

ILLUMINANCE SELECTION

In 1979, the IESNA established an illuminance selection procedure, which was published in the 6th, 7th, and 8th editions of its *Lighting Handbook*. The philosophy of that procedure was to enable the lighting designer to select illuminances based on a knowledge of space and occupant characteristics as well as the task and worker characteristics.

The philosophy of that procedure has been embraced again in this edition, but the procedure has been modified and simplified to place visual performance and therefore illuminance selection more in balance with the other important lighting design criteria presented in this chapter and discussed throughout this edition of the *IESNA Lighting Handbook*. Specifically, the recommended illuminances provided in the Design Guide are based on the Society's judgment of best practice for "typical" applications. Every situation is unique so, naturally, typical conditions may not be appropriate for a specific application. As a professional, the lighting designer should have a better understanding of the particular space and the needs of the occupants and clients than what can be presented in a recommended illuminance value for a typical space.

Illuminance Recommendations

In 1979, the IESNA established nine illuminance categories, "A," the lowest set of recommended illuminances, through "I," the highest set. Each of the nine categories had general descriptions of the visual task, irrespective of the application. Generally, the same approach has been employed in this edition of the *IESNA Lighting Handbook* to help lighting designers establish the best task illuminance. However, four important modifications have been adopted.

1. The recommended illuminances are no longer provided without reference to a specific application. Every application in the Design Guide has a specific recommended illuminance (horizontal, vertical, or both) representing best practice for a typical application.
2. The nine illuminance selection categories established earlier by the IESNA have been reduced to seven categories and organized into three sets of visual tasks (orientation and simple, common, and special). These groupings provide additional clarity to the category descriptions (Figure 10-9).
3. Additional precision has been given to the task descriptions in each category. In the previous three editions it was impossible for the lighting designer to unambiguously ascertain what constituted, for example, "low contrast" or "small size." Specific ranges of contrast and size have been established for this edition (Figures 10-10 and 10-11).
4. Recommended illuminances increase roughly logarithmically with increasing task difficulty by combined changes in task contrast and task size, as defined in Figure 10-10. These recommendations are guided by both the scientific literature and practical experience.

Orientation and simple visual tasks. Visual performance is largely unimportant. These tasks are found in public spaces where reading and visual inspection are only occasionally performed. Higher levels are recommended for tasks where visual performance is occasionally important.

A	Public spaces	30 lx (3 fc)
B	Simple orientation for short visits	50 lx (5 fc)
C	Working spaces where simple visual tasks are performed	100 lx (10 fc)

Common visual tasks. Visual performance is important. These tasks are found in commercial, industrial and residential applications. Recommended illuminance levels differ because of the characteristics of the visual task being illuminated. Higher levels are recommended for visual tasks with critical elements of low contrast or small size.

D	Performance of visual tasks of high contrast and large size	300 lx (30 fc)
E	Performance of visual tasks of high contrast and small size, or visual tasks of low contrast and large size	500 lx (50 fc)
F	Performance of visual tasks of low contrast and small size	1000 lx (100 fc)

Special visual tasks. Visual performance is of critical importance. These tasks are very specialized, including those with very small or very low contrast critical elements. Recommended illuminance levels should be achieved with supplementary task lighting. Higher recommended levels are often achieved by moving the light source closer to the task.

G	Performance of visual tasks near threshold	3000 to 10,000 lx (300 to 1000 fc)
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* Expected accuracy in illuminance calculations are given in Chapter 9, Lighting Calculations. To account for both uncertainty in photometric measurements and uncertainty in space reflections, measured illuminances should be with $\pm 10\%$ of the recommended value. It should be noted, however, that the final illuminance may deviate from these recommended values due to other lighting design criteria.

Figure 10-9. Determination of Illuminance Categories*

IESNA Lighting Design Guide

I. INTERIOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
Accounting (see Offices)																								Ch. 11
Air Terminals (see Transportation Terminals in Section V, Transportation)																								Ch. 23
Armories																								
Art Galleries (see Museums)																								Ch. 14
Auditoriums																								
Assembly																								
Social activity																								
Banks (see Reading)																								Ch. 11
Lobby																								
General																								
Writing area																								
Tellers' stations																								
ATM facilities — keypad																								
ATM facilities — display screen																								
ATM facilities — writing surface																								
ATM facilities — surrounding area																								

I. INTERIOR LOCATIONS AND TASKS		Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
	Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
		Correctional Facilities																							
	Cells																				D	B		(4)	
	Day rooms																				D	B			
Corridors (see Service Spaces)																									
Court Rooms (see Reading)																									Ch. 14
	Seating area (spectators)																				C	A			
	Judge and clerk																		(1)		E	C		(5)	
	Litigant's table																		(1)		E	C		(6)	
	Podium																		(1)		E	C		(5)	
	Witness chair																		(1)		D	B			
Dance Halls/Discotheques																									
	Dance halls/discotheques																				A	A			
	Ballrooms/social events																				B	A			
Depots, Terminals, Stations (see Transportation Terminals in Section V, Transportation)																									Ch. 23
Drafting/Graphic Arts																									
	CAD stations only																				C	A			
	Mixed CAD and paper task																				D	A			

I. INTERIOR LOCATIONS AND TASKS	Very Important Important Somewhat important Blank = Not important or not applicable																							
Design Issues																								
	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
Filing (see Offices and Reading)																								Ch. 11
Financial Facilities (see Banks)																								Ch. 11
Fire Stations (see Municipal Buildings - Police and Fire)																								Ch. 11
Food Service Facilities																								Ch. 13
(If equipment locations are known, see Residences-Kitchens)																								
Butcher shop																								
Cashier																								
Cleaning																								
Dining																								
Food displays																								
Food storage																								
Nonrefrigerated																								
Refrigerated																								
Galley																								
Kitchen																								
Pantry																								
Refuse area																								
Sculleries																								
Thaw room																								

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I. INTERIOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
Recovery room																								
General																				C		A		
Dialysis unit, medical																			F		D			
Elevators																			B		A			
EKG and specimen room																								
General																	(10)		A		A			
Emergency outpatient																								
General																	(10)		E		C			
Endoscopy rooms																								
General																	(10)		E		C			
Peritoneoscopy																	(10)		D		B			
Culdoscopy																	(10)		D		B			
Eye surgery																	(10)		G		E			
Fracture room																								
General																	(10)		E		C			
Local																	(10)		F		D			
Inhalation therapy																	(10)		D		B			
Laboratories																								
Specimen collecting																	(10)		E		C			
Linens																								
Sorting soiled linen																			D		A			
Central (clean) linen room																			D		A			
Sewing room, general																	(10)		D		B			
Linen closet																			B		A			
Lobby																	(10)		B		A			
Locker rooms																			B		A			
Medical illustration studio																	(10)		F		D			
Medical records																	(10)		E		C			
Nurseries																								
General																	(10)		B		A			

I. INTERIOR LOCATIONS AND TASKS	Very Important Important Somewhat important Blank = Not important or not applicable																							
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Radiation therapy section																								
General																		(10)		B		A		
Solarium																								
General																		(10)		C		A		
Local for reading																		(10)		D		B		
Stairways																					C		A	
Surgical suite																								
Operating room, general																		(10)		G		E		
Operating table																		(10)		G		E		
Scrub room																				F		D		
Instruments and sterile supply room																				D		B		
Clean-up room, instruments																				E		C		
Anesthesia storage																				C		A		
Substerilizing room																				C		A		
Surgical induction room																				E		C		
Surgical holding area																				E		C		
Toilets																				C		A		
Utility room																				D		A		
Waiting areas																								
General																		(10)		C		A		
Local for reading																		(10)		D		B		
Homes (see Residences)																								Ch. 18

I. INTERIOR LOCATIONS AND TASKS		Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
	Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
		Locker Rooms																					C		A
Merchandising Spaces																									Ch. 17
Retail store areas																									
Alteration room																					F		D		
Fitting room																									
Dressing areas																					D		B		
Fitting areas																					F		D		
Locker rooms																					C		A		
Stock rooms, wrapping and packaging																					D		B		
Sales transaction area																					D				
Circulation																					C				
General merchandise display																					E		C		
Feature display																					F		D		
Show windows																					G		E		

I. INTERIOR LOCATIONS AND TASKS		■ Very Important ■ Important ■ Somewhat important Blank = Not important or not applicable															
Design Issues		Appearance of Space and Luminaires Color Appearance (and Color Contrast) Daylighting Integration and Control Direct Glare Flicker (and Strobe) Light Distribution on Surfaces Light Distribution on Task Plane (Uniformity) Luminances of Room Surfaces Modeling of Faces or Objects Point(s) of Interest Reflected Glare Shadows Source/Task/Eye Geometry Sparkle/Desirable Reflected Highlights Surface Characteristics System Control and Flexibility Special Considerations Notes on Special Considerations Illuminance (Horizontal) Category or Value (lux) Illuminance (Vertical) Category or Value (lux) Notes on Illuminance - see end of section Reference Chapter(s)															
		Offices (13)															
Filing (see Reading)																	
General and private offices (see Reading)																	
Open plan office																	
Intensive VDT use		(14,15)															
Open plan office																	
Intermittent VDT use		(14,15)															
Private office																	
Libraries (see Libraries)																	
Lobbies, lounges, and reception areas																	
Mail sorting																	
Copy rooms																	
Parking Facilities (see Section III, Outdoor)																	
Post Offices																	
Lobby		(1)															
Customer service counter		(1)															
Mail processing, general		(1)															

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Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)	Illuminance (Vertical)	Category or Value (lux)	Notes on Illuminance - see end of section	Reference Chapter(s)
Specific visual tasks																								
Dining																			B					
Grooming																								
Makeup and shaving																		D	B					
Dressing evaluation (mirror)																		D	B					
Handcrafts and hobbies																								
Ordinary tasks (e.g., crafts)																		D	B					
Difficult tasks (e.g., sewing)																		E	C					
Critical tasks (e.g., workbench)																		F	D					
Easel hobbies																								
Ironing																		D						
Kitchen counter																								
Critical seeing (e.g., cutting)																		E	C					
General																		D	B					
Kitchen range																								
Difficult seeing (e.g., cooking)																		E	C					
Kitchen sink																								
Difficult seeing																		E	C					
Noncritical (clean up)																		D	B					
Laundry																		D	A					
Music study (piano, organ)																		D	B					
Reading																								
In a chair (casual)																		D	B					
In a chair (serious)																		E	C					
In bed (casual)																		D	B					

I. INTERIOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable
Design Issues	Appearance of Space and Luminaires			
	Color Appearance (and Color Contrast)			
	Daylighting Integration and Control			
	Direct Glare			
	Flicker (and Strobe)			
	Light Distribution on Surfaces			
	Light Distribution on Task Plane (Uniformity)			
	Luminances of Room Surfaces			
	Modeling of Faces or Objects			
	Point(s) of Interest			
	Reflected Glare			
	Shadows			
	Source/Task/Eye Geometry			
	Sparkle/Desirable Reflected Highlights			
	Surface Characteristics			
	System Control and Flexibility			
Special Considerations				
Notes on Special Considerations				
Illuminance (Horizontal)				
Category or Value (lux)				
Illuminance (Vertical)				
Category or Value (lux)				
Notes on Illuminance - see end of section				
Reference Chapter(s)				
Notes:				
(1) Consider lighting for video cameras.				
(2) Maximum illuminance.				
(3) At ground level.				
(4) The minimum illuminance in a prison cell is 200 lx (20 fc); 300 lx (30 fc) should be provided for reading at the head of the bed.				
(5) Adjustable task lighting recommended.				
(6) Task lighting recommended, possibly located in ceiling.				
(7) Degradation factors important to consider.				
(8) In the display plane.				
(9) Special lighting for signage or banners may be required.				
(10) See Chapter for special considerations.				
(11) Refer to Chapter 16, Health Care Facility Lighting, for specific recommendations for surgical task lighting.				
(12) At 30" above floor.				
(13) Design issues, including illuminances, can be listed for room or space. Refer to specific task under "Reading" or "Graphic Design and Materials", for example.				
(14) Lighting should be flexible to accommodate changes in office furniture.				
(15) Acoustical aspects of luminaires need to be considered.				
(16) Design issues and illuminances listed for the task. See "Offices" or "Educational Facilities", for example, for additional considerations for the room.				



II. INDUSTRIAL LOCATIONS AND TASKS^(a)

Very Important Important Somewhat important Blank = Not important or not applicable

Design Issues	Appearance of Space and Luminaires Color Appearance (and Color Contrast) Daylighting Integration and Control Direct Glare Flicker (and Strobe) Intrinsic Material Characteristics Light Distribution on Surfaces Light Distribution on Task Plane (Uniformity) Luminances of Room Surfaces Modeling of Faces or Objects Reflected Glare Shadows Source/Task/Eye Geometry	Special Considerations	Notes on Special Considerations	Illuminance on Task Plane ^(b)	Category or Value (lux) Notes — see end of section	Reference Chapter(s)
Basic Industrial Tasks Raw material processing (cleaning, cutting, crushing, sorting, grading) Coarse Medium Fine Very fine Materials handling Wrapping, packing, and labeling Picking stock, classifying Loading, inside trucks and freight cars Component manufacturing Large Medium Fine Machining Rough bench or machine work Medium bench or machine work (ordinary automatic machines, rough grinding, medium buffing, and polishing) Fine bench or machine work (fine automatic machines, medium grinding, fine buffing, and polishing) Extra-fine bench or machine work (fine grinding)				C D E F D D C D E F D E G G		



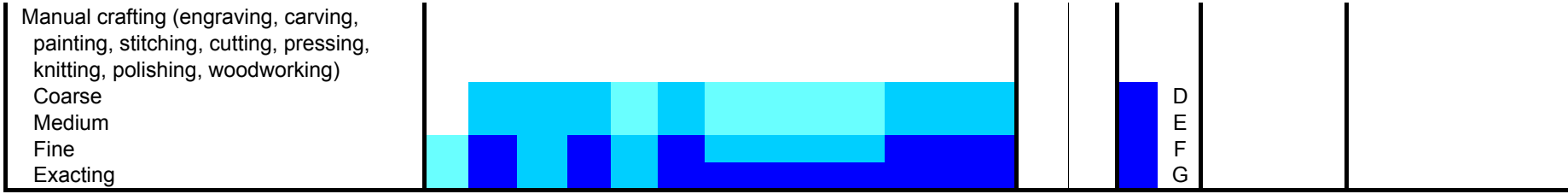


II. INDUSTRIAL LOCATIONS AND TASKS^(a)

Very Important
 Important
 Somewhat important
 Blank = Not important or not applicable

Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Intrinsic Material Characteristics	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Reflected Glare	Shadows	Source/Task/Eye Geometry	Special Considerations	Notes on Special Considerations	Illuminance on Task Plane ^(b)	Category or Value (lux)	Notes — see end of section	Reference Chapter(s)
Assembly																			
Simple																			
Difficult																			
Exacting																			
Warehousing and storage																			
Inactive																			
Active: bulky items; large labels																			
Active: small items; small labels																			
Inspection																			
Simple																			
Difficult																			
Exacting																			
Service spaces																			
Stairways, corridors																			
Elevators, freight and passenger																			
Toilets and wash rooms																			
Shipping and receiving																			
Maintenance																			
Motor and equipment observation																			
Control panel and VDT observation																			
Welding																			
Orientation																			
Precision manual arc-welding (Inspection of work after completion of weld)																			





- Notes:
- (a) For details on specific tasks or spaces refer to Chapter 19, Industrial Lighting.
 - (b) The task may be horizontal, inclined, or vertical.





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III. OUTDOOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																	
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Direct Glare	Light Distribution on Surfaces	Light Pollution/Trespass	Modeling of Faces or Objects	Peripheral Detection	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(a, b)	Illuminance (Vertical)	Category or Value (lux) ^(a, b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Advertising Signs and Poster Boards (see Bulletin and Poster Boards, or Signs)																					
Bikeways																					Ch. 21, 22, 29
Alongside roadways — commercial areas																10		20	(1)		
Distant from roadways																5		5	(1)		
Building																					
General construction																B		A			
Excavation work																A		A			
Building Exteriors																					Ch. 21, 29
Entrances																					
Active (pedestrian/conveyance)																B		A			
Inactive (normally locked, infrequent use)																A		A			
Prominent structures																B		A			
Building and Grounds Security (see Section VI, Emergency, Safety, and Security)																					
Buildings and Monuments, Floodlighted																					Ch. 21
Bright surrounding																					
Light surfaces																			A		
Medium light surfaces																			B		
Medium dark surfaces																			B		
Dark surfaces																			C		





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III. OUTDOOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																	
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Direct Glare	Light Distribution on Surfaces	Light Pollution/Trespass	Modeling of Faces or Objects	Peripheral Detection	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(a, b)	Illuminance (Vertical)	Category or Value (lux) ^(a, b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Logging																					Ch. 19
Yarding																	A				
Log loading and unloading																	A		A		
Log stowing (water)																	10				
Active log storage area (land)																	10				
Log booming area (water) — foot traffic																	10				
Active log handling area — (water)																	10				
Log grading — water or land																	B				
Log bins (land)																	20				
Lumber Yards																	10		3		Ch. 19
Marinas																B		A		Ch. 21, 23	
Parks, Plazas, and Pedestrian Malls																B		A		Ch. 21	
Parking Areas																			(4)	Ch. 22, 29	
Piers																					Ch. 23
Freight																					
Active shipping area															(3)		B				
Active shipping — surrounds																	A				
Passenger															(3)		C				
Prison Yards																	A				Ch. 14





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III. OUTDOOR LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																																
Design Issues											Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Direct Glare	Light Distribution on Surfaces	Light Pollution/Trespass	Modeling of Faces or Objects	Peripheral Detection	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(a, b)	Illuminance (Vertical)	Category or Value (lux) ^(a, b)	Notes on Illuminance — see end of section	Reference Chapter(s)					
Roadways																																		(5)	Ch. 22	
Roadway Rest Areas																																		(6)	Ch. 22	
Sculptures																																			Ch. 21	
Ship Yards																																			Ch. 19, 23	
General																																				
Ways																																				
Fabrication areas																																				
Shopping Centers (see Parking and Building Exterior, Entrances)																																				
Signs																																			Ch. 21, 22	
Advertising																																				
Externally lighted roadway																																				
Smokestacks with Advertising Messages (see Bulletin and Poster Boards)																																				
Storage Yards																																				
Active																																				
Inactive																																				
Streets (See Roadways)																																				
Tunnels																																			(7)	Ch. 22





Walkways																					(3)				(8)	Ch. 21, 22, 29
Water Tanks with Advertising Messages (see Bulletin and Poster Boards)																										Ch. 22
Water and Rock Features																										Ch. 21
Softscape (natural water bodies)																										
Fountains, waterfalls																										
Decorative pools																										
Large natural rock features																										
Notes:																										
(a) Low illuminances (less than 30 lux) are given in lux; values greater than 30 lux are given in letter categories.																										
(b) When security is a concern, consult Chapter 29, Emergency, Safety, and Security Lighting, for additional illuminance recommendations.																										
(1) Intersections and conflict zones may require higher illuminances.																										
(2) Lighting must not interfere with visibility for pedestrians, motorists, or boaters.																										
(3) Hazards such as stairs or areas adjacent to bodies of water should be clearly identified and lighted for safety.																										
(4) Illuminances for parking areas listed in Chapter 22, Roadway Lighting.																										
(5) Illuminances for Roadway listed in Chapter 22, Roadway Lighting.																										
(6) Illuminances for Rest Areas listed in Chapter 22, Roadway Lighting.																										
(7) Illuminances for Tunnels listed in Chapter 22, Roadway Lighting.																										
(8) Illuminances for Walkways listed in Chapter 22, Roadway Lighting.																										





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IV. SPORTS AND RECREATION LOCATIONS AND TASKS ^(a)	 Very Important	 Important	 Somewhat important	 Blank = Not important or not applicable														
Design Issues	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Task Plane (Uniformity)	Light Pollution/Trespass	Luminaire Noise	Modeling of Faces or Objects	Reflected Glare	Shadows	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(b)	Illuminance (Vertical)	Category or Value (lux) ^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Archery (Indoor)																		
Target at 18.3m																	(1)	
Shooting line																		
Archery (Outdoor)																		
Target at 30.4m																	(1)	
Shooting line																		
Badminton (Indoor)																		
Baseball																		
Professional (Outdoor)																	(2)	
Recreational																	(2)	
Basketball																		
Indoor																		
Outdoor																		
Billiards																		





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IV. SPORTS AND RECREATION LOCATIONS AND TASKS ^(a)	 Very Important	 Important	 Somewhat important	 Blank = Not important or not applicable														
Design Issues	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Task Plane (Uniformity)	Light Pollution/Trespass	Luminaire Noise	Modeling of Faces or Objects	Reflected Glare	Shadows	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(b)	Illuminance (Vertical)	Category or Value (lux) ^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Horse Shows	Lightcyan		Blue		Lightcyan				Lightcyan	Blue			Blue		Lightcyan			
Lacrosse	Lightcyan		Blue		Blue			Lightcyan		Lightcyan			Blue		Lightcyan			
Playgrounds			Lightcyan		Lightcyan				Lightcyan				Lightcyan					
Quoits			Blue		Lightcyan					Lightcyan			Blue					
Racing (Outdoor)																		
Motor — Track	Lightcyan		Blue		Lightcyan			Lightcyan	Lightcyan	Blue			Blue		Lightcyan			
Bicycle — Track			Blue		Lightcyan			Lightcyan	Lightcyan	Blue			Blue				(3)	
Dog			Blue		Lightcyan			Lightcyan	Lightcyan	Blue			Blue				(3)	
Dragstrip	Lightcyan		Blue		Lightcyan			Lightcyan	Lightcyan	Blue			Lightcyan				(3)	
Racquetball																		
Indoor	Lightcyan	Lightcyan	Blue	Lightcyan	Blue		Lightcyan	Lightcyan	Blue	Lightcyan			Blue		Lightcyan			
Rodeo and Animal Shows	Lightcyan		Blue		Lightcyan				Lightcyan	Blue			Blue		Lightcyan			
Roque (see Croquet)																		
Shooting, Indoor																		
Target	Lightcyan		Blue		Blue		Lightcyan	Lightcyan	Blue	Lightcyan			Blue		Blue			
Shooting line	Lightcyan		Blue		Lightcyan		Blue	Lightcyan	Blue	Lightcyan			Blue		Lightcyan			





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Shooting, Outdoor at 45 m									
Target									
Shooting line									
Shuffleboard									
Indoor									
Outdoor									
Skating, Speed									
Indoor									
Outdoor									
Skeet and Trap									
Targets at 18.3 m									
Shooting line									
Skiing									
Soccer (see Football)									
Softball									
Squash									
Swimming (Water Sports)									
Indoor — on pool deck									
Outdoor — on pool deck									
Tennis									
Indoor									
Outdoor									
Trap (see Skeet and Trap)									
Volleyball									
Indoor									
Outdoor									

(3)

(3)





IESNA Lighting Design Guide

IV. SPORTS AND RECREATION LOCATIONS AND TASKS ^(a)		Very Important	Important	Somewhat important	Blank = Not important or not applicable
Design Issues	Color Appearance (and Color Contrast)				
	Daylighting Integration and Control				
	Direct Glare				
	Flicker (and Strobe)				
	Light Distribution on Task Plane (Uniformity)				
	Light Pollution/Trespass				
	Luminaire Noise				
	Modeling of Faces or Objects				
	Reflected Glare				
	Shadows				
	Special Considerations				
	Notes on Special Considerations				
	Illuminance (Horizontal)				
	Category or Value (lux) ^(b)				
	Illuminance (Vertical)				
Category or Value (lux) ^(b)					
Notes on Illuminance — see end of section					
Reference Chapter(s)					
Notes:					
(a) Criteria are for recreational or lowest classes of play unless otherwise stated. For other classes of play, and for lighting for television cameras for professional or higher classes of play, see Chapter 20, Sports and Recreational Area Lighting					
(b) All illuminance values for sporting events/activities are found in Chapter 20, Sports and Recreational Area Lighting					
(1) Vertical illuminance should increase with shooting distance.					
(2) Infield values					
(3) Readings taken at grade. All other readings taken at 1 meter (36") above grade.					





IESNA Lighting Design Guide

V. TRANSPORTATION^(a)		Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
LOCATIONS AND TASKS																									
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(b)	Illuminance (Vertical)	Category or Value (lux) ^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)	
Aircraft																				Ch. 23					
Passenger compartment																									
General																									
Reading (at seat)																									
Airports																				Ch. 23					
Hangar apron																									
Terminal building apron																									
Parking area																									
Loading area																									
Buses (See Road Conveyances)																				Ch. 23					
Rail Conveyances																				Ch. 23					
Boarding or exiting																									
Fare box (rapid transit train)																									
Vestibule (commuter and intercity trains)																									
Aisles																									
Advertising cards (rapid transit and commuter trains)																									
Back-lighted advertising cards (rapid transit and commuter trains)																									
860 cd/m ² (80 cd/ft ²) average maximum.																									





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V. TRANSPORTATION ^(a) LOCATIONS AND TASKS		Very Important	Important	Somewhat important	Blank = Not important or not applicable																			
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(b)	Illuminance (Vertical)	Category or Value (lux) ^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Reading (at seat)																			D					
Rest rooms (intercity train)																			B					
Dining area (intercity train)																			D		A			
Food preparation (intercity train)																			E		A	(1)		
Lounge (intercity train)																								
General lighting																			B		A			
Table games																			D					
Sleeping car																								
General lighting																			A		A			
Normal reading																			D					
Prolonged reading																			E					
Road Conveyances																								Ch. 23
Step well and adjacent ground area																			A		A			
Fare box																			B		A			
General lighting																			A		A			
City/intercity buses at city stop																			A		A			
Intercity bus at country stop																			A		A			
School bus while moving																			B		A			
School bus at stops																			D		A			
Advertising cards																					D			
Back-lighted advertising cards (see Rail Conveyances)																								
Reading (at seat)																			D					
Emergency exit (school bus)																			A					





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V. TRANSPORTATION ^(a) LOCATIONS AND TASKS	Very Important	Important	Somewhat important	Blank = Not important or not applicable																				
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(b)	Illuminance (Vertical)	Category or Value (lux) ^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Recreation areas																								
Ballrooms																			B		A			
Cocktail lounges																			B		A			
Swimming pools																								Ch. 20
General																			B		A			
Underwater																						(4)		
Theatre or Auditorium (see Theater and Motion Picture House, in Section I, Interior)																								Ch. 15
Navigating areas																								
Chart room																								
General																			B		A			
On chart table																			D		B			
Gyro room																			B					
Radar room																			B					
Radio room																								
Operating areas																			E		C			
Passenger foyer																			D					
Ship's offices																								
General lighting/lobby areas																			B					
Clerical tasks																			E		A			
Wheelhouse, pilothouse, bridge																								
Day, in-port during maintenance																			B		A			
Night when underway																						(5)		





IESNA Lighting Design Guide

V. TRANSPORTATION^(a) LOCATIONS AND TASKS		Very Important	Important	Somewhat important	Blank = Not important or not applicable																			
Design Issues	Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Daylighting Integration and Control	Direct Glare	Flicker (and Strobe)	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Luminances of Room Surfaces	Modeling of Faces or Objects	Point(s) of Interest	Reflected Glare	Shadows	Source/Task/Eye Geometry	Sparkle/Desirable Reflected Highlights	Surface Characteristics	System Control and Flexibility	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux)^(b)	Illuminance (Vertical)	Category or Value (lux)^(b)	Notes on Illuminance — see end of section	Reference Chapter(s)
Workshops (see Machining in Section II, Industrial)																								
General																								
On bench top																								
Machine shop																								
Cargo holds																								
Safety																								
During cargo handling																								
Passageways and trunks																								
Transportation Terminals																								
Waiting room and lounge																								
Ticket counters																								
Baggage checking																								
Rest rooms																								
Concourse																								
Boarding area																								
Notes:																								
(a) Design issues are listed for room or space. Refer to specific task under Reading or Graphic Design and Materials, for example, for task design issues and illuminance																								
(b) Low illuminances (less than 30 lux) are given in lux; values greater than 30 lux are given in letter categories.																								





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VI. EMERGENCY, SAFETY, AND SECURITY		Very Important	Important	Somewhat important	Blank = Not important or not applicable																		
	Design Issues																						
		Appearance of Space and Luminaires	Color Appearance (and Color Contrast)	Direct Glare	Flicker	Light Distribution on Surfaces	Light Distribution on Task Plane (Uniformity)	Light Pollution/Trespass	Luminances of Room Surfaces	Modeling of Faces or Objects	Peripheral Detection	Reflected Glare	Shadows	Source/Task/Eye Geometry	Surface Characteristics	Special Considerations	Notes on Special Considerations	Illuminance (Horizontal)	Category or Value (lux) ^(a)	Illuminance (Vertical)	Category or Value (lux) ^(a)	Notes on Illuminance	Reference chapter(s)
Emergency Lighting																							Ch. 29
Egress path																		10				(1, 2)	
Areas adj. to egress path																		0.5				(2)	
Stairwells																						(2)	
Exterior path of egress																		10				(1, 2)	
Safety																						(2)	Ch. 29
Security, Buildings and Grounds																							Ch. 29
CCTV Surveillance																						(3)	
Perimeter Fences for Correctional Facilities																				10		(3, 4)	
Protection of People																						(3)	
Residential security																						(3)	
Security of property																						(3)	
Notes:																							
(a) Low illuminances (less than 30 lux) are given in lux; values greater than 30 lux are given in letter categories.																							
(1) 10 lx along center of egress path, 1 lx along 1-m band centered on egress path																							
(2) Minimum illuminance for safety are listed in Chapter 29, Emergency, Safety, and Security																							
(3) Illuminances for security are listed in Chapter 29, Emergency, Safety, and Security																							
(4) Two levels of vertical illuminance are required, one for normal operations (10 lx) and one for full-alert operation (50 lx)																							

