

1 RCNY §5000-02

CHAPTER 5000

New York City Energy Conservation Code

§ 5000-02 Amendment to ASHRAE 90.1 Relating to Lighting Controls and Modeling Requirements. Pursuant to section 28-103.19 of the Administrative Code of the City of New York, ASHRAE 90.1, as modified by section ECC CA102.1 of the 2016 New York City Energy Conservation Code, is hereby amended to read as follows:

4.2.1.2 Additions to Existing Buildings.

Revise Section 4.2.1.2 to read as follows:

4.2.1.2 Additions to Existing Buildings. Additions to existing buildings shall comply with either the provisions of Sections 5, 6, 7, 8, 9, and 10 or Section 11 or Normative Appendix G.

4.2.1.2.1 When an addition to an existing building cannot comply by itself, trade-offs will be allowed by modification to one or more of the existing components of the existing building. Modeling of the modified components of the existing building and addition shall employ the procedures of Section 11 or Normative Appendix G; the addition shall not increase the energy consumption of the existing building plus the addition beyond the energy that would be consumed by the existing building plus the addition if the addition alone did comply.

4.2.1.3 Alterations to Existing Buildings.

Revise Section 4.2.1.3 to read as follows:

4.2.1.3 Alterations to Existing Buildings. Alterations of existing buildings shall comply with the provisions of Sections 5, 6, 7, 8, 9, and 10 or Section 11 or Normative Appendix G.

Exception: Historic buildings need not comply with these requirements.

9.4.1.1 Interior Lighting Controls.

Revise Item c of Section 9.4.1.1 to read as follows:

c. Restricted to partial automatic ON: No more than 50% of the lighting power for the general lighting shall be allowed to be automatically turned on, and none of the remaining lighting shall be automatically turned on. For open plan offices, a control device meeting this requirement shall control no more than 2500 ft².

Table 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method.

Revise Table 9.6.1 to read as follows:

TABLE 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

Informative Note: This table is divided into two sections; this first section covers space types that can be commonly found in multiple building types. The second part of this table covers space types that are typically found in a single building type.			The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.								
			Local Control (See Section 9.4.1.1(a))	Restricted to Manual ON (See Section 9.4.1.1(b))	Restricted to Partial Automatic ON (See Section 9.4.1.1(c))	Bilevel Lighting Control (See Section 9.4.1.1(d))	Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1(e) ⁶)	Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1(f) ⁶)	Automatic Partial OFF (See Section 9.4.1.1(g) (Full Off complies))	Automatic Full OFF (See Section 9.4.1.1(h))	Scheduled Shutoff (See Section 9.4.1.1(i))
Common Space Types ¹	LPD W/ft ²	RCR Threshold	a	b	C	d	e	f	g	h	i
Atrium											
...that is < 20 ft in height	0.03/ft total height	NA	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
...that is ≥ 20 ft and ≤ 40 ft in height	0.03/ft total height	NA	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...that is > 40 ft in height	0.40 + 0.02/ft total height	NA	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Audience Seating Area											
...in an auditorium	0.63	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a convention center	0.82	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a gymnasium	0.65	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a motion picture theater	1.14	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a penitentiary	0.28	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
...in a performing arts theater	2.43	8	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a religious building	1.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a sports arena	0.43	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
...all other audience seating areas	0.43	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
Banking Activity Area											
...in a penitentiary	1.01	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Breakroom (See Lounge/Breakroom)											
Classroom/Lecture hall/Training Room^{8,9}											
...in a penitentiary	1.34	4	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
...all other classrooms/lecture halls/training rooms	1.24	4	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
Conference/Meeting/Multipurpose Room^{8,9}											
...in a penitentiary	1.23	6	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
Confinement Cells											
...in a penitentiary	0.81	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Copy/Print Room											
...in a penitentiary	0.72	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	REQ	-
Corridor²											

...in a facility for the visually impaired (and not used primarily by the staff) ³	0.92	width < 8 ft	REQ	-	-	-	REQ	REQ	REQ	ADD2	ADD2
...in a hospital	0.99	width < 8 ft	REQ	-	-	-	REQ	REQ	ADD2	ADD2	ADD2
...in a manufacturing facility	0.41	width < 8 ft	REQ	-	-	-	REQ	REQ	-	ADD2	ADD2
...all other corridors	0.66	width < 8 ft	REQ	-	-	-	REQ	REQ	REQ	ADD2	ADD2
Courtroom	1.72	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Computer Room	1.71	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Dining Area											
...in a penitentiary	0.96	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a facility for the visually impaired and not used primarily by staff) ³	2.65	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in bar lounge or leisure dining	1.07	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in cafeteria or fast food dining	0.65	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in family dining	0.89	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...all other dining areas	0.65	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Electrical/Mechanical Room⁷	0.42	6	REQ	-	-	-	REQ	REQ	-	-	-
Emergency Vehicle Garage	0.56	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
Food Preparation Area	1.21	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Guest Room	0.91	6	See Section 9.4.1.3b.								
Laboratory											
...in or as a classroom	1.43	6	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
...all other laboratories	1.81	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Laundry/Washing Area	0.60	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Loading Dock, Interior	0.47	6	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
Lobby											
...in a facility for the visually impaired and not used primarily by staff) ³	1.80	4	REQ	-	-	-	REQ	REQ	REQ	ADD2	ADD2
...for an elevator	0.64	6	REQ	-	-	-	REQ	REQ	-	ADD2	ADD2
...in a hotel	1.06	4	REQ	-	-	-	REQ	REQ	-	ADD2	ADD2
...in a motion picture theater	0.59	4	REQ	-	-	-	REQ	REQ	-	ADD2	ADD2
...in a performing arts theater	2.00	6	REQ	-	-	-	REQ	REQ	REQ	ADD2	ADD2
...all other lobbies	0.90	4	REQ	-	-	-	REQ	REQ	REQ	ADD2	ADD2
Locker Room	0.75	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	REQ	-
Lounge/Breakroom^{8,9}											
...in a healthcare facility	0.92	6	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
...all other lounges/breakrooms	0.73	4	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
Office											
...enclosed and ≤ 250 ft ² (^{8,9})	1.0	8	REQ	REQ	-	REQ	REQ	REQ	-	REQ	-
...enclosed and > 250 ft ²	1.0	8	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...open plan	0.90	4	REQ	-	REQ	REQ	REQ	REQ	-	REQ	-
Parking Area, Interior	0.19	4	See Section 9.4.1.2								
Pharmacy Area	1.68	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Restroom											
...in a facility for the visually impaired (and not used primarily by the staff) ³	1.21	8	REQ	-	-	-	REQ	REQ	-	REQ	-
...all other restrooms	0.98	8	REQ	-	-	-	REQ	REQ	-	REQ	-
Sales Area⁴	1.30	6	REQ	ADD1	ADD1	REQ	-	REQ	-	ADD2	ADD2
Seating Area, General	0.54	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
Stairway The space containing the stairway shall determine the LPD and control requirements for the stairway.											
Stairwell	0.69	10	REQ	-	-	REQ	REQ	REQ	REQ	ADD2	ADD2
Storage Room											
... < 50 ft ²	1.24	6	REQ	-	-	-	-	-	-	ADD2	ADD2
... ≥ 50 ft ² and ≤ 1000 ft ²	0.63	6	REQ	ADD1	ADD1	-	REQ	REQ	-	REQ	-

...all other storage rooms	0.63	6	REQ	ADD1	ADD1	-	REQ	REQ	REQ	ADD2	ADD2
Vehicular Maintenance Area	0.67	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Workshop	1.59	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2

**TABLE 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method
and Minimum Control Requirements Using Either Method (Continued)**

Informative Note: This table is divided into two sections; this first section covers space types that can be commonly found in multiple building types. The second part of this table covers space types that are typically found in a single building type.

The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.

Building Type Specific/Space Types ¹	LPD W/ft ²	RCR Threshold	Local Control (See Section 9.4.1.1(a))	Restricted to Manual ON (See Section 9.4.1.1(b))	Restricted to Partial Automatic ON (See Section 9.4.1.1(c))	Bilevel Lighting Control (See Section 9.4.1.1(d))	Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1(e) ⁶)	Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1(f) ⁶)	Automatic Partial OFF (See Section 9.4.1.1(g)) (Full Off complies))	Automatic Full OFF (See Section 9.4.1.1(h))	Scheduled Shutoff (See Section 9.4.1.1(i))
			a	b	c	d	e	f	g	h	i
Facility for the Visually Impaired³											
...in a chapel (used primarily by residents)	2.21	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a recreation room/common living room (and not used primarily by staff)	2.41	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Automotive (See "Vehicular Maintenance Area")											
Convention Center-Exhibit Space	1.45	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Dormitory-Living Quarters	0.38	8	REQ	-	-	-	-	-	-	-	-
Fire Station-Sleeping Quarters	0.22	6	REQ	-	-	-	-	-	-	-	-
Facility for the Visually Impaired³											
...in a recreation room/common living room (and not used primarily by staff)	2.41	6	-	-	-	-	-	-	-	-	-
Gymnasium/Fitness Center											
...in an exercise area	0.72	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a playing area	1.20	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Healthcare Facility											
...in an exam/treatment room	1.66	8	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2
...in an imaging room	1.51	6	REQ	-	-	REQ	-	-	-	ADD2	ADD2
...in a medical supply room	0.74	6	(See "Storage Room" under "Common Space Types" for control requirements)								
...in a nursery	0.88	6	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2
...in a nurse's station	0.71	6	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2
...in an operating room	2.48	6	REQ	-	-	REQ	-	-	-	ADD2	ADD2
...in a patient room	0.62	6	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2
...in a physical therapy room	0.91	6	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2
...in a recovery room	1.15	6	REQ	-	-	REQ	REQ	REQ	-	ADD2	ADD2

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The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.

Building Specific/Space Types ¹	Type	LPD W/ft ²	RCR Threshold	Local Control (See Section 9.4.1.1(a))	Restricted to Manual ON (See Section 9.4.1.1(b))	Restricted to Partial Automatic ON (See Section 9.4.1.1(c))	Bilevel Lighting Control (See Section 9.4.1.1(d))	Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1(e) ⁶)	Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1(f) ⁶)	Automatic Partial OFF (See Section 9.4.1.1(g) (Full Off complies))	Automatic Full OFF (See Section 9.4.1.1(h))	Scheduled Shutoff (See Section 9.4.1.1(i))
				a	b	c	d	e	f	g	h	i
Library												
...in a reading area		1.06	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in the stacks		1.71	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
Manufacturing Facility												
...in a detailed manufacturing area		1.29	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in an equipment room		0.74	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in an extra high bay area (> 50 ft floor-to-ceiling height)		1.05	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a high bay area (25-50 ft floor-to-ceiling height)		1.23	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a low bay area (< 25 ft floor-to-ceiling height)		1.19	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Museum												
...in a general exhibition area		1.05	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a restoration room		1.02	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Performing Arts Theater-Dressing Room		0.61	6	REQ	ADD1	ADD1	REQ	REQ	REQ	-	REQ	-
Post Office-Sorting Area		0.94	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
Religious Buildings												
...in a fellowship hall		0.64	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...in a worship/pulpit/choir area	a	1.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Retail Facilities												
...in a dressing/fitting room		0.71	8	REQ	ADD1	ADD1	REQ	-	REQ	-	REQ	-
...in a mall concourse		1.10	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Sports Arena-Playing Area												
...for a Class I facility		3.68	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...for a Class II facility		2.40	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
...for a Class III facility		1.80	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2

Informative Note: This table is divided into two sections; this first section covers space types that can be commonly found in multiple building types. The second part of this table covers space types that are typically found in a single building type.

The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.

Building Type Specific/Space Types ¹	LPD W/ft ²	RCR Threshold	Local Control (See Section 9.4.1.1(a))	Restricted to Manual ON (See Section 9.4.1.1(b))	Restricted to Partial Automatic ON (See Section 9.4.1.1(c))	Bilevel Lighting Control (See Section 9.4.1.1(d))	Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1(e) ⁶)	Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1(f) ⁶)	Automatic Partial OFF (See Section 9.4.1.1(g) Full Off complies)	Automatic Full OFF (See Section 9.4.1.1(h))	Scheduled Shutoff (See Section 9.4.1.1(i))
			a	b	c	d	e	f	g	h	i
...for a Class IV facility	1.20	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Transportation Facility											
...in a baggage/carousel area	0.53	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
...in an airport concourse	0.36	4	REQ	ADD1	ADD1	-	REQ	REQ	-	ADD2	ADD2
...at a terminal ticket counter	0.80	4	REQ	ADD1	ADD1	REQ	REQ	REQ	-	ADD2	ADD2
Warehouse-Storage Area											
...for medium to bulky, palletized items	0.58	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
...for smaller, hand-carried items ⁵	0.95	6	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2

1. In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.
2. In corridors, the extra lighting power density allowance is permitted when the width of the corridor is less than 8 ft and is not based on the RCR.
3. A "Facility for the Visually Impaired" is a facility that can be documented as being designed to comply with the light levels in ANSI/IES RP-28 and is licensed or will be licensed by local/state authorities for either senior long-term care, adult daycare, senior support and/or people with special visual needs.
4. For accent lighting, see Section 9.6.2(b).
5. Sometimes referred to as a "Picking Area."
6. Automatic daylight responsive controls are mandatory only if the requirements of the specified sections are present.
7. An additional 0.53w/ft² shall be allowed, provided that the additional lighting is controlled separately from the base allowance of 0.42 W/ft². The additional 0.53 w/ft² allowance shall not be used for any other purpose.
8. Occupant sensor shall not have an override switch that converts from manual-on to automatic-on functionality.
9. The occupant sensor may have a grace period of up to 30 seconds to turn on the lighting automatically after the sensor has turned off the lighting if occupancy is detected.

APPENDIX G – PERFORMANCE RATING METHOD

G1.3 Trade-Off Limits.

Revise Section G1.3 to read as follows:

G1.3 Trade-Off Limits. RESERVED.

TABLE G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance.

Revise Item 2 of Table G3.1 to read as follows:

No.	Proposed Building Performance	Baseline Building Performance
2. Additions and Alterations		
<p>It is acceptable to predict performance using building models that exclude parts of the existing building provided that all of the following conditions are met:</p> <ul style="list-style-type: none"> a. Work to be performed in excluded parts of the building shall meet the requirements of Sections 5 through 10. b. Excluded parts of the building are served by HVAC systems that are entirely separate from those serving parts of the building that are included in the building model. c. Design space temperature and HVAC system operating setpoints and schedules on either side of the boundary between included and excluded parts of the building are essentially the same. d. If a declining block or similar utility rate is being used in the analysis, and the excluded and included parts of the building are on the same utility meter, the rate shall reflect the utility block or rate for the building plus the addition. 	<p>If the proposed building model excluded parts of the existing building, the baseline building model shall exclude them as well.</p> <p>When modeled, unmodified existing building component shall follow the same rules as new and modified building components.</p>	

Revise Item 6 of Table G3.1 to read as follows:

No.	Proposed Building Performance	Baseline Building Performance
6.	Lighting	
	<p>Lighting power in the proposed design shall be determined as follows:</p> <ol style="list-style-type: none"> Where a complete lighting system exists, the actual lighting power for each thermal block shall be used in the model. Where a lighting system has been designed and submitted with design documents, lighting power shall be determined in accordance with Sections 9.1.3 and 9.1.4. Where lighting neither exists nor is submitted with design documents, lighting shall comply with but not exceed the requirements of Section 9. Where space types are known, lighting power shall be determined in accordance with the Space-by-Space Method. Where space types are not known, lighting power shall be determined in accordance with the Building Area Method. Lighting system power shall include all lighting system components shown or provided for on the plans (including lamps and ballasts and task and furniture-mounted fixtures). <p>Exception: For multifamily dwelling units, hotel/motel guest rooms, and other spaces in which lighting systems are connected via receptacles and are not shown or provided for on building plans, assume identical lighting power for the proposed and baseline building designs in the simulations.</p> <ol style="list-style-type: none"> Lighting power for parking garages and building facades shall be modeled. For lighting controls, at a minimum, the proposed building design shall contain the mandatory automatic lighting controls specified in Section 9.4.1 (e.g., automatic daylight responsive controls, occupancy sensors, programmable controls, etc.). These controls shall be modeled in accordance with (g) and (h). Automatic daylighting responsive controls shall be modeled directly in the proposed building design or through schedule adjustments determined by a separate daylighting analysis approved by the rating authority. Modeling and schedule adjustments shall separately account for primary sidelighted areas, secondary sidelighted areas, and toplighted areas. Other automatic lighting controls included in the proposed building design shall be modeled directly in the building simulation by reducing the lighting schedule each hour by the occupancy sensor reduction factors in Table G3.7 for the applicable space type. This reduction shall be taken only for lighting controlled by the occupancy sensors. Credit for other programmable lighting control in buildings less than 5,000 ft² can be taken by reducing the lighting schedule each hour by 10%. 	<p>Interior lighting power in the baseline building design shall be determined using the values in Table G3.7.</p> <p>Exceptions: Where lighting neither exists nor is submitted with design documents, and the proposed building lighting power is determined in accordance with the Building Area Method, the baseline lighting power shall be determined in accordance with Table G3.8.</p> <p>Lighting shall be modeled having the automatic shutoff controls in buildings > 5000 ft² and occupancy sensors in employee lunch and break rooms, conference/meeting rooms, and classrooms (not including shop classrooms, laboratory classrooms, and preschool through 12th grade classrooms). These controls shall be reflected in the baseline building design lighting schedules. No additional automatic lighting controls (e.g., automatic controls for daylight utilization and occupancy sensors in space types not listed above) shall be modeled in the baseline building design.</p> <p>Exterior lighting in areas identified as “Tradable Surfaces” in Table G3.6 shall be modeled with the baseline lighting power shown in Table G3.6. Other exterior lighting shall be modeled the same in the baseline building as in the <i>proposed design</i>.</p>

TABLE G3.1.1-4 Baseline System Descriptions

Revise Table G3.1.1-4 to read as follows:

TABLE G3.1.1-4 Baseline System Descriptions

System No.	System Type	Fan Control	Cooling Type (1)	Heating Type (1)
1. PTAC	Packaged terminal air conditioner	Constant volume	Direct expansion	Hot-water fossil fuel boiler
2. PTHP	Packaged terminal heat pump	Constant volume	Direct expansion	Electric heat pump
3. PSZ-AC	Packaged rooftop air conditioner	Constant volume	Direct expansion	Fossil fuel furnace
4. PSZ-HP	Packaged rooftop heat pump	Constant volume	Direct expansion	Electric heat pump
5. Packaged VAV with Reheat	Packaged rooftop VAV with reheat	VAV	Direct expansion	Hot-water fossil fuel boiler
6. Packaged VAV with PFP Boxes	Packaged rooftop VAV with parallel fan power boxes and reheat	VAV	Direct expansion	Electric resistance
7. VAV with Reheat	VAV with reheat	VAV	Chilled water	Hot-water fossil fuel boiler
8. VAV with PFP Boxes	VAV with parallel fan-powered boxes and reheat	VAV	Chilled water	Electric resistance
9. Heating and Ventilation	Warm air furnace, gas fired	Constant volume	None	Fossil fuel furnace
10. Heating and Ventilation	Warm air furnace, electric	Constant volume	None	Electric resistance
11. SZ-VAV	Single-zone VAV	VAV	Chilled water	See note 2.
12. SZ-CV-HW	Single zone	Constant volume	Chilled water	Hot-water fossil fuel boiler
13. SZ-CV-ER	Single zone	Constant volume	Chilled water	Electric resistance

Notes:

1. For purchased chilled water and purchased heat, see G3.1.1.3.
2. For Climate Zones 0 through 3a, the heating type shall be electric resistance. For all other climate zones the heating type shall be hot-water fossil fuel boiler.

G3.1.3.5 Hot-Water Pumps.

Revise Section G3.1.3.5 to read as follows:

G3.1.3.5 Hot-Water Pumps. The baseline building design hot-water pump power shall be 19 W/gpm. The pumping system shall be modeled as primary-only with continuous variable flow and a minimum of 25% of the design flow rate. Hot-water systems serving 120,000 ft² or more shall be modeled with variable-speed drives, and systems serving less than 120,000 ft² shall be modeled as riding the pump curve.

Exception: The pump power for systems using purchased heat shall be 14 W/gpm.

G3.1.3.10 Chilled-Water Pumps.

Revise Section G3.1.3.10 to read as follows:

G3.1.3.10 Chilled-Water Pumps. Chilled-water systems shall be modeled as primary/secondary systems with constant flow primary loop and variable flow secondary loop. For systems with a cooling capacity of 300 tons or more, the secondary pump shall be modeled with variable-speed drive and a minimum flow of 25% of the design flow rate. For systems with less than 300 tons cooling capacity the secondary pump shall be modeled as riding the pump curve. The baseline building constant-volume primary pump power shall be modeled as 9 W/gpm and the variable-flow secondary pump power shall be modeled as 13 W/gpm at design conditions. For computer room systems using System 11 with an integrated water-side economizer, the baseline building design primary chilled-water pump power shall be increased by 3 W/gpm for flow associated with the water-side economizer.

Exception: For systems using purchased chilled water, the building distribution pump shall be modeled with variable-speed drive, a minimum flow of 25% of the design flow rate, and a pump power of 16 W/gpm.

G3.1.3.11 Heat Rejection.

Revise Section G3.1.3.11 to read as follows:

G3.1.3.11 Heat Rejection (Systems 7, 8, 11, and 12). The heat rejection device shall be an axial-fan open-circuit cooling tower with variable-speed fan control and shall have an efficiency of 38.2 gpm/hp at the conditions specified in Table 6.8.1-7. Condenser water design supply temperature shall be calculated using the cooling tower approach to the 0.4% evaporation design wet-bulb temperature as generated by the formula below, with a design temperature rise of 10°F.

$$\text{Approach}_{10^{\circ}\text{F Range}} = 25.72 - (0.24 \times \text{WB})$$

where WB is the 0.4% evaporation design wet-bulb temperature in °F; valid for wet bulbs from 55°F to 90°F.

The tower shall be controlled to maintain a 70°F leaving water temperature where weather permits, floating up to leaving water temperature at design conditions. The baseline building design condenser-water pump power shall be 19 W/gpm. For computer room systems using System 11 with an integrated water-side economizer, the baseline building design condenser water-pump power shall be increased 3 W/gpm for flow associated with the water-side economizer. Each chiller shall be modeled with separate condenser water and chilled-water pumps interlocked to operate with the associated chiller.

TABLE G3.7 Performance Rating Method Lighting Power.

Revise Table G3.7 to read as follows:

TABLE G3.7 Performance Rating Method Lighting Power Densities and Occupancy Sensor Reductions Using the Space-by-Space Method

Common Space Types^a	Lighting Power Density, W/ft²	Occupancy Sensor Reduction^b	Building Type Specific Space Types^a	Lighting Power Density, W/ft²	Occupancy Sensor Reduction^b
Audience Seating Area			Assisted Living Facility		
...in an auditorium	0.90	10%	...in a chapel (used primarily by residents)	2.77	10%
...in a convention center	0.70	10%	...in a recreation room (used primarily by residents)	3.02	10%
...in an exercise center	0.30	10%	Automotive (See "Vehicular Maintenance Area")		
...in a gymnasium	0.40	10%	Convention Center – Exhibit Space	1.30	35%
...in a motion picture theater	1.20	10%	Dormitory – Living Quarters	1.11	10%
...in a penitentiary	0.70	10%	Fire Station – Sleeping Quarters	0.30	10%
...in a performing arts theater	2.60	10%	Gymnasium/Fitness Center		
...in a religious building	1.70	10%	...in an exercise area	0.90	35%
...in a sports arena	0.40	10%	...in a playing area	1.40	35%
...in a transportation facility	0.50	10%	Healthcare Facility		
...all other audience seating area	0.90	10%	...in an emergency room	2.70	10%
Atrium			...in an exam/treatment room	1.50	10%
...that is ≤ 40 ft in height	0.0375 per foot in total height	10%	...in an imaging room	0.40	22%
...that is > 40 ft in height	0.50 + 0.025 per foot in total height	10%	...in a medical supply room	1.40	45%
Banking Activity Area	1.50	10%	...in a nursery	0.60	10%
Breakroom (See Lounge/Breakroom)			...in a nurse's station	1.00	10%
Classroom/Lecture Hall/Training Room			...in an operating room	2.20	10%
...in a penitentiary	1.30	None	...in a patient room	0.70	10%
...all other classroom/lecture hall/training room	1.40	30%	...in a physical therapy room	0.90	10%
Conference/Meeting/Multipurpose Room	1.30	None	...in a recovery room	0.80	10%
Confinement Cells	0.90	10%	Library		
Copy/Print Room	0.90	10%	...in a reading area	1.20	15%
Corridor			...in the stacks	1.70	15%
...in a facility for the visually impaired (and used primarily by residents)	1.15	25%	Manufacturing Facility		
...in a hospital	1.00	25%	...in a detailed manufacturing area	2.10	10%
...in a manufacturing facility	0.50	25%	...in an equipment room	1.20	10%
...all other corridor	0.50	25%	...in an extra-high bay area (> 50 ft floor-to-ceiling height)	1.32	10%
Courtroom	1.90	10%	...in a high bay area (25-50 ft floor-to-ceiling height)	1.70	10%
Computer Room	2.14	35%	...in a low bay area (< 25 ft floor-to-ceiling height)	1.20	10%
Dining Area			Museum		
...in a penitentiary	1.30	35%	...in a general exhibition area	1.00	10%
...in a facility for the visually impaired (and used primarily by residents)	3.32	35%	...in a restoration room	1.70	10%
...in bar/lounge or leisure dining	1.40	35%	Post Office – Sorting Area	1.20	10%
...in cafeteria or fast food dining	0.90	35%	Religious Buildings		
...in family dining	2.10	35%	...in a fellowship hall	0.90	10%
...all other dining area	0.90	35%	...in a worship/pulpit/choir area	2.40	10%
Electrical/Mechanical Room	1.50	30%	Retail Facilities		
Emergency Vehicle Garage	0.80	10%	...in a dressing/fitting room	0.89	10%
Food Preparation Area	1.20	30%	...in a mall concourse	1.70	10%
Guest Room	1.14	45%	Sport Arena – Playing Area		
Judges Chambers	1.30	30%	...for a Class I facility	4.61	10%
Laboratory			...for a Class II facility	3.01	10%
...in or as a classroom	1.40	None	...for a Class III facility	2.26	10%

...all other laboratories	1.40	10%	...for a Class IV facility	1.50	10%
Laundry/Washing Area	0.60	10%	Transportation Facility		
Loading Dock, Interior	0.59	10%	...in a baggage/carousel area	1.00	10%
Lobby			...in an airport concourse	0.60	10%
...in a facility for the visually impaired (and used primarily by residents)	2.26	25%			
...for an elevator	0.80	25%	...at a terminal ticket counter	1.50	10%
...in a hotel	1.10	25%	Warehouse – Storage Area		
...in a motion picture theater	1.10	25%	...for medium to bulky, palletized items	0.90	45%
...in a performing arts theater	3.30	25%	...for smaller, hand-carried items	1.40	45%
...all other lobbies	1.30	25%			
Locker Room	0.60	25%			
Lounge/Breakroom					
...in a healthcare facility	0.80	None			
...all other lounge/breakroom	1.20	None			
Office					
...enclosed	1.10	30%			
...open plan	1.10	15%			
Parking Area, Interior	0.20	15%			
Pharmacy Area	1.20	10%			
Restroom					
...in a facility for the visually impaired (and used primarily by residents)	1.52	45%			
...all other restroom	0.90	45%			
Sales Area	1.70	15%			
Seating Area, General	0.68	10%			
Stairwell	0.60	75%			
Storage Room					
...in a hospital	0.90	45%			
...that is ≥ 50 ft2	0.80	45%			
...that is < 50 ft2	0.80	45%			
Vehicular Maintenance Area	0.70	10%			
Workshop	1.90	10%			

- In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.
- For manual-ON or partial-auto-ON occupancy sensors, the occupancy sensor reduction factor shall be multiplied by 1.25.
- For occupancy sensors controlling individual workstation lighting, occupancy sensor reduction factor shall be 30%.