighting education.
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 or C405.2.2.2.
  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.



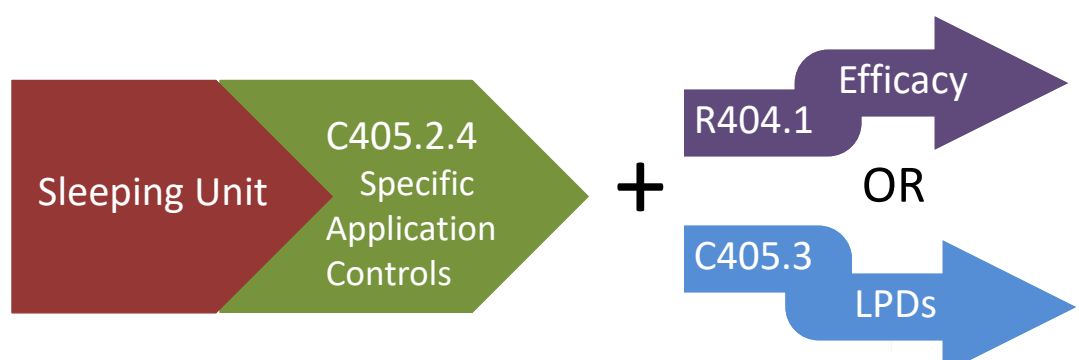
23


## #1

### C405.1 Sleeping Unit Paths

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

**Sleeping Units:  
Comply with C405.2.4, and with R404.1 or C405.3**





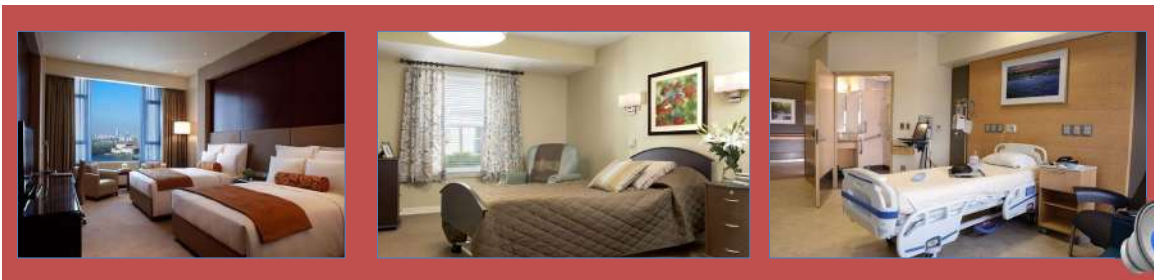
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## C405.1 Sleeping Unit Paths

#1

### Sleeping Units:

Definition: A room or space in which people sleep, that can include permanent provisions for living, eating, and either sanitation or kitchen facilities, but not both. **Such rooms and spaces that are part of a dwelling unit are not sleeping units**



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## C405.1 Sleeping Unit Paths

#1

### Sleeping Units:

Comply with C405.2.4 and R404.1, or C405.3

**C405.2.4 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:
  - 1.1. Display and accent.
  - 1.2. Lighting in display cases.
  - 1.3. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting.
  - 1.4. Lighting equipment that is for sale or demonstration in lighting education.

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 or C405.2.2.2.
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.

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## C405.1 or ASHRAE 9.4.4

### Dwelling Units and Sleeping Units:

IECC

SECTION C405  
ELECTRICAL POWER AND LIGHTING SYSTEMS

**C405.1 General (Mandatory).** This section covers lighting system controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.

*Dwelling units* within multifamily buildings shall comply with Section R404.1. All other *dwelling units* shall comply with Section R404.1, or with Sections C405.2.4 and C405.3. *Sleeping units* shall comply with Section C405.2.4, and with Section R404.1 or C405.3. Lighting installed in walk-in coolers, *walk-in freezers*, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with the lighting requirements of Section C403.10.1 or C403.10.2.


ASHRAE

as amended by NYC

9.4.4 Dwelling Units

Not less than 90% of the permanently installed lighting fixtures shall use lamps with an efficacy of at least 65 lm/W or have a total luminaire efficacy of at least 45 lm/W.

# #1



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## C405.2 Two Lighting Control Paths


ECCCNYS	ECCCNYSstretch	NYCECC
✓	✓	✓

+

OR

**LUMINAIRE-LEVEL LIGHTING CONTROLS.** A lighting system consisting of one or more luminaires with embedded lighting control logic, occupancy and ambient light sensors, wireless networking capabilities and local override switching capability, where required.

# #2



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## C405.2.2 – Luminaire Level Lighting Control

#2

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

### Provisions:

- Monitor occupant activity to brighten or dim lighting
- Monitor ambient light to maintain light level
- Bright/dim setpoints, timeouts, dimming, fade rates, sensitivity, wireless zoning

### Must follow these provisions:

- Occupancy sensor
- Specific application controls
- Manual controls

### Provision Exceptions:

- Time-switch controls
- Light-reduction controls
- Daylight responsive controls



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## C405.2 Emergency, Exit, Egress Exception

#3

ECCCNYS	ECCCNYSStretch	NYCECC
Exempt	Exempt	✓

### NYS

### Section C405.2 Lighting Controls (mandatory)

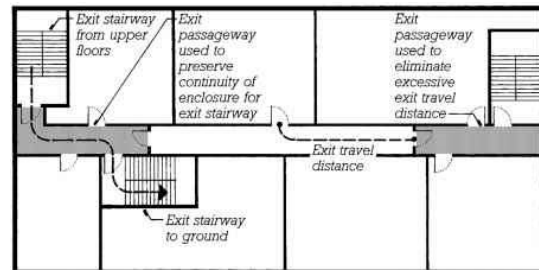
#### Exceptions

2. Interior exit stairways, interior exit ramps and exit passageways.

### NYC

#### Section C405.2 Exception 2:

2. Interior exit stairways, interior exit ramps and exit passageways, as defined by the New York City Building Code.



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## C405.2 Emergency, Exit, Egress Exception

#3

### NYC Building Code 2014: Definitions Section BC1002

**EXIT.** That portion of a means of egress system, which is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel between the exit access and the exit discharge. Exits include exterior exit doors at the level of exit discharge, vertical exit enclosures, exit passageways, exterior exit stairways, exterior exit ramps and horizontal exits, but do not include access stairs, aisles, exit access doors opening to corridors, or corridors.

**EXIT PASSAGEWAY.** An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to the exit discharge or the public way.



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## C405.2 Emergency, Exit, Egress Exception

#3

### NYC Building Code 2014: Exit Passageways Section BC1023

#### SECTION BC 1023 EXIT PASSAGEWAYS

**1023.1 Exit passageway.** Exit passageways serving as an exit component in a means of egress system shall comply with the requirements of this section. An exit passageway shall not be used for any purpose other than as a means of egress.

**1023.2 Width.** The width of exit passageways shall be determined as specified in Section 1005.1 but such width shall not be less than 44 inches (1118 mm), except that exit passageways serving an occupant load of less than 50 shall not be less than 36 inches (914 mm) in width.

The required width of exit passageways shall be unobstructed.

**Exception:** Doors complying with Section 1005.2.

**1023.3 Construction.** Exit passageway enclosures shall have walls, floors and ceilings of not less than 1-hour fire-resistance rating, and not less than that required for any connecting exit enclosure. Exit passageways shall be constructed as fire barriers in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both.

**1023.4 Termination.** Exit passageways shall terminate at an exit discharge or a public way.

**1023.5 Openings and penetrations.** Exit passageway opening protectives shall be in accordance with the requirements of Section 715.

Except as permitted in Section 402.4.6, openings in exit passageways other than unexposed exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway.

Where an exit enclosure is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall also comply with Section 1022.2.1.

Elevators shall not open into an exit passageway.

**1023.6 Penetrations.** Penetrations into and openings through an exit passageway are prohibited except for required exit doors, equipment and ductwork necessary for independent pressurization, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the exit passageway and terminating at a steel box not exceeding 16 square inches (0.010 m<sup>2</sup>). Such penetrations shall be protected in accordance with Section 713. There shall be no penetrating communicating openings, whether protected or not, between adjacent exit passageways.



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## C405.2 Emergency, Exit, Egress Exception

#3

### NYC Building Code 2014: Exit Stairways Section BC 1007.3

**1007.3 Exit stairways.** To be considered part of an accessible means of egress, an exit access stairway as permitted by Section 1016.1 or exit stairway shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of rescue assistance within an enlarged floor-level landing or shall be accessed from either an area of rescue assistance complying with Section 1007.6 or a horizontal exit.

Unenclosed exit stairways as permitted by Section 1022.1 are permitted to be considered part of an accessible means of egress.

**Exceptions:** The following exceptions apply to the requirements of clear width and area of rescue assistance, and do not supersede the other requirements of the accessible means of egress:

1. The area of rescue assistance is not required for open exit access or exit stairways as permitted by Sections 1016.1 and 1022.1 in buildings that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The clear width of 48 inches (1219 mm) between handrails and the area of rescue assistance is not required at exit access stairways as permitted by Section 1016.1 or exit stairways in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Areas of rescue assistance are not required at exit stairways in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
4. The clear width of 48 inches (1219 mm) between handrails is not required for enclosed exit stairways accessed from a horizontal exit.
5. Areas of rescue assistance are not required at exit stairways serving open parking garages.
6. Areas of rescue assistance are not required for smoke protected seating areas complying with Section 1028.6.2.
7. The areas of rescue assistance are not required in Group R-2 occupancies.

**EXIT, HORIZONTAL.** An exit that provides a path of egress travel from one building to an area in another building on approximately the same level, or a path of egress travel through or around a wall or partition to an area on approximately the same level in the same building, or a bridge or tunnel between two buildings, which affords safety from fire and smoke from the area of incidence and areas communicating therewith.



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## C405.2 Emergency, Exit, Egress Exception

#3

### NYC Building Code 2014: Interior Exit Stairways and Interior Exit Ramps Section BC1022.1

**1022.1 Enclosures required.** Interior exit stairways and interior exit ramps shall be enclosed with fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the exit enclosure shall include any basements but not any mezzanines. Exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. In Group R-1 and R-2 occupancies, where exit enclosures are required to have a fire-resistance rating of 2 hours, such enclosures shall be constructed of masonry or masonry equivalent. Wall assemblies constituting masonry equivalent shall be constructed in accordance with department rules. Exit enclosures shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1023, except as permitted in Section 1027.1. An exit enclosure shall not be used for any purpose other than means of egress.

**Exceptions:**

1. In all occupancies, other than Group H and I occupancies, a stairway is not required to be enclosed when the stairway serves an occupant load of less than 10 and the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.
  - 1.1 The stairway is open to not more than one story above its level of exit discharge; or
  - 1.2 The stairway is open to not more than one story below its level of exit discharge.
2. Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.
3. Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
4. Stairways in open parking structures that serve only the parking structure are not required to be enclosed.
5. Stairways in Group I-3 occupancies as provided for in Section 408.3.8 are not required to be enclosed.
6. Means of egress stairways as required by Sections 410.5.3 and 1015.6.1 are not required to be enclosed.
7. Means of egress stairways from balconies, galleries or press boxes as provided for in Section 1028 are not required to be enclosed.

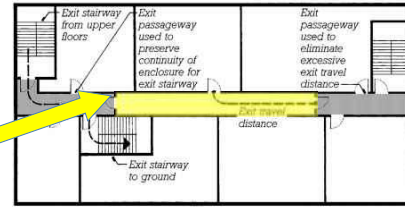


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### C405.2.1.4 Egress Illumination Controls

#3

ECCCNYS	ECCCNYSStretch	NYCECC
	✓	✓



#### NYC

Section C405.2 Exception 2:

- Interior exit stairways, interior exit ramps and exit passageways, as defined by the New York City Building Code

**C405.2.1.4 Occupant sensor control function for egress illumination.** In new buildings, luminaires serving the exit access and providing means of egress illumination required by the New York City Building Code, including luminaires that function as both normal and emergency means of egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors, or signal from another building control system, that automatically **reduces the lighting power by 50 percent** when unoccupied for a period longer than 15 minutes.



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### BC1014 Exit Access Definition

#3

## NYC Building Code 2014: Exit Access Definition Exit Access Section

**EXIT ACCESS.** That portion of a means of egress system that leads from any occupied portion of a building or structure to an exit.

#### SECTION BC 1014 EXIT ACCESS

**1014.1 General.** The exit access shall comply with the applicable provisions of Sections 1003 through 1013. Exit access arrangement shall comply with Sections 1014 through 1019.



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## BC1006 Means of Egress Illumination

#3

### NYC Building Code 2014: Means of Egress Illumination Section BC1006

**1006.1 Illumination required.** Exits, exit discharges and public corridors shall be illuminated at all times by either daylight or electric lighting fixtures. Exit access components shall be illuminated by either daylight or electric lighting fixtures at all times that the space served by the exit access component is occupied.

**Exceptions:**

1. Occupancies in Group U. Utility and Miscellaneous
2. Aisle accessways in Group A. Assembly
3. Dwelling units and sleeping units in Groups I-1, R-1, R-2 and R-3. Institutional 24-hr home and Residential
4. Sleeping units of Group I occupancies. Institutional
5. Areas beyond safe dispersal area where such areas are provided, and designed in accordance with Section 1027.6, Exceptions 1 through 5.



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## BC1006 Means of Egress Illumination

#3

### NYC Building Code 2014: Means of Egress Illumination Section BC1006

**1006.2 Illumination level.** The means of egress illumination level shall not be less than 1 foot-candle (11 lux) at the walking surface.

**Exceptions:**

Design to 2 footcandles, minimum, to allow for 50% reduction 

1. For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances to not less than 0.5 foot-candle (5.38 lux) for aisles and cross aisles, and 0.2 foot-candle (2.15 lux) for other portions of the space, provided that the required illumination is automatically restored upon activation of a premise's fire alarm system where such system is provided. Step lights shall be provided in accordance with Section 1028.11.4.
2. Safe areas in assembly occupancies shall be illuminated in accordance with Section 1028.17.3.2.
3. Open exterior spaces used to receive occupants as Class 1 or 2 exits in assembly occupancies shall be illuminated in accordance with Section 1028.17.4.
4. In exits in buildings that contain existing photoluminescent exit path markings tested in laboratory condition foot-candles (22 lux) of activating illumination, the illumination level shall not be less than 2 foot-candles (22 lux).



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## BC1006 Means of Egress Illumination

#3

### NYC Building Code 2014: Means of Egress Illumination Section BC1006

**1006.2.1 Sensors and controls.** Automatic, occupant sensor or photosensor lighting controls shall be permitted within means of egress, provided that the illumination level is not reduced to a level below the minimum requirements of Section 1006.2, and the switch controllers are equipped for fail-safe operation ensuring that if the sensor or control fails, the lighting levels will be at the levels required by Section 1006.2.



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## C405.2.1.4 Egress Lighting Exemption

#3

ECCCNYS	ECCCNYSStretch	NYCECC
	✓	✓

**Section C405.2.1.4 Occupant sensor control function for egress illumination.**

**Exceptions:**

1. Means of egress illumination serving the exit access that does not exceed 0.02 watts per square foot of building area is exempt from this requirement.
2. Emergency lighting designated to meet the requirements of the New York City Building Code.



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## C405.2.1 Occupancy Sensor Time Delay #4

ECCCNYS	ECCCNYSStretch	NYCECC
20min	20min	15min

NYCECC is now a 15 minute time delay

**Provisions:**

- Lights auto off within 20 minutes (15min NYC)

Total daily energy use (kWh) Energy saved compared to baseline		Total daily energy use (kWh) Energy saved compared to baseline		Total daily energy use (kWh) Energy saved compared to baseline	
Break Room		Classroom		Private office	
Baseline	5.53 ---	Baseline	11.37 ---	Baseline	2.83 ---
5-minute	4.33 22%	5-minute	6.21 45%	5-minute	1.92 32%
10-minute	4.64 16%	10-minute	6.60 42%	10-minute	2.05 28%
15-minute	4.83 13%	15-minute	6.88 39%	15-minute	2.14 24%
20-minute	4.97 10%	20-minute	7.12 37%	20-minute	2.21 22%

Source: An Analysis of the energy and cost savings potential of occupancy sensors for commercial lighting systems, VonNieda, Maniccia, Tweed, IES Paper #43, 8/16/00

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## C405.2.1 Manual or Auto On Restrictions #4

ECCCNYS	ECCCNYSStretch	NYCECC
		✓

**Provisions:**

- Lights auto off within 20 minutes (15min NYC)
- Manual on or auto on to ≥50% lighting power
- Manual off control

NYCECC requires manual on control for these spaces:

- Classrooms
- Conference/Meeting Rooms
- Lunch & Breakrooms
- Offices <200ft<sup>2</sup>

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## #4

### C405.2.1 Occupancy Sensor Required Spaces

ECCCNYS	ECCCNYSStretch	NYCECC
+ open office	+ dining, corridor, transition	+ janitor closets

**Provisions:**

- Lights auto off within 20 minutes (15min NYC)
- Manual on or auto on to ≥50% lighting power
- Manual off control

**Required for:**

- Classrooms
- Lecture hall
- Training rooms
- Conference
- Multipurpose
- Copy/print
- Warehouse
- Breakroom/lounge
- Dining areas
- Corridor/transition areas

- Enclosed offices
- Restroom
- Storage rooms
- Janitor closets
- Locker rooms
- Spaces ≤300ft<sup>2</sup>
- Open office

**Changed**

**Removed**

**Already in NYCECC**

**Combined**

**Added to Stretch & NYCECC**

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## #4

### C405.2.1 Occupancy Sensor Required Spaces

ECCCNYS	ECCCNYSStretch	NYCECC
+ open office	+ dining, corridor, transition	+ janitor closets

**Provisions:**

- Lights auto off within 20 minutes (15min NYC)
- Manual off control

**Required for:**

- Classrooms
- Lecture hall
- Training rooms
- Conference
- Multipurpose
- Copy/print
- Warehouse
- Breakroom/lounge
- Dining areas
- Corridor/transition areas

- Enclosed offices
- Restroom
- Storage rooms
- Janitor closets
- Locker rooms
- Spaces ≤300ft<sup>2</sup>
- Open office

**NYC added back**

• Using occupancy sensors in other spaces typically goes beyond code

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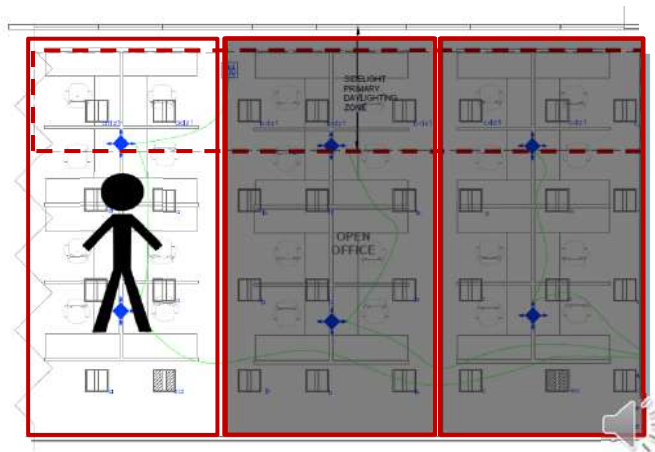
### C405.2.1.3 Open Plan Office OS Control

#5

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	Cafeteria & Fast Food Dining

**Provision:**

- Control areas ≤600ft<sup>2</sup>
- Shut off or reduce lighting ≥80% within 20/15 minutes of occupants leaving
- Shut off when no occupants in entire open office



45

### C405.2.3 Daylight Responsive Controls

#6

Requirement Update	ECCCNYS	ECCCNYSStretch	NYCECC
Alterations (including all control req.)	10% & 50%	10%	10%
Daylight-responsive threshold	150W	100W	100W
Daylight-responsive continuous dim	✓	✓	✓
Daylight Sidelight Access definition	1 x height	0.5 x height	1 x height



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## C503.6 Daylight Responsive Control Alterations

#6

ECCCNYS	ECCCNYSStretch	NYCECC
10% & 50%	10%	10%

### State and City

#### C503.6 Lighting Systems

New Lighting Systems that are part of the *alteration* shall comply with Section C405.

Exception: *Alterations* that replace less than 10 percent of the luminaires in a space, provided that such *alterations* do not increase the installed interior lighting power.

#### NYS ONLY

Section C503.1 General Alterations to any building or structure ...

Exceptions: 8. *Alterations* that replace less than fifty percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.



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## ASHRAE Daylight Responsive Control Alterations

#6

### ASHRAE 90.1-2016

#### 9.1.2 Lighting Alterations

For the *alteration* of any *lighting system* in an interior *space*, that *space* shall comply with the *lighting power density (LPD)* allowances of Section 9.5.1 or 9.6.1 and the *control* requirements of Section 9.4.1.1 (a), (b), (c), (d), (g), (h), and (i), as applicable to that *space*.



#### NYCECC 2020 – ASHRAE Path

#### Section 9.1.2 Lighting Alterations

Section 9.1.2 - Revise the first sentence of Section 9.1.2 to read as follows:

For the alteration of any lighting system in an interior space, that space shall comply with the lighting power density (LPD) allowances of Section 9.2.2.3 and the control requirements of Section 9.4.1.1, as applicable to that space.



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## #6

### C405.2.3 Daylight Responsive Wattage Threshold

ECCCNYS	ECCCNYSStretch	NYCECC
150W	100W	100W

**C405.2.3 and ASHRAE 90.1 Sections 9.4.1.1(e) and (f)**  
 NYC lowered the threshold that triggers Daylight Responsive Control Requirements to **100 watts**

**ECCCNYS 2016  
&  
NYC ECC 2016**

**150 watt  
Threshold**

**NYS ECC 2020**

**150 watt  
Threshold**

**NYC ECC 2020**

**100 watt  
Threshold**

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## #6

### C405.2.3 Daylight Responsive Controls

**The IECC Path requires all lighting to be Daylight Responsive**  
**In ASHRAE, only the general lighting has to be daylight responsive**

IECC Path	If > 100 Watts of General Lighting	<b>Most</b> lighting must be daylight responsive
ASHRAE Path-Primary	If ≥ 100 Watts of General Lighting	<b>General</b> lighting must be daylight responsive
ASHRAE Primary + Secondary	If ≥ 200 Watts of General Lighting	<b>General</b> lighting must be daylight responsive

50

## #6

### C405.2.3.1 Daylight Responsive Control Dimming

ECCCNYS	ECCCNYSStretch	NYCECC
✓	Uses IECC 2018	✓

**C405.2.3.1 as Amended by NYS and incorporated into NYC ECC**


**[NY] C405.2.3.1 Daylight-responsive control function.** 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:

...

4. *Daylight responsive controls* shall dim lights continuously from full *design* light power to 40 percent of full design light power or lower.

5. *Daylight responsive controls* shall be configured to completely shut off all controlled lights.

...



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## #6

### C405.2.3.1 Daylight Responsive Control Dimming

ECCCNYS	ECCCNYSStretch	NYCECC
✓	Uses IECC 2018	✓

**IECC 2018 & NYStretch**

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:

...

4. Where located in offices, classrooms, laboratories and library reading rooms, *daylight responsive controls* shall dim lights continuously from full light output to 15 percent of full light output or lower.

...

**NYStretch Energy Code – 2020 – Unaffected Provisions**

The chapters, sections, tables, and other provisions in the 2018 IECC and ASHRAE 90.1-2016 not amended by NYStretch Code shall continue in full force and effect. Nothing in the NYStretch Code shall be construed as deleting all or part of any unaffected provision.



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### C405.2.3.1 Daylight Responsive Control Dimming

#6

ECCCNYS	ECCCNYSStretch	NYCECC
✓ limited	Uses IECC 2018	✓

**ASHRAE 90.1-2016, 9.4.1.1 (e) and (f) not amended by NYC**

#### 9.4.1.1 (e) 2. and 9.4.1.1 (f) 1.

The photocontrol shall reduce electric lighting in response to available daylight using continuous dimming or with at least one control point between 50% and 70% of design lighting power, a second control point between 20% and 40% of design lighting power or the lowest dimming level the technology allows, and a third control point that turns off all the controlled lighting.



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### C405.2.3.2 Daylight Sidelit Access Definition

#6

ECCCNYS	ECCCNYSStretch	NYCECC
<1 x height	>0.5 x height <b>ERROR</b>	<1 x height

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

...

3. The distance from the fenestration to any building or geological formation that would block access to daylight **is greater than the height** from the bottom of the fenestration to the top of the building or geological formation.



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## C405.2.3.2 Daylight Sidelit Access Definition #6

Where  $D > H$  = Sidelit Daylight Zone

**IECC 2018**  
**ECCNYS 2020**  
**ECCNYC 2020**

3. The distance from the fenestration to any building or geological formation that would block access to daylight is greater than the height from the bottom of the fenestration to the top of the building or geological formation.

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## C405.2.3.2 Daylight Sidelit Access Definition #6

ECCCNYS	ECCCNYSStretch	NYCECC
1 x height	0.5 x height	1 x height

**C405.2.3.2 sidelight daylight zone, in NY State Stretch Energy Code - 2020 – v1 July 2019:**

**C405.2.3.2 Sidelit zone.** The sidelit zone is the floor area adjacent to vertical *fenestration* that complies with all of the following:

...

3. The distance from the fenestration to any building or geological formation that would block access to daylight is no greater than one-half of the height from the bottom of the fenestration to the top of the building or geologic formation.

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### C405.2.3.2 Daylight Sidelit Access Definition #6

**NYStretch 2020**

3. The distance from the fenestration to any building or geological formation that would block access to daylight is **no greater** than the half height from the bottom of the fenestration to the top of the building or geological formation.

$D \leq 0.5 \times H = \text{Sidelit Daylight Zone}$

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### C405.2.3.2 Daylight Sidelit Access Definition #6

**NYStretch 2020**

3. The distance from the fenestration to any building or geological formation that would block access to daylight is **no greater** than the half height from the bottom of the fenestration to the top of the building or geological formation.

$D \leq 0.5 \times H = \text{Sidelit Daylight Zone}$

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## ASHRAE Daylight Sidelit Access Definition #6

**ECCNYC 2020 Addendum CA ASHRAE/IES 90.1 Exception to 9.4.1.1 (e)**  
 1. Primary sidelighted areas where the top of any existing adjacent structure is twice as high above the distance as its distance away from the windows

When  $H \geq 2xD \neq$  Sidelit Daylight Zone

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## C405.2.3.3 Daylight Control LPA Reduction Tradeoff #7

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

4. 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 ( $LPA_{adj}$ ) calculated in accordance with Equation 4-9

$$LPA_{adj} = \left[ \frac{LPA_{norm} \times (1.0 - 0.4 \times UDZFA)}{TBFA} \right] \quad \text{(Equation 4-9)}$$

where:

- $LPA_{adj}$  = Adjusted building interior lighting power allowance in watts.
- $LPA_{norm}$  = 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.
- $UDZFA$  = Uncontrolled daylight zone floor area is the sum of all sidelit and toplit zones, calculated in accordance with Sections C405.2.3.2 and C405.2.3.3, that do not have daylight responsive controls.
- $TBFA$  = Total building floor area is the sum of all floor areas included in the lighting power allowance calculation in Section C405.3.2.

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### C405.2.3.3 Daylight Control LPA Reduction Tradeoff

#7

$$LPA_{adj} = [LPA_{norm} \times (1.0 - 0.4 \times UDZFA/TBFA)] \quad \text{(Equation 4-9)}$$

*Uncontrolled Daylight Zone Floor Area*

*Total Building Floor Area*

**Example:**

TBFA = 10,000 ft<sup>2</sup> office, UDZFA = 1,000 ft<sup>2</sup>, LPA<sub>C405.3</sub> = 0.69 W/ft<sup>2</sup> (BAM)

$$LPA_{norm} = 0.69 \times .90 = 0.621 \text{ W/ft}^2$$

*90% LPA from C406*

$$LPA_{adj} = 0.621 \text{ W/ft}^2 \times (1.0 - 0.4 \times 1,000/10,000)$$

$$LPA_{adj} = 0.596 \text{ W/ft}^2$$



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### C405.3.1 Total Connected Interior Lighting Power

#8

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

$$TCLP = [LVL + BLL + LED + TRK + OTHER] \quad \text{(Equation 4-10)}$$

LVL – Luminaires with line voltage lamps – rated wattage of lamp, not luminaire

BLL – rated wattage of ballast or transformer

LED – wattage of dedicated LED luminaire

TRK - wattage of luminaires or 8 watts per linear foot, current limiter or transformer

Other – All others



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### C405.3.1 Total Connected Interior Lighting Power #8

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

**TCLP = [LVL + BLL + LED + TRK + OTHER]**

**LVL** – Luminaires with line voltage lamps – **rated wattage of lamp, not luminaire**

**BLL** – rated wattage of ballast or transformer



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### C405.3.1 Total Connected Interior Lighting Power #8

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

**TCLP = [LVL + BLL + LED + TRK + OTHER]**

**LED** – rated wattage of dedicated LED luminaire, with integral or remote drivers



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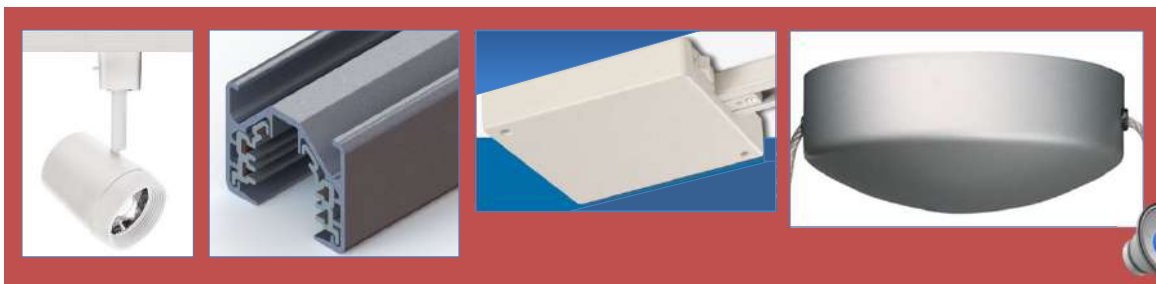
### C405.3.1 Total Connected Interior Lighting Power

#8

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

**TCLP = [LVL + BLL + LED + TRK + OTHER]**

**TRK** - wattage of luminaires or **≥ 8 watts per linear foot**, current limiter or transformer



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### C405.3.2(1) Interior Lighting Power **BAM**

#8

ECCCNYS	ECCCNYSStretch	NYCECC
✓	Lower yet	Some even lower

Building Area Type	NYC 2016	NYS 2020	NYC ECC 2020 Both Paths	Δ NYC 2016 to NYC 2020
Dining: Bar Lounge/leisure	1.01	<b>0.90</b>	<b>0.69 *</b>	32 %
Dormitory	0.57	<b>0.61</b>	<b>0.52 *</b>	9 %
Health Care Clinic	0.90	<b>0.82</b>	<b>0.68 *</b>	24 %
Hospital	1.05	<b>1.05</b>	<b>0.86 *</b>	18 %
Hotel/Motel	0.87	<b>0.75</b>	<b>0.70</b>	20 %
Multi-family	0.51	<b>0.68</b>	<b>0.49</b>	4 %
Museum	1.02	<b>1.06</b>	<b>0.68</b>	33 %
Office	0.82	<b>0.79</b>	<b>0.69</b>	16 %
Parking Garage	0.21	<b>0.15</b>	<b>0.12 *</b>	40 %
Retail	1.26	<b>1.06</b>	<b>0.91</b>	28 %
School/University	0.87	<b>0.81</b>	<b>0.76</b>	13 %

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## C405.3.2(2) Interior Lighting Power SBS

#8

Space Type	NYC 2016	NYS 2020	NYC ECC 2020 Both Paths	Δ NYC 2016 to NYC 2020
Audience Seating PAC	2.43	2.03	2.03	16 %
Classroom/Lecture Hall/Training	1.24	0.96	0.74	40 %
Corridor	0.66	0.66	0.58	12 %
Dining - Family	0.89	0.71	0.54 *	39 %
Electrical/Mechanical Room	0.95	0.43	0.39 *	59 %
Laboratory – non-classroom	1.81	1.45	1.45	20 %
Lobby - Elevator	0.64	0.68	0.52 *	20 %
Office - Enclosed	1.00	0.93	0.85	15 %
Office - Open	0.90	0.81	0.78	13 %
Sales Area	1.30	1.22	1.06	18 %
Health Care – Exam treatment	1.66	1.68	1.16	30 %



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## C405.3.2 Interior Lighting Power Unfinished Spaces

#8

ECCCNYS	ECCCNYSStretch	NYCECC
		0.2W/Ft <sup>2</sup>

Buildings with unfinished spaces shall use the Space-by-Space Method.

### Section C405.3.2.2 Space-by-Space Method.

Where a building has unfinished spaces, the lighting power allowance for the unfinished spaces shall be the total connected lighting power for those spaces, or 0.2 watts per square foot, whichever is less.



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### C405.3.2.2.1 Additional Interior Lighting Power

#8

1. For lighting equipment to be installed in sales areas specifically to highlight merchandise, the additional lighting power shall be determined in accordance with Equation 4-11

1,000 W +



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### C405.3.2.2.1 Additional Interior Lighting Power

#8

2. For spaces in which lighting is specified to be installed in addition to the general lighting for the purpose of decorative appearance or for highlighting art or exhibits, provided that the additional power shall be not more than 0.9 W/ft<sup>2</sup> (9.7 W/m<sup>2</sup>) in lobbies and not more than 0.75 W/ft<sup>2</sup> (8.1 W/m<sup>2</sup>) in other spaces.



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## #9

### C405.2.6 Exterior Lighting Controls

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓


**General section reorganization – now C405.2.6**

Landscape & Façade Lighting → Decorative Lighting


All Other Lighting → Setback Lighting

Exceptions:

1. Lighting for covered vehicle entrances and exits from buildings and parking structures where required for eye adaptation.
2. Lighting controlled from within dwelling units.



Source: <https://www.priceedwards.com/oklahoma-city-property/office/>



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## #9

### C405.2.6 Exterior Lighting Controls


ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓


**Requirements**

1. Daylight Shut-Off
 

C405.2.6.1 Daylight shutoff. Lights shall be automatically turned off when daylight is present and satisfies the lighting needs.
2. Decorative Lighting Shut-off
 

C405.2.6.2 Decorative lighting shutoff. Building facade 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.





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## C405.2.6 Exterior Lighting Controls

#9

ECCCNYS	ECCCNYSStretch	NYCECC
30%	50%	50%

### Requirements

#### 3. Lighting setback

[NY] C405.2.6.3 Lighting setback. Lighting that is not controlled in accordance with Section C405.2.6.2 shall be controlled so that the total wattage of such lighting is automatically reduced by not less than 30 percent by selectively switching off or dimming luminaires at one of the following times:

#### Stretch, NYCECC, ASHRAE 90.1 paths

C405.2.6.3 Lighting setback. Lighting not controlled in accordance with Section C405.2.6.2 shall 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 times:

#### When:

1. Setback from midnight to no earlier than 6am
2. Not later than one hour after business close to not earlier than one hour before business opening
3. No activity detected for 15 minutes (occupancy sensor)



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## C405.2.6.3 (4) Parking Area Setback Controls

#9

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

#### 4. Each luminaire serving outdoor parking areas

- Rated input greater than 78W
- Mounting height ≤ 24 feet
- Reduce power ≥ 50% within 15min of no activity
- No more than 1500W controlled together



Source: <https://www.actionservicesgroup.com>

#### NYStretch Code ONLY

Exemption: Outdoor parking with <1000W power



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## Table C405.4.2(2) Lighting Power Exterior

#9

Exterior Lighting Zone 3	NYC 2016	NYS 2020 Both Paths	NYC ECC 2020 Both Paths	Δ NYC 2016 to NYC 2020
Base Site Allowance	750 W	500 W	500 W	33 %
Parking Areas and Drives	0.10	0.06	0.05	50 %
Walkways and Ramps <10ft wide	0.8 W/lin ft	0.6 W/lin ft	0.6 W/lin ft	25 %
Walkways and Ramps >10ft wide	0.16	0.11	0.11	31 %



Parking Areas and Drives ≤ 0.05 W/ft<sup>2</sup>



Walkways, Ramps, Plaza ≤ 0.11 W/ft<sup>2</sup>



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## C406 Additional Efficiency Options

#10

ECCCNYS	ECCCNYSStretch	NYCECC
✓	✓	✓

### Comply with at least one:

1. More efficient HVAC performance
2. **Reduced lighting power**
3. **Enhanced digital lighting controls**
4. On-site renewable energy
5. Dedicated outdoor air provision
6. High-efficiency water heating
7. **Enhanced envelope performance**
8. **Reduced air infiltration**

All buildings must select and comply with at least one additional efficiency option packages

### Key Exceptions:

- **Tenant spaces alterations which previously complied with one of these provisions**



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## C406 Additional Efficiency Options #10

**NYCECC & NYStretch IECC Path**

Comply with at least one:


1. More efficient HVAC performance
2. **Reduced lighting power**
3. **Enhanced digital lighting controls**
4. ~~On-site renewable energy~~
5. Dedicated outdoor air provision
6. High-efficiency water heating
7. Enhanced envelope performance
8. Reduced air infiltration

### Removed

All buildings must select and comply with at least one additional efficiency option packages

Key Exceptions:

- Tenant spaces alterations which previously complied with one of these provisions



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## C406 Additional Efficiency Options #10

**NYCECC ASHRAE Path**

4.2.1.1 New Buildings  
New buildings shall comply with either the provisions of

- a. Section 5, "Building Envelope"; Section 6, "Heating, Ventilating, and Air Conditioning"; Section 7, "Service Water Heating"; Section 8, "Power"; Section 9, "Lighting"; Section 10, "Other Equipment"; and Appendix I "Required Additional Efficiency Packages," or
- b. Section 11, "Energy Cost Budget Method," or
- c. Appendix G, "Performance Rating Method," using one of the following:

**Additional efficiency packages added to ASHRAE Path**



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# C406 Additional Efficiency Options

#10

## NYCECC ASHRAE Path

Normative Appendix I  
Required Additional Efficiency Packages

### II. GENERAL

#### II.1 Requirements

New buildings shall comply with at least one of the following sections:

1. More efficient HVAC equipment in accordance with Section I2.
2. Reduced lighting power density in accordance with Section I3.
3. Enhanced digital lighting controls in accordance with Section I4.
4. Dedicated outdoor air systems with energy recovery ventilation in accordance with Section I5.
5. High-efficiency service water heating in accordance with Section I6.
6. Enhanced envelope performance in accordance with Section I7.
7. Reduced air infiltration in accordance with Section I8.

Same as NYCECC IECC Path,  
without onsite renewable energy



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# NYC Energy Code – Two Paths



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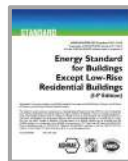
## NYC Energy Code – Two Paths

NYC only accepts ASHRAE for Total Building Performance method

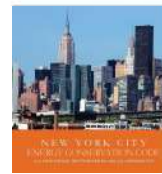
### SECTION ECC C407 TOTAL BUILDING PERFORMANCE

#### C407.1 Scope.

This section establishes criteria for compliance using total building performance. Buildings following the total building performance path must comply with ASHRAE 90.1–2016 (as amended), as set forth in Appendix CA of this code, demonstrating compliance under Section 11 or Appendix G of such standard.



**NYC**  
Buildings  
Amendments



NYCECC Appendix CA

**2020 NYCEC**  
ASHRAE/IES  
90.1 - 2016

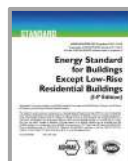


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## NYC Energy Code – Two Paths



- ASHRAE 90.1-2016, the most current version of the standard, is the referenced standard for energy performance.



**NYC**  
Buildings  
Amendments



NYCECC Appendix CA

**2020 NYCEC**  
ASHRAE/IES  
90.1 - 2016



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## Future Codes, Efficiency and Sustainability

Local Law 88 of 2009 and Local Law 132 of 2016

- Lighting upgrades for all Commercial buildings  
> 25,000 square feet completed by **2025**



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## Future Codes, Efficiency and Sustainability

### Greenhouse Gas Emission Caps

#### NYCECC OF THE FUTURE

- **Intro 1253 of 2019**
  - Sets Greenhouse Gas emission caps on existing buildings beginning in 2024
  - Caps will reduce over time to require deep-energy retrofits of all buildings 25,000 sq. ft. and greater, based on their occupancy
- Future legislation is expected to target net-zero performance for all new buildings by 2030
- Future legislation is expected to address smaller buildings to mandate deep-energy retrofits

### Stretch Code and EUI

#### NYCECC of the Future

##### Local Law 32 of 2018

- Mandates that we adopt the next version of the NYStretch Code, if it exists, in 2022
- Requires that the 2025 Code set absolute limits on energy consumption in buildings 25,000 sq. ft. and greater, based on a to-be-determined metric (such as energy use intensity, or EUI, or carbon)



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## Links to free online codes:

New York State Energy Conservation Construction Code 2020

<https://codes.iccsafe.org/content/ECCNYS2020/ecccnys-commercial-provisions-chapter-4-ce-commercial-energy-efficiency>

New York State Stretch Energy Code 2020

<https://www.nyserda.ny.gov/-/media/Files/Programs/energy-code-training/NYStretch-Energy-Code-2020.pdf>

New York City Energy Conservation Code 2020 – NYC website

<https://www1.nyc.gov/site/buildings/codes/energy-conservation-code.page>



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## Links to free online codes:

New York City Energy Conservation Code 2020 – **ICC website**

<https://codes.iccsafe.org/content/NYCECC2020P1/chapter-c4-commercial-energy-efficiency>

ECCNYS 2020  
change to IECC  
2018 included in  
NYCECC 2020

NYCECC 2020  
change

### C405.2.3.1 Daylight-responsive control function.

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:

1. Lights in *toplit zones* in accordance with Section C405.2.3.3 shall be controlled independently of lights in *sidelit zones* in accordance with Section C405.2.3.2.
  2. *Daylight responsive controls* within each space shall be configured so that they can be calibrated from within that space by authorized personnel.
  3. Calibration mechanisms shall be in a location with *ready access*.
  4. *Daylight responsive controls* shall dim lights continuously from full design light power to 40 percent of full design light power or lower.
  5. *Daylight responsive controls* shall be configured to completely shut off all controlled lights.
  6. Lights in *sidelit zones* in accordance with Section C405.2.3.2 facing different cardinal orientations [within 45 degrees (0.79 rad) of due north, east, south, west] shall be controlled independently of each other.
- Exception:** Up to 100 watts of lighting in each space is permitted to be controlled together with lighting in a daylight zone facing a different cardinal orientation.




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This concludes The American Institute of Architects Continuing Education Systems Course




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Designers Lighting Forum

## Stretch Codes Putting a Squeeze? Energy Code Yoga and Updates



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Wednesday, August 19, Noon – 1:30pm



leducation.

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# APPENDIX INFORMATION

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## C405.2 Lighting Controls (Mandatory)

2 – addition of C405.2.5 Manual Control section,  
no longer part of Time-switch section.

Changes Exterior lighting controls to C405.2.6

No change to exceptions

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## C405.2.2 Time-switch Controls

Fixed the exception:

Previous language said, “Where a manual control provides light reduction in accordance with Section C405.2.2.2, **automatic controls** shall not be required for the following:” This caused confusion, because OS are also automatic controls.

“automatic controls” replaced with “time-switch controls”

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### **C405.2.2.1 Time-switch control function**

- Confusing language that time-switch control is an over-ride control. Fixed in 2021
- Time-switch functional requirements not changed
- Exception 1: Now mall concourses, auditoriums, sales areas, manufacturing facilities and sports arenas
  - Previously malls, arcades, auditoriums, single-tenant retail facilities, industrial facilities and arenas.
  - Broadens retail exemption, clarifies manufacturing, not industrial. Clarifies mall concourse, but broadened retail sales areas, means same exemption.
- Exception 2 unchanged – but is a light reduction control exception, so should really be part of the next section

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### **C405.2.2.2 Light Reduction Controls**

- Light reduction controls are a sub-section of Time-switch controls, so only spaces with time-switch are required to include light reduction. Spaces with OS do not require manual light reduction. ASHRAE 90.1 can be different
- Exception, manual light reduction is not required in daylight zones with daylight responsive controls. Also different from 90.1. Interesting thought, Daylight zones that don't require daylight responsive controls, could require light reduction. Can we think of valid examples that wouldn't be OS spaces?

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### C405.2.3.3 Toplit Daylight Zone

- Monitor zone definition unchanged
- Rewording of criteria 3 and 4 with same net results

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### C405.2.4 Specific Application Controls

#### General reorganization of section:

- Clarification that OS or TS plus manual control must be provided for 4 types of special applications
- Sleeping Units no longer defined as only Hotel, motel and guest suites. Similar control requirements and exception for spaces with Card Key controls
- Exception for patient care spaces
- **Dwelling Unit control requirements, when NOT using R404.1 compliance path: permanently installed luminaires require OS or TS. NOT required in ASHRAE 90.1**
- TS must be provided for non-visual applications

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## **C405.2.5 Manual Controls**

Manual control language moved out of Time switch Section to C405.2.5, its own section. All usage of the term “Manual Controls” can now reference this section.

**- Allows remote location of manual controls**

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## **C405.2.6.4 Exterior Lighting Control Function**

Adds function of exterior time-switch control with requirements similar to interior TS requirements, without override

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## **C405.3 Interior Lighting Power**

Exceptions not labeled as Exceptions in IECC – NYC add a sentence:

### **Section C405.3.1 Total connected interior lighting power.**

Section C405.3.1- Revise the sentence after Equation 4-10 and its key, and before the enumerated list, in Section C405.3.1 to read as follows:

**Exception:** The connected power associated with the following lighting equipment and applications is not included in calculating total connected lighting power.

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## **C405.3.2(1) Interior Lighting Power BAM**

New footnotes about sleeping units and dwellings units

Footnotes in IECC 2018 cross reference the wrong section, NYC corrected it.

The correct section is R404.1, not R405.1

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### **C405.3.2(1) Interior Lighting Power SBS**

New footnotes about sleeping units and dwellings units  
Footnotes about class of sporting facilities

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### **C405.4.1 Total Connected Exterior Building Exterior Lighting Power**

Change in general language  
Exceptions list expanded –  
Exception for exterior art, fountains and swimming pools added, align with ASHRAE

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