



LIGHTING WATTAGE WORKSHEET

ALLOWANCE SHEET

To comply with Fort Collins adopted commercial energy code Ashrae 90.1-2007, a lighting wattage worksheet must be submitted for new buildings and whenever 50% or more of the lighting changed, added or replaced for a tenant finish. Find the applicable allowances recorded in Ashrae 90.1-2007, section 9. Record these allowances with floor area to the allowance table. Sum up the Total Interior Lighting Power Allowance for this table. Keeping this allowance in mind, list every new light fixture and its individual wattage on the Proposed Interior Connected Lighting Power worksheet. Sum the proposed lighting and verify that this is equal or less than the Allowance. When the proposed is greater than the Allowance, lighting fixtures must be removed or replaced with lower wattage fixtures. All tenant finish submittals must use the Specific Space method rather than the Building Space method, unless the tenant finish involves the entire structure. Along with a lighting plan, submit the completed Lighting Wattage worksheets for review and approval.

BUILDING SPACE METHOD (Ashrae, table 9.5.1)

Location	Building Space Type	Area square feet	Allowed watts/sq.ft.	Total allowed watts
Total Interior Lighting Power Allowance:				

SPECIFIC SPACE METHOD (Ashrae, table 9.6.1)

Room Number	Specific Space Activity	Area square feet	Allowed watts/sq.ft.	Total allowed watts
Total Interior Lighting Power Allowance:				

**TABLE 9.5.1 Lighting Power Densities
Using the Building Area Method**

Building Area Type ^a	LPD (W/ft ²)
Automotive facility	0.9
Convention center	1.2
Courthouse	1.2
Dining: bar lounge/leisure	1.3
Dining: cafeteria/fast food	1.4
Dining: family	1.6
Dormitory	1.0
Exercise center	1.0
Gymnasium	1.1
Health-care clinic	1.0
Hospital	1.2
Hotel	1.0
Library	1.3
Manufacturing facility	1.3
Motel	1.0
Motion picture theater	1.2
Multifamily	0.7
Museum	1.1
Office	1.0
Parking garage	0.3
Penitentiary	1.0
Performing arts theater	1.6
Police/fire station	1.0
Post office	1.1
Religious building	1.3
Retail	1.5
School/university	1.2
Sports arena	1.1
Town hall	1.1
Transportation	1.0
Warehouse	0.8
Workshop	1.4

^a In cases where both a general building area type and a specific building area type are listed, the specific building area type shall apply.

- c. Multiply the gross lighted floor areas of the building area type(s) times the *LPD*.
- d. The *interior lighting power allowance* for the building is the sum of the *lighting power allowances* of all building area types. Trade-offs among building area types are permitted provided that the total *installed interior lighting power* does not exceed the *interior lighting power allowance*.

9.6 Alternative Compliance Path: Space-by-Space Method

9.6.1 Space-by-Space Method of Calculating Interior Lighting Power Allowance. Use the following steps to determine the interior lighting power allowance by the Space-by-Space Method:

- a. Determine the appropriate building type from Table 9.6.1. For building types not listed, selection of a reasonably equivalent type shall be permitted.
- b. For each space enclosed by partitions 80% or greater than ceiling height, determine the gross interior floor area by measuring to the center of the partition wall. Include the floor area of balconies or other projections. Retail spaces do not have to comply with the 80% partition height requirements.
- c. Determine the *interior lighting power allowance* by using the columns designated Space-by-Space Method in Table 9.6.1. Multiply the floor area(s) of the space(s) times the allowed *LPD* for the space type that most closely represents the proposed use of the space(s). The product is the *lighting power allowance* for the space(s). For space types not listed, selection of a reasonable equivalent category shall be permitted.
- d. The *interior lighting power allowance* is the sum of *lighting power allowances* of all spaces. Trade-offs among spaces are permitted provided that the total *installed interior lighting power* does not exceed the *interior lighting power allowance*.

9.6.2 Additional Interior Lighting Power. When using the Space-by-Space Method, an increase in the *interior lighting power allowance* is allowed for specific lighting functions. Additional power shall be allowed only if the specified lighting is installed and automatically controlled, separately from the general lighting, to be turned off during nonbusiness hours. This additional power shall be used only for the specified *luminaires* and shall not be used for any other purpose.

An increase in the *interior lighting power allowance* is permitted in the following cases:

- a. For spaces in which lighting is specified to be installed in addition to the general lighting for the purpose of decorative appearance, such as chandelier-type luminaires or sconces or for highlighting art or exhibits, provided that the additional lighting power shall not exceed 1.0 W/ft² of such spaces.
- b. For lighting equipment installed in sales areas and specifically designed and directed to highlight merchandise, calculate the additional lighting power as follows:

$$\begin{aligned} \text{Additional Interior Lighting Power Allowance} = & 1000 \text{ watts} + (\text{Retail Area 1} \times 1.0 \text{ W/ft}^2) \\ & + (\text{Retail Area 2} \times 1.7 \text{ W/ft}^2) \\ & + (\text{Retail Area 3} \times 2.6 \text{ W/ft}^2) \\ & + (\text{Retail Area 4} \times 4.2 \text{ W/ft}^2), \end{aligned}$$

where

- Retail Area 1 = the floor area for all products not listed in Retail Areas 2, 3, or 4;
- Retail Area 2 = the floor area used for the sale of vehicles, sporting goods, and small electronics;
- Retail Area 3 = the floor area used for the sale of furniture, clothing, cosmetics, and artwork; and

TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method

Common Space Types ^a	LPD, W/ft ²	Building-Specific Space Types	LPD, W/ft ²
Office—Enclosed	1.1	Gymnasium/Exercise Center	
Office—Open Plan	1.1	Playing Area	1.4
Conference/Meeting/Multipurpose	1.3	Exercise Area	0.9
Classroom/Lecture/Training	1.4	Courthouse/Police Station/Penitentiary	
For Penitentiary	1.3	Courtroom	1.9
Lobby	1.3	Confinement Cells	0.9
For Hotel	1.1	Judges' Chambers	1.3
For Performing Arts Theater	3.3	Fire Stations	
For Motion Picture Theater	1.1	Engine Room	0.8
Audience/Seating Area	0.9	Sleeping Quarters	0.3
For Gymnasium	0.4	Post Office—Sorting Area	1.2
For Exercise Center	0.3	Convention Center—Exhibit Space	1.3
For Convention Center	0.7	Library	
For Penitentiary	0.7	Card File and Cataloging	1.1
For Religious Buildings	1.7	Stacks	1.7
For Sports Arena	0.4	Reading Area	1.2
For Performing Arts Theater	2.6	Hospital	
For Motion Picture Theater	1.2	Emergency	2.7
For Transportation	0.5	Recovery	0.8
Atrium—First Three Floors	0.6	Nurses' Station	1.0
Atrium—Each Additional Floor	0.2	Exam/Treatment	1.5
Lounge/Recreation	1.2	Pharmacy	1.2
For Hospital	0.8	Patient Room	0.7
Dining Area	0.9	Operating Room	2.2
For Penitentiary	1.3	Nursery	0.6
For Hotel	1.3	Medical Supply	1.4
For Motel	1.2	Physical Therapy	0.9
For Bar Lounge/Leisure Dining	1.4	Radiology	0.4
For Family Dining	2.1	Laundry—Washing	0.6
Food Preparation	1.2	Automotive—Service/Repair	0.7
Laboratory	1.4	Manufacturing	
Restrooms	0.9	Low Bay (<25 ft Floor to Ceiling Height)	1.2
Dressing/Locker/Fitting Room	0.6	High Bay (≥25 ft Floor to Ceiling Height)	1.7
Corridor/Transition	0.5	Detailed Manufacturing	2.1
For Hospital	1.0	Equipment Room	1.2
For Manufacturing Facility	0.5	Control Room	0.5
Stairs—Active	0.6	Hotel/Motel Guest Rooms	1.1
Active Storage	0.8	Dormitory—Living Quarters	1.1
For Hospital	0.9	Museum	
Inactive Storage	0.3	General Exhibition	1.0
For Museum	0.8	Restoration	1.7
Electrical/Mechanical	1.5	Bank/Office—Banking Activity Area	1.5

TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method (continued)

Common Space Types ^a	LPD, W/ft ²	Building-Specific Space Types	LPD, W/ft ²
Workshop	1.9	Religious Buildings	
Sales Area [for accent lighting, see Section 9.6.2(b)]	1.7	Worship Pulpit, Choir	2.4
		Fellowship Hall	0.9
		Retail	
		Sales Area [for accent lighting, see Section 9.6.3(c)]	1.7
		Mall Concourse	1.7
		Sports Arena	
		Ring Sports Area	2.7
		Court Sports Area	2.3
		Indoor Playing Field Area	1.4
		Warehouse	
		Fine Material Storage	1.4
		Medium/Bulky Material Storage	0.9
		Parking Garage—Garage Area	0.2
		Transportation	
		Airport—Concourse	0.6
		Air/Train/Bus—Baggage Area	1.0
		Terminal—Ticket Counter	1.5

^aIn cases where both a common space type and a building-specific type are listed, the building specific space type shall apply.

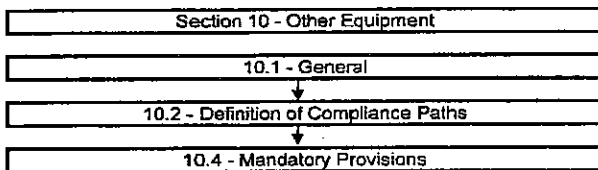
Retail Area 4 = the floor area used for the sale of jewelry, crystal, and china.

Exception: Other merchandise categories may be included in Retail Areas 2 through 4 above, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display is approved by the *authority having jurisdiction*.

9.7 Submittals (Not Used)

9.8 Product Information (Not Used)

10. OTHER EQUIPMENT



10.1 General

10.1.1 Scope. This section applies only to the equipment described below.

10.1.1.1 New Buildings. Other equipment installed in new buildings shall comply with the requirements of this section.

10.1.1.2 Additions to Existing Buildings. Other equipment installed in *additions to existing buildings* shall comply with the requirements of this section.

10.1.1.3 Alterations to Existing Buildings

10.1.1.3.1 Alterations to other building service equipment or systems shall comply with the requirements of this section applicable to those specific portions of the building and its systems that are being altered.

10.1.1.3.2 Any new equipment subject to the requirements of this section that is installed in conjunction with the *alterations*, as a direct replacement of existing equipment or control devices, shall comply with the specific requirements applicable to that equipment or control devices.

Exception: Compliance shall not be required for the relocation or reuse of existing equipment.

10.2 Compliance Path(s)

10.2.1 Compliance with Section 10 shall be achieved by meeting all requirements of Section 10.1, General; Section 10.4, Mandatory Provisions; and Section 10.8, Product Information.

10.2.2 Projects using the Energy Cost Budget Method (Section 11 of this standard) must comply with Section 10.4, the mandatory provisions of this section, as a portion of that compliance path.

10.3 Simplified/Small Building Option (Not Used)

10.4 Mandatory Provisions

10.4.1 Electric Motors. Electric motors shall comply with the requirements of the Energy Policy Act of 1992 where applicable, as shown in Table 10.8. Motors that are not included in the scope of the Energy Policy Act of 1992 have no performance requirements in this section.