

How to Calculate and Design

Indoor Illuminance Recommendations Interior Categories and Footcandle Ranges¹

Type of Activity	Illuminance Category	Ranges of Illuminances		Reference Work Plane
		Lux	Footcandles	
Public spaces with dark surroundings	A	20-30-50	2-3-5	General Lighting Throughout Spaces
Simple orientation for short temporary visits	B	50-75-100	5-7.5-10	
Working spaces where visual tasks are only occasionally performed	C	100-150-200	10-15-20	
Performance of visual tasks of high contrast or large size	D	200-300-500	20-30-50	Illuminance on task
Performance of visual tasks of medium contrast or small size	E	500-750-1000	5-75-100	
Performance of visual tasks of low contrast or very small size	F	1000-1500-2000	100-150-200	
Performance of visual tasks of low contrast and very small size over a prolonged period	G	2000-3000-5000	200-300-500	
Performance of very prolonged and exacting visual tasks	H	5000-7500-10000	500-750-1000	Illuminance on task, obtained by a combination of general and local (supplementary lighting)
Performance of very special visual tasks of extremely low contrast and small size	I	10000-15000-20000	1000-1500-2000	

1. IESNA Lighting Handbook

Weighting Factors for Selecting the Appropriate Footcandle Value^a

a. For Illuminance Categories A through C				
Room and Occupant Characteristics	Weighting Factor			
	-1	0	+1	
Occupant's ages	Under 40	40-55	Over 55	
Room surface reflectances ^b	Greater than 70%	30 to 70%	Less than 30%	
b. For Illuminance Categories D through I				
Task and Worker Characteristics	Weighting Factor			
	-1	0	+1	
Worker's ages	Under 40	40-55	Over 55	
Speed and/or accuracy ^c	Not Important	Important	Critical	
Reflectance of task background ^d	Greater than 70%	30 to 70%	Less than 30%	

- a. IESNA Lighting Handbook.
- b. Average weighted surface reflectances, including wall, floor and ceiling reflectances, if they encompass a large portion of the task area or visual surround. For instance, in an elevator lobby, where the ceiling height is 7.6 meters (25 feet), neither the task nor the visual surround encompass the ceiling, so only the floor and wall reflectances would be considered.

- c. In determining whether speed and/or accuracy is not important, important or critical, the following questions need to be answered: What are the time limitations? How important is it to perform the task rapidly? Will errors produce an unsafe condition or product? Will errors reduce productivity and be costly? For example, in reading for leisure there are not time limitations and it is not important to read rapidly. Errors will not be costly and will not be related to safety. Thus, speed and/or accuracy is not important. If, however, prescription notes are to be read by a pharmacist, accuracy is critical because errors could produce an unsafe condition and time is important for customer relations.
- d. The task background is that portion of the task on which the meaningful visual display is exhibited. For example, on this page the meaningful visual display includes each letter which combines with other letters to form words and phrases. The display medium, or task background, is the paper, which has a reflectance of approximately 85 percent.

Simplified Procedure

- Determine the generic "Type of Activity," its "Illuminance Category," and the "Range of Illuminance" from the chart of IES illuminance Recommendations.
- Using Table a. or b., determine the weighting factors applicable to the illuminance category selected.
- Add the weighting factors algebraically. If the sum is -2 for Categories A-C or -3 for Categories D-I, use the lowest of the three illuminance values; if +2 or +3 for the same respective category ranges, use the highest illuminance value. Otherwise use the middle illuminance value.

Note: Refer to the IES application Handbook for specific task illuminance recommendations.