Interior LPD

2021 International Energy Conservation Code

C405.3.2Interior lighting power allowance.
The total interior lighting power allowance (watts) for an entire building shall be determined according to Table C405.3.2(1) using the Building Area Method or Table C405.3.2(2) using the Space-by-Space Method. The interior lighting power allowance for projects that involve only portions of a building shall be determined according to Table C405.3.2(2) using the Space-by-Space Method. Buildings with unfinished spaces shall use the Space-by-Space Method.
Revise as follows:
TABLE C405.3.2(1) INTERIOR LIGHTING POWER ALLOWANCES: BUILDING AREA METHOD

BUILDING AREA TYPE	LPD (w/ft^2)
Automotive facility	~~0.75~~ 0.719
Convention center	~~0.64~~ 0.629
Courthouse	~~0.79~~ 0.729
Dining: bar lounge/leisure	~~0.80~~ 0.729
Dining: cafeteria/fast food	~~0.76~~ 0.679
Dining: family	~~0.71~~ 0.639
Dormitory[a, b]	~~0.53~~ 0.509
Exercise center	~~0.72~~ 0.699
Fire station[a]	~~0.56~~ 0.559
Gymnasium	~~0.76~~ 0.729
Health care clinic	~~0.81~~ 0.759
Hospital[a]	~~0.96~~ 0.919
Hotel/Motel[a, b]	~~0.56~~ 0.519
Library	0.83
Manufacturing facility	0.82
Motion picture theater	~~0.44~~ 0.419
Multiple-family[c]	0.45
Museum	0.55
Office	~~0.64~~ 0.609
Parking garage	~~0.18~~ 0.169
Penitentiary	~~0.69~~ 0.649
Performing arts theater	~~0.84~~ 0.809
Police station	~~0.66~~ 0.609
Post office	0.65 ~~0.629~~
Religious building	~~0.67~~ 0.649
Retail	~~0.84~~ 0.769
School/university	~~0.72~~ 0.689
Sports arena	~~0.76~~ 0.699

BUILDING AREA TYPE	LPD (w/ft²)
Town hall	~~0.69~~ 0.659
Transportation	~~0.50~~ 0.539
Warehouse	0.45
Workshop	~~0.91~~ 0.859

For SI: 1 watt per square foot = 10.76 w/m².

a. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, n the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.

b. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, n the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

c. Dwelling units are excluded. Neither the area of the dwelling units nor the wattage of lighting in the dw units is counted.

TABLE C405.3.2(2) INTERIOR LIGHTING POWER ALLOWANCES: SPACE-BY-SPACE METHOD

COMMON SPACE TYPES[a]	LPD (
Atrium	
Less than 40 feet in height	~~0.4~~
Greater than 40 feet in height	~~0.6~~
Audience seating area	
In an auditorium	~~0.6~~
In a gymnasium	
In a motion picture theater	
In a penitentiary	~~0.6~~
In a performing arts theater	~~1.~~
In a religious building	
In a sports arena	~~0.3~~
Otherwise	
Banking activity area	~~0.6~~
Breakroom (See Lounge/breakroom)	
Classroom/lecture hall/training room	
In a penitentiary	~~0.8~~
Otherwise	~~0.7~~
Computer room, data center	~~0.9~~
Conference/meeting/multipurpose room	~~0.9~~

COMMON SPACE TYPES[a]	LPD (
Copy/print room	~~0.3~~
Corridor	
In a facility for the visually impaired (and not used primarily by the staff)[b]	
In a hospital	~~0.7~~
Otherwise	~~0.4~~
Courtroom	~~1.2~~
Dining area	
In bar/lounge or leisure dining	~~0.8~~
In cafeteria or fast food dining	~~0.4~~
In a facility for the visually impaired (and not used primarily by the staff)[b]	~~1.2~~
In family dining	~~0.6~~
In a penitentiary	~~0.4~~
Otherwise	~~0.4~~
Electrical/mechanical room	~~0.4~~
Emergency vehicle garage	~~0.5~~
Food preparation area	~~1.0~~
Guestroom[c, d]	
Laboratory	
In or as a classroom	~~1.1~~
Otherwise	~~1.3~~
Laundry/washing area	~~0.5~~
Loading dock, interior	
Lobby	
For an elevator	~~0.6~~
In a facility for the visually impaired (and not used primarily by the staff)[b]	~~1.6~~
In a hotel	
In a motion picture theater	~~0.2~~
In a performing arts theater	~~1.2~~
Otherwise	~~0.8~~
Locker room	
Lounge/breakroom	

COMMON SPACE TYPES[a]	LPD (
In a healthcare facility	~~0.4~~
Otherwise	~~0.5~~
Office	
Enclosed	~~0.7~~
Open plan	~~0.6~~
Parking area daylight transition zone	1.059
Parking area, interior	~~0.1~~
Pharmacy area	~~1.6~~
Restroom	
In a facility for the visually impaired (and not used primarily by the staff[b]	~~1.2~~
Otherwise	~~0.6~~
Sales area	~~1.0~~
Seating area, general	~~0.2~~
Security Screening General Areas	0.639
Security Screening in Transportation Facilities	0.929
Security Screening Transportation Waiting Area	0.559
Stairwell	~~0.4~~
Storage room	~~0.3~~
Vehicular maintenance area	~~0.6~~
Workshop	~~1.2~~
BUILDING TYPE SPECIFIC SPACE TYPES[a]	**LPD (**
Automotive (see Vehicular maintenance area)	
Convention Center—exhibit space	~~0.6~~
Dormitory—living quarters[c, d]	~~0.5~~
Facility for the visually impaired[b]	
In a chapel (and not used primarily by the staff)	~~0.7~~
In a recreation room (and not used primarily by the staff)	~~1.7~~
Fire Station—sleeping quarters[c]	
Gaming Establishments	
High Rollers Area	1.679
Slots	0.539

COMMON SPACE TYPES[a]	LPD (
Sportsbook	0.819
Table Games	1.089
Gymnasium/fitness center	
In an exercise area	~~0.9~~
In a playing area	~~0.8~~
Healthcare facility	
In an exam/treatment room	1.4
In an imaging room	
In a medical supply room	0.6
In a nursery	0.9
In a nurse's station	1.1
In an operating room	2.2
In a patient room[c]	0.6
In a physical therapy room	0.9
In a recovery room	1.2
In a telemedicine room	1.439
Library	
In a reading area	~~0.9~~
In the stacks	
Manufacturing facility	
In a detailed manufacturing area	0.8
In an equipment room	0.7
~~In an extra-high-bay area (greater than 50 feet floor-to-ceiling height)~~	
In a low-bay area (less than 25 feet floor-to-ceiling height)	0.86
In a high-bay area (25–50 feet floor-to-ceiling height)	
~~In a low-bay area (less than 25 feet floor-to-ceiling height)~~	
In an extra-high-bay area (greater than 50 feet floor-to-ceiling height)	~~1.42~~ 1.36
Museum	
In a general exhibition area	
In a restoration room	~~1.1~~
Performing arts theater—dressing room	~~0.4~~

COMMON SPACE TYPES[a]	LPD (
Post office—sorting area	~~0.7~~
Religious buildings	
In a fellowship hall	~~0.5~~
In a worship/pulpit/choir area	~~0.8~~
Retail facilities	
In a dressing/fitting room	~~0.5~~
Hair salon	0.649
Nail salon	0.749
In a mall concourse	~~0.8~~
Massage space	0.809
Sports arena—playing area	
For a Class I facility[e]	~~2.9~~
For a Class II facility[f]	~~2.0~~
For a Class III facility[g]	~~1.3~~
For a Class IV facility[h]	
Sports arena—Pools	
For a Class I facility	2.199
For a Class II facility	1.469
For a Class III facility	0.989
For a Class IV facility	0.589
Transportation facility	
Airport Hanger	1.359
At a terminal ticket counter	~~0.51~~ 0.3
In a baggage/carousel area	~~0.3~~
In an airport concourse	~~0.2~~
Warehouse—storage area	
For medium to bulky, palletized items	
For smaller, hand-carried items	

For SI: 1 foot = 304.8 mm, 1 watt per square foot = 10.76 w/m^2.

a. In cases where both a common space type and a building area specific space type are listed, the buildin specific space type shall apply.

b. A 'Facility for the Visually Impaired' is a facility that is licensed or will be licensed by local or state auth for senior long-term care, adult daycare, senior support or people with special visual needs.

c. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, n the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.

d. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, n the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

e. Class I facilities consist of professional facilities; and semiprofessional, collegiate, or club facilities with for 5,000 or more spectators.

f. Class II facilities consist of collegiate and semiprofessional facilities with seating for fewer than 5,000 spectators; club facilities with seating for between 2,000 and 5,000 spectators; and amateur league and school facilities with seating for more than 2,000 spectators.

g. Class III facilities consist of club, amateur league and high school facilities with seating for 2,000 or few spectators.

h. Class IV facilities consist of elementary school and recreational facilities; and amateur league and high facilities without provision for spectators.

C405.3.2.1Building Area Method.

For the Building Area Method, the interior lighting power allowance is calculated as follows:

1. For each building area type inside the building, determine the applicable building area type and the allo lighting power density for that type from Table C405.3.2(1). For building area types not listed, select th building area type that most closely represents the use of that area. For the purposes of this method, ar shall be defined as all contiguous spaces that accommodate or are associated with a single building are

2. Determine the floor area for each building area type listed in Table C405.3.2(1) and multiply this area b applicable value from Table C405.3.2(1) to determine the lighting power (watts) for each building area

3. The total interior lighting power allowance (watts) for the entire building is the sum of the lighting pow each building area type.

C405.3.2.2Space-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 (10.76 w/m^2), whichever is less. For the Space-by-Space Method, the interior lighting power allowance is calculated as follows:

1. For each space enclosed by partitions that are not less than 80 percent of the ceiling height, determine applicable space type from Table C405.3.2(2). For space types not listed, select the space type that mos represents the proposed use of the space. Where a space has multiple functions, that space may be divi separate spaces.

2. Determine the total floor area of all the spaces of each space type and multiply by the value for the spac Table C405.3.2(2) to determine the lighting power (watts) for each space type.

3. The total interior lighting power allowance (watts) shall be the sum of the lighting power allowances fo space types.

Reason:

The values in Table C405.3.2(2) are interlinked with the values in Table C405.3.2(1). The building values [Table C405.3.2(1)] are comprised via aggregating the individual space values [Table C405.3.2(1)].

These proposed values were developed via a multi-step analysis:

- More than 150 data sheets from more than 10 lighting manufacturers data sheets were compiled.
- The 2021 data sheets indicate increased efficacy compared to products from 2018 and 2019. At least 2/3 of the data sheets compared were the same fixture from 2019 and 2021. For most of the directly tracked products, the efficacy of these fixtures had increased in this time.
- Lighting conditions were modeled for each of the spaces using these 2021 efficacy values and the resultant lighting power density values were these proposed values.

These proposed values represent a 4 - 5% reduction (based on a straight average of changes) compared to the previous version. These proposed values are similar to those that are being considered by ANSI/ASHRAE/IES Standard 90.1.

Cost Impact:

The code change proposal will neither increase nor decrease the cost of construction.

There is no cost increase for this proposal. The proposed reduced lighting power density values are based on manufacturer data sheets. Manufacturers have improved the performance of their products and these values are based on their improvements. As stated in the rationale, more than 150 products were evaluated. Between 2018 and 2021, these fixtures became more efficient. Cost changes between 2018 and 2021 are not from changes in efficacy, but inflation, supply chain, and material constraints.