

## Currently Recommended Illuminance Categories & Illuminance Values For Lighting Design—Target Maintained Levels

The tabulation that follows is a consolidated listing of current illuminance recommendations. This listing is intended to guide the lighting designer in selecting an appropriate illuminance for design and evaluation of lighting systems.

Guidance is provided in two forms: (1), in Parts I, II, and III as an Illuminance Category, representing a range of illuminances and (2), in parts IV, V and VI as an Illuminance Value. Illuminance Categories are represented by letter designations A through I. Illuminance Values are given in lux with an approximate equivalence in footcandles and as such are intended as target (nominal) values with deviations expected. These target values also represent maintained values.

This table has been divided into the six parts for ease of use. Part I provides a listing of both Illuminance Categories and Illuminance Values for generic types of interior activities and normally is to be used when Illuminance Categories for a specific Area/Activity cannot be found in Parts II and III. Parts IV, V and VI provide target maintained Illuminance Values for outdoor facilities, sports and recreational areas, and transportation vehicles where special considerations apply.

In all cases, the recommendations in this table are based on the assumption that the lighting will be properly designed to take into account the visual characteristics of the task.

### I. Illuminance Categories and Illuminance Values for Generic Types of Activities in Interiors

TYPE OF ACTIVITY	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	
Performance of visual tasks of medium contrast or small size	E	500-750-1000	50-75-100	Illuminance on task
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	Illuminance on task, obtained by a combination of general and local (supplementary lighting)
Performance of very prolonged and exacting visual tasks	H	5000-7500-10000	500-750-1000	
Performance of very special visual tasks of extremely low contrast and small size	I	10000-15000-20000	1000-1500-2000	

## II. Commercial, Institutional, Residential and Public Assembly Interiors

Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category
Air terminals (see Transportation terminals)		Food service facilities		Examination and treatment rooms <sup>17</sup>		Post-anesthetic recovery room <sup>17</sup>	
Armories . . . . .C <sup>1</sup>		Dining areas		General . . . . .D		General <sup>18</sup> . . . . .E	
Auditoriums		Cashier . . . . .D		Local . . . . .D		Local . . . . .H	
Assembly . . . . .C <sup>1</sup>		Cleaning . . . . .C		Eye surgery <sup>17</sup> . . . . .F		Pulmonary function laboratories <sup>17</sup> . . . . .E	
Social activity . . . . .B		Dining . . . . .B <sup>9</sup>		Fracture room <sup>17</sup>		Radiology suite <sup>17</sup>	
Banks (also see Reading)		Food displays (see Merchandising spaces)		General . . . . .E		Diagnostic section	
Lobby		Kitchen . . . . .E		Local . . . . .F		General <sup>18</sup> . . . . .A	
General . . . . .C		Gasoline stations (see Service Stations)		Inhalation therapy . . . . .D		Waiting area . . . . .A	
Writing area . . . . .D		Graphic design and material		Laboratories <sup>17</sup>		Radiographic/fluoroscopic room . . . . .A	
Tellers stations . . . . .E <sup>3</sup>		Color selection . . . . .F <sup>11</sup>		Specimen collecting . . . . .E		Film sorting . . . . .F	
Barber shops and beauty parlors . . . . .E		Charting and mapping . . . . .F		Tissue laboratories . . . . .F		Barium kitchen . . . . .E	
Conference rooms		Graphs . . . . .E		Microscopic reading room . . . . .D		Radiation therapy section	
Conferring . . . . .D		Keylining . . . . .F		Gross specimen review . . . . .F		General <sup>18</sup> . . . . .B	
Critical seeing (refer to individual task)		Layout and artwork . . . . .F		Chemistry rooms . . . . .E		Waiting area . . . . .B	
Depots, terminals and stations (see Transportation terminals)		Photographs, moderate detail . . . . .E <sup>13</sup>		Bacteriology rooms		Isotope kitchen, general . . . . .E	
Drafting		Health care facilities		General . . . . .E		Isotope kitchen, benches . . . . .E	
Mylar		Ambulance (local) . . . . .E		Reading culture plates . . . . .F		Hematology . . . . .E	
High contrast media; india ink, plastic leads, soft graphite leads . . . . .E <sup>3</sup>		Anesthetizing . . . . .E		Linens		Sorting soiled linen . . . . .D	
Low contrast media: hard graphite leads . . . . .F <sup>3</sup>		Autopsy and morgue <sup>17,18</sup>		Central (clean)		Central (clean) linen room . . . . .D	
Vellum		Autopsy, general . . . . .E		linen room . . . . .D		Sewing room, general . . . . .D	
High contrast . . . . .E <sup>3</sup>		Autopsy table . . . . .G		Sewing room, work area . . . . .E		Sewing room, work area . . . . .E	
Low contrast . . . . .F <sup>3</sup>		Morgue, general . . . . .D		Linen closet . . . . .B		Lobby . . . . .C	
Tracing paper		Museum . . . . .E		Locker rooms . . . . .C		Locker rooms . . . . .C	
High contrast . . . . .E <sup>3</sup>		Cardiac function lab . . . . .E		Medical illustration studio <sup>17,18</sup> . . . . .F		Medical illustration studio <sup>17,18</sup> . . . . .F	
Low contrast . . . . .F <sup>3</sup>		Central sterile supply		Medical records . . . . .E		Nursery <sup>17</sup> . . . . .C	
Overlays <sup>2</sup>		Inspection, general . . . . .E		Nursery <sup>17</sup> . . . . .C		General <sup>18</sup> . . . . .C	
Light table . . . . .C		Inspection . . . . .F		Observation and treatment . . . . .E		Observation and treatment . . . . .E	
Prints		At sinks . . . . .E		Nursing stations <sup>17</sup>		Nursing stations <sup>17</sup>	
Blue line . . . . .E		Work areas, general . . . . .D		General . . . . .D		General . . . . .D	
Blueprints . . . . .E		Processed storage . . . . .D		Desk . . . . .E		Desk . . . . .E	
Sepia prints . . . . .F		Corridors <sup>17</sup>		Corridors day . . . . .C		Corridors day . . . . .C	
Educational facilities		Nursing areas — day . . . . .C		Corridors night . . . . .A		Corridors night . . . . .A	
Classrooms		Nursing areas — night . . . . .B		Medication station . . . . .E		Medication station . . . . .E	
General (see Reading)		Operating areas, delivery, recovery, and laboratory suites and service . . . . .E		Obstetric delivery suite <sup>17</sup>		Obstetric delivery suite <sup>17</sup>	
Drafting (see Drafting)		Critical care areas <sup>17</sup>		Labor rooms		Labor rooms	
Home economics		General . . . . .C		General . . . . .C		General . . . . .C	
Science laboratories . . . . .E		Examination . . . . .E		Local . . . . .E		Local . . . . .E	
Lecture rooms		Surgical task lighting . . . . .H		Birthing room . . . . .F <sup>7</sup>		Birthing room . . . . .F <sup>7</sup>	
Audience (see Reading)		Handwashing . . . . .F		Delivery area		Delivery area	
Demonstration . . . . .F		Cystoscopy room <sup>17,18</sup> . . . . .E		Scrub, general . . . . .G		Scrub, general . . . . .G	
Music rooms (see Reading)		Dental suite <sup>17</sup>		General . . . . .G		General . . . . .G	
Shops (see Part III, Industrial Group)		General . . . . .D		Resuscitation . . . . .G		Resuscitation . . . . .G	
Sight saving rooms . . . . .F		Instrument tray . . . . .E		Post-delivery recovery area . . . . .E		Post-delivery recovery area . . . . .E	
Study halls (see Reading)		Oral cavity . . . . .H		Substerilizing room . . . . .B		Substerilizing room . . . . .B	
Typing (see Reading)		Prosthetic laboratory, general . . . . .D		Work area, general . . . . .D		Work area, general . . . . .D	
Sports facilities (see Part V, Sports and Recreational Areas)		Prosthetic laboratory, work bench . . . . .E		Work tables or benches . . . . .E		Work tables or benches . . . . .E	
Cafeterias (see Food Service facilities)		Prosthetic laboratory, local . . . . .F		Patients rooms <sup>17</sup>		Patients rooms <sup>17</sup>	
Dormitories (see Residences)		Recovery room, general . . . . .C		General <sup>17</sup> . . . . .B		General <sup>17</sup> . . . . .B	
Elevators, freight and passenger . . . . .C		Recovery room, emergency examination . . . . .E		Observation . . . . .A		Observation . . . . .A	
Exhibition halls . . . . .C <sup>1</sup>		Dialysis unit, medical <sup>17</sup> . . . . .F		Critical examination . . . . .E		Critical examination . . . . .E	
Fire halls (see Municipal buildings)		Elevators . . . . .C		Reading . . . . .D		Reading . . . . .D	
		EKG and specimen room <sup>17</sup>		Toilets . . . . .D		Toilets . . . . .D	
		General . . . . .B		Pharmacy <sup>17</sup>		Pharmacy <sup>17</sup>	
		On equipment . . . . .C		General . . . . .E		General . . . . .E	
		Emergency outpatient <sup>17</sup>		Alcohol vault . . . . .D		Alcohol vault . . . . .D	
		General . . . . .E		Laminar flow bench . . . . .F		Laminar flow bench . . . . .F	
		Local . . . . .F		Night light . . . . .A		Night light . . . . .A	
		Endoscopy rooms <sup>17,18</sup>		Parenteral solution room . . . . .D		Parenteral solution room . . . . .D	
		General . . . . .E		Physical therapy departments		Physical therapy departments	
		Peritoneoscopy . . . . .D		Gymnasiums . . . . .D		Gymnasiums . . . . .D	
		Culdoscopy . . . . .D		Tank rooms . . . . .D		Tank rooms . . . . .D	
				Treatment cubicles . . . . .D		Treatment cubicles . . . . .D	
						Hospitals (see Health care facilities)	
						Kitchens (see Food service facilities)	

Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	
Libraries Reading areas (see Reading) Book stacks (vertical 760 millimeters [30 inches] above floor) Active stacks . . . . . D Inactive stacks . . . . . B Book repair and binding . . . . . D Cataloging . . . . . D <sup>3</sup> Card files . . . . . E Carrels, individual study areas (see Reading) Circulation desks . . . . . D Map, picture and print rooms (see Graphic design and material) Audiovisual areas . . . . . D Audio listening areas . . . . . D Microform areas (see Reading)		Handwritten carbon copies . . . . . E		Cutting, punching, stitching . . E Embossing and inspection . . . . . F		steaming . . . . . E Inspection and spotting. . . . . G Presiding . . . . . F Repair and alteration . . . . . F		
		Locker rooms . . . . . C		Non-photographically reproducible colors . . . . F Chalkboards . . . . . E <sup>3</sup>		Breweries Brew house . . . . . D Boiling and keg washing . . . . . D Filling (bottles, cans, kegs) . . D		Cloth products Cloth inspection . . . . . I Cutting . . . . . G Sewing . . . . . G Pressing . . . . . F
				Printed tasks 6 point type . . . . . E <sup>3</sup> 8 and 10 point type . . . . . D <sup>3</sup> Glossy magazines . . . . . D <sup>13</sup> Maps . . . . . E Newsprint . . . . . D Typed originals . . . . . D Typed 2nd carbon and later . . . . . E Telephone books . . . . . E				
		Municipal buildings—fire and police Police Identification records . . . . F Jail cells and interrogation rooms . . . D Fire hall . . . . . D		Safety		Candy making Box department . . . . . D Chocolate department Husking, winnowing, fat extraction, crushing and refining, feeding . . . . . D Bean cleaning, sorting, dipping, packing, wrapping . . . . . D Milling . . . . . E Cream making Mixing, cooking, molding . . D Gum drops and jellied forms . . . . . D Hand decorating . . . . . D Hard candy Mixing, cooking, molding . . D Die cutting and sorting . . . E Kiss making and wrapping . . E		Control rooms (see Electric generating stations — interior) Corridors (see Service spaces)
				Schools (see Educational facilities)				
		Offices Accounting (see Reading) Conference areas (see Conference rooms) Drafting (see Drafting) General and private offices (see Reading) Libraries (see Libraries) Lobbies, lounges and reception areas . . . . . C Mail sorting . . . . . E Off-set printing and duplicating area . . . . . D		Service spaces (see also Storage rooms) Stairways, corridors . . . . . C Elevators, freight and passenger . . . . . C Toilets and wash rooms . . . . C		Stairways (see Service spaces)		Cotton gin industry Overhead equipment — separators, dryers, grid cleaners stick machines, conveyers, feeders and catwalks . . . . . D Gin stand . . . . . D Control console . . . . . D Lint cleaner . . . . . D Bale press . . . . . D
				Service stations Service bays (see Part III, Industrial Group) Sales room (see Merchandising spaces)				
		Reading Copied tasks Ditto copy . . . . . E <sup>3</sup> Micro-fiche reader . . . . . B <sup>12,13</sup> Mimeograph . . . . . D Photographs, moderate detail . . . . . E <sup>13</sup> Thermal copy, poor copy . . F <sup>3</sup> Xerograph . . . . . D Xerography, 3rd generation and greater . . . . . E Electronic data processing tasks CRT screens . . . . . B <sup>12,13</sup> Impact printer good ribbon . . . . . D poor ribbon . . . . . E 2nd carbon and greater . . . . . E Ink jet printer . . . . . D Keyboard reading . . . . . D Machine rooms Active operations . . . . . D Tape storage . . . . . D Machine area . . . . . C Equipment service . . . . . E <sup>10</sup> Thermal print . . . . . E Handwritten tasks #3 pencil and softer leads . . . . . E <sup>3</sup> #4 pencil and harder leads . . . . . F <sup>3</sup> Boll-point pen . . . . . D <sup>3</sup> Felt-tip pen . . . . . D		Stairways (see Service spaces)		Toilets and washrooms . . . . . C		Dairy products Fluid milk industry Boiler room . . . . . D Bottle storage . . . . . D Bottle sorting . . . . . E Bottle washers . . . . . E <sup>22</sup> Can washers . . . . . D Cooling equipment. . . . . D Filling inspection . . . . . E Gauges (on face) . . . . . E Laboratories . . . . . E Meter panels (on face) . . . E Pasteurizers . . . . . D Separators . . . . . D Storage refrigerator . . . . . D Tanks, vats Light interiors . . . . . C Dark interiors . . . . . E Thermometer (on face) . . . E Weighing room . . . . . D Scales . . . . . E
				Storage rooms (see Part III, Industrial Group)				
				Stores (see Merchandising spaces and Show windows)		III. INDUSTRIAL GROUP		Electrical equipment manufacturing Impregnating . . . . . D Insulating: coil winding . . . . E
Toilets and washrooms . . . . . C	Assembly Simple . . . . . D Moderately difficult . . . . . E Difficult . . . . . F Very difficult . . . . . G Exactng . . . . . H		Cleaning and pressing industry Checking and sorting . . . . . E Dry and wet cleaning and					
Transportation terminals Waiting room and lounge . . . C Ticket counters . . . . . E Baggage checking . . . . . D Rest rooms . . . . . C Concourse . . . . . B Boarding area . . . . . C				Bakeries Mixing room . . . . . D Face of shelves . . . . . D Inside of mixing bowl . . . . D Fermentation room . . . . . D Make up room Bread Sweet yeast-raised products . . . . . D Proofing room . . . . . D Oven room . . . . . D Fillings and other ingredients. . . . . D Decorating and icing Mechanical . . . . . D Hand . . . . . E Scales and thermometers . . . . D Wrapping . . . . . D	Casting (see Foundries) Central stations (see Electric generating stations) Chemical plants (see Petroleum and chemical plants) Clay and concrete products Grinding, filter presses, kiln rooms . . . . . C Molding, pressing, cleaning, trimming . . . . . D Enameling . . . . . E Color and glazing — rough work . . . . . E Color and glazing — fine work . . . . . F			
III. INDUSTRIAL GROUP	Book binding Folding, assembling pasting. . D							
Assembly Simple . . . . . D Moderately difficult . . . . . E Difficult . . . . . F Very difficult . . . . . G Exactng . . . . . H				Book binding Folding, assembling pasting. . D				



Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category							
Electric generating stations — interior (see also Nuclear power plants) Air-conditioning equipment, air pre-heater and fan floor, ash sluicing . . . . .B Auxiliaries, pumps, tanks, compressors, gauge area . . . . .C Battery rooms . . . . .D Boiler platforms . . . . .B Burner platforms . . . . .C Cable room . . . . .B Coal handling systems . . . . .B Coal pulverizer . . . . .C Condensers, deaerator floor, evaporator floor, heater floors . . . . .B Control rooms Main control boards . . . . .D <sup>23</sup> Auxiliary control panels . . . . .D <sup>23</sup> Operator's station . . . . .E <sup>23</sup> Maintenance and wiring areas . . . . .D Emergency operating lighting . . . . .C Gauge reading . . . . .D Hydrogen and carbon dioxide manifold area . . . . .C Laboratory . . . . .E Precipitators . . . . .B Screen house . . . . .C Soot or slag blower platform . . . . .C Steam headers and throttles . . . . .B Switchgear and motor control centers . . . . .D Telephone and communication equipment rooms . . . . .D Tunnels or galleries, piping and electrical . . . . .B Turbine building Operating floor . . . . .D Below operating floor . . . . .C Visitors gallery . . . . .C Water treating area . . . . .D	Feed storage area — storage Haymow . . . . .A Hay inspection area . . . . .C Ladders and stairs . . . . .C Silo . . . . .A Silo room . . . . .C Feed storage area — grain and concentrate Grain bin . . . . .A Concentrate storage area . . . . .B Feed processing area . . . . .B Livestock housing area (community, maternity, individual calf pens, and loose housing holding and resting areas) . . . . .B Machine storage area (garage and machine shed) . . . . .B Farm shop area Active storage area . . . . .B General shop area (machinery repair rough sawing) . . . . .D Rough bench and machine work (painting, fine storage, ordinary sheet metal work, welding, medium benchwork) . . . . .D Medium bench and machine work (fine woodworking, drill press, metal lathe, grinder) . . . . .E Miscellaneous areas Farm office (see Reading) Restrooms (see Service spaces) Pumphouse . . . . .C	Fine grinding, beveling, polishing . . . . .E Inspection, etching and decorating . . . . .F Glove manufacturing Pressing . . . . .G Knitting . . . . .F Sorting . . . . .F Cuffing . . . . .G Sewing and inspection . . . . .G Hangars (see Aircraft manufacturing) Hat manufacturing Dyeing, stiffening, braiding, cleaning, refining . . . . .E Forming, sizing, pouncing, flanging, finishing, ironing . . . . .F Sewing . . . . .G Inspection Simple . . . . .D Moderately difficult . . . . .E Difficult . . . . .F Very difficult . . . . .G Exacting . . . . .H Jewelry and watch manufacturing . . . . .G Laundries Washing . . . . .D Flat work ironing, weighing, listing, marking . . . . .D Machine and press finishing, sorting . . . . .E Fine hand ironing . . . . .E Leather manufacturing Cleaning tanning and stretching, vats . . . . .D Cutting, fleshing and stuffing . . . . .D Finishing and scarfing . . . . .E Leather working Pressing, winding, glazing . . . . .F Grading, matching, cuffing, scarfing, sewing . . . . .G Loading and unloading platforms (see Part IV, Outdoor Facilities) Locker rooms . . . . .C Logging (see Part IV, Outdoor Facilities) Lumber yards (see Part IV, Outdoor Facilities) Machine shops Rough bench or machine work . . . . .D Medium bench or machine work, ordinary automatic machines, rough grinding, medium buffing and polishing . . . . .E Fine bench or machine work, fine automatic machines, medium grinding, fine buffing and polishing . . . . .G Extra-fine bench or machine work, grinding, fine work . . . . .H	Materials handling Wrapping, packing, labeling . . . . .D Picking stock, classifying . . . . .D Loading, inside truck bodies and freight cars . . . . .C Meat packing Slaughtering . . . . .D Cleaning, cutting, cooking, grinding, canning, packing . . . . .D Nuclear power plants (see also Electric Generating Stations) Auxiliary building, uncontrolled access areas . . . . .C Controlled access areas Count room . . . . .E <sup>23</sup> Laboratory . . . . .E Health physics office . . . . .F Medical aid room . . . . .F Hot laundry . . . . .D Storage room . . . . .C Engineered safety features equipment . . . . .D Diesel generator building . . . . .D Fuel handling building Operating floor . . . . .D Below operating floor . . . . .C Oil gas building . . . . .C Radwaste building . . . . .D Reactor building Operating floor . . . . .D Below operating floor . . . . .C Packing and boxing (see Materials handling) Paint manufacturing Processing . . . . .D Mix comparison . . . . .F Paint shops Dipping, simple spraying, firing . . . . .D Rubbing, ordinary hand painting and finishing art, stencil and special spraying . . . . .D Fine hand painting and finishing . . . . .E Extra-fine hand painting and finishing . . . . .G Paper-box manufacturing . . . . .E Paper manufacturing Beaters, grinding, calendering . . . . .D Finishing, cuffing, trimming, papermaking machines . . . . .E Hand counting, wet end of paper machine . . . . .E Paper machine reel, paper inspection, and laboratories . . . . .F Rewinder . . . . .F Plating . . . . .D Polishing and burnishing (see Machine shops) Power plants (see Electric generating stations)											
				Farms — poultry (see Poultry Industry)	Farms — dairy Milking operation area (milking parlor and stall barn) General . . . . .C Cow's udder . . . . .D Milk handling equipment and storage area (milk house or milk room) General . . . . .C Washing area . . . . .E Bulk tank interior . . . . .E Loading platform . . . . .C Feeding area (stall barn feed alley, pens, loose housing feed area). . . . .C	Flour mills Rolling, sifting, purifying . . . . .E Packing . . . . .D Product control . . . . .F Cleaning, screens, man lifts, aisleways and walkways, bin checking. . . . .D Forge shops . . . . .E Foundries Annealing (furnaces) . . . . .D Cleaning . . . . .D Core making Fine . . . . .F Medium . . . . .E Grinding and chipping . . . . .F Inspection Fine . . . . .G Medium . . . . .F Molding Medium . . . . .F Large . . . . .E Pouring . . . . .E Sorting . . . . .E Cupola . . . . .C Shakeout . . . . .D Garages — service Repairs . . . . .E Active traffic areas . . . . .C Write-up . . . . .D Glass works Mix and furnace rooms, pressing and lehr, glass-blowing machines. . . . .C Grinding, cutting, silvering . . . . .D	Paper manufacturing Beaters, grinding, calendering . . . . .D Finishing, cuffing, trimming, papermaking machines . . . . .E Hand counting, wet end of paper machine . . . . .E Paper machine reel, paper inspection, and laboratories . . . . .F Rewinder . . . . .F Plating . . . . .D Polishing and burnishing (see Machine shops) Power plants (see Electric generating stations)							
				Electric generating stations — exterior (see Part IV, Outdoor Facilities)		Electric generating stations — exterior (see Part IV, Outdoor Facilities)		Electric generating stations — exterior (see Part IV, Outdoor Facilities)	Electric generating stations — exterior (see Part IV, Outdoor Facilities)					
				Elevators (see Service spaces)		Elevators (see Service spaces)		Elevators (see Service spaces)	Elevators (see Service spaces)					
				Explosives manufacturing Hand furnaces, boiling tanks, stationary dryers, stationary and gravity crystallizers . . . . .D Mechanical furnace, generators and stills, mechanical dryers, evaporators, filtration, mechanical crystallizers . . . . .D Tanks for cooking, extractors, percolators, nitrotrators . . . . .D		Farms — dairy Milking operation area (milking parlor and stall barn) General . . . . .C Cow's udder . . . . .D Milk handling equipment and storage area (milk house or milk room) General . . . . .C Washing area . . . . .E Bulk tank interior . . . . .E Loading platform . . . . .C Feeding area (stall barn feed alley, pens, loose housing feed area). . . . .C		Farms — dairy Milking operation area (milking parlor and stall barn) General . . . . .C Cow's udder . . . . .D Milk handling equipment and storage area (milk house or milk room) General . . . . .C Washing area . . . . .E Bulk tank interior . . . . .E Loading platform . . . . .C Feeding area (stall barn feed alley, pens, loose housing feed area). . . . .C	Farms — dairy Milking operation area (milking parlor and stall barn) General . . . . .C Cow's udder . . . . .D Milk handling equipment and storage area (milk house or milk room) General . . . . .C Washing area . . . . .E Bulk tank interior . . . . .E Loading platform . . . . .C Feeding area (stall barn feed alley, pens, loose housing feed area). . . . .C	Farms — dairy Milking operation area (milking parlor and stall barn) General . . . . .C Cow's udder . . . . .D Milk handling equipment and storage area (milk house or milk room) General . . . . .C Washing area . . . . .E Bulk tank interior . . . . .E Loading platform . . . . .C Feeding area (stall barn feed alley, pens, loose housing feed area). . . . .C				
											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
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											Explosives manufacturing	Explosives manufacturing	Explosives manufacturing	Explosives manufacturing
				Explosives manufacturing		Explosives manufacturing		Explosives manufacturing	Explosives manufacturing					



Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Illuminance Category	Area/Activity	Foot Lux Candles
Poultry industry (see also Farm — dairy)		Safety (see Fig. 44)		Active		<b>IV. OUTDOOR FACILITIES</b>	
Brooding, production, and laying houses		Sawmills		Rough, bulky items . . . . .C		Building, (construction)	
Feeding, inspection, cleaning . . . . .C		Secondary log deck . . . . .B		Small items . . . . .D		General	
Charts and records . . . . .D		Head saw (cutting area viewed by sawyer) . . . . .E		Storage yards (see Part IV, Outdoor Facilities)		construction . . . .100	10
Thermometers, thermostats, time clocks . . . . .D		Head saw outfeed . . . . .B		Structural steel fabrication . . . . .E		Excavation work. . . .20	2
Hatcheries		Machine in-feeds (bull edger, resaws, edgers, trim, hula saws, planers) . . . . .B		Sugar refining		Building exteriors	
General area and loading platform . . . . .C		Main mill floor (base lighting) . . . . .A		Grading . . . . .E		Entrances	
Inside incubators . . . . .D		Sorting tables . . . . .D		Color inspection . . . . .F		Active (pedestrian and/or conveyance) . . .50	5
Dubbing station. . . . .F		Rough lumber grading . . . . .D		Testing		Inactive (normally locked infrequently used) . . . . .10	1
Sexing . . . . .H		Finished lumber grading . . . . .F		General . . . . .D		Vital locations or structures . . . . .50	5
Egg handling, packing and shipping		Dry lumber warehouse (planer) . . . . .C		Exacting tests, extra-fine instruments, scales, etc. . . . .F		Building surrounds .10	1
General cleanliness . . . . .E		Dry kiln coiling shed . . . . .B		Textile mills		Buildings and monuments, floodlighted	
Egg quality inspection . . . . .E		Chipper infeed . . . . .B		Staple fiber preparation		Bright surroundings	
Loading platform, egg storage area, etc. . . . .C		Basement areas		Stock dyeing, tinting . . . . .D		Light surfaces . . .150	15
Egg processing		Active . . . . .A		Sorting and grading (wool and cotton) . . . . .E <sup>16</sup>		Medium light surfaces . . . .200	20
General lighting . . . . .E		Inactive . . . . .A		Yarn manufacturing		Medium dark surfaces . . . .300	30
Fowl processing plant		Filing room (work areas) . . . . .E		Opening and picking (chute feed) . . . . .D		Dark surfaces . . .500	50
General (excluding killing and unloading area) . . . . .E		Service spaces (see also Storage rooms)		Carding (nonwoven web formation) . . . . .D <sup>24</sup>		Dark surroundings	
Government inspection station and grading stations . . . . .E		Stairways, corridors . . . . .B		Drawing (gilling, pin drafting) . . . . .D		Light surfaces . . .50	5
Unloading and killing area . . . . .C		Elevators, freight and passenger . . . . .B		Combing . . . . .D <sup>24</sup>		Medium light surfaces . . . .100	10
Feed storage		Toilets and wash rooms . . . . .C		Roving (clubbing, fly frame) . . . . .E		Medium dark surfaces . . . .150	15
Grain, feed rations . . . . .C		Sheet metal works		Spinning (cap spinning, twisting, texturing) . . . . .E		Dark surfaces . . .200	20
Processing . . . . .C		Miscellaneous machines		Yarn preparation		Bulletin and poster boards	
Charts and records . . . . .D		ordinary bench work . . . . .E		Winding, quilling, twisting .E		Bright surroundings	
Machine storage area (garage and machine shed) . . . . .B		Presses, shears, stamps, spinning, medium bench work . . . . .E		Warping (beaming, sizing) . . . . .F <sup>16</sup>		Light surfaces . . .500	50
Printing Industries		Punches . . . . .E		Warp tie-in or drawing-in (automatic) . . . . .E		Dark surfaces . .1000	100
Type foundries		Tin plate inspection, galvanized . . . . .F		Fabric production		Dark surroundings	
Matrix making, dressing type . . . . .E		Scribing . . . . .F		Weaving, knitting, tufting .F		Light surfaces . . .200	20
Font assembly—sorting . . .D		Shoe manufacturing — leather		Inspection . . . . .G <sup>16,25</sup>		Dark surfaces . . .500	50
Casting . . . . .E		Cutting and stitching		Finishing		Central station (see Electric generating stations—exterior)	
Printing plants		Cutting tables . . . . .G		Fabric preparation (desizing, scouring, bleaching, singeing, and mercerization) . . . . .D		Coal yards (protective) . . . . .2	0.2
Color inspection and appraisal . . . . .F		Marking, buttonholing, skiving, sorting, vamping, counting . . . . .G		Fabric dyeing (printing) . . . . .D		Dredging . . . . .20	2
Machine composition. . . . .E		Stitching dark materials . . .G		Fabric finishing (calendering, sanforizing, sueding, chemical treatment) . . . . .E <sup>16</sup>		Electric generating stations — exterior	
Composing room . . . . .E		Making and finishing, nailers, sole layers, welt beaters and scarfers. trimmers, welters, lasters, edge setters sluggers, randers, wheelers, beers, cleaning, spraying, buffing, polishing, embossing . . .F		Inspection . . . . .G <sup>16,25</sup>		Boiler areas	
Presses . . . . .E		Shoe manufacturing—rubber		Tobacco products		Catwalks, general areas . . . . .20	2
Imposing stones . . . . .F		Washing, coating, mill run compounding . . . . .D		Drying, stripping . . . . .D		Stairs and platforms. . . .50	5
Proofreading. . . . .F		Varnishing, vulcanizing, calendering, upper and sole cutting . . . . .D		Grading and sorting . . . . .F		Ground level areas including precipitators, FD and ID fans, bottom ash hoppers . . . . .50	5
Electrotyping		Sole rolling, lining, making and finishing processes . . .E		Toilets and wash rooms (see Service spaces)		Cooling towers	
Molding, routing, finishing leveling molds, trimming . . . . .E		Soap manufacturing		Upholstering . . . . .F		Fan deck, platforms, stairs, valve areas . . . . .50	5
Blocking, tinning . . . . .D		Kettle houses. cutting, soap chip and powder . . . . .D		Warehouse (see Storage rooms)		Pump areas . . . .20	2
Electroplating, washing, backing . . . . .D		Stamping, wrapping and packing, filling and packing soap powder . . . . .D		Welding		Fuel handling	
Photoengraving		Stairways (see Service spaces)		Orientation . . . . .D		Barge unloading, car dumper, unloading hoppers, truck unloading, pumps, gas metering . . .50	5
Etching, staging, blocking . . . . .D		Steel (see Iron and Steel)		Precision manual arc welding . . . . .H		Conveyors . . . . .20	2
Routing, finishing, proofing . . . . .E		Storage battery manufacturing . . . . .D		Woodworking		Storage tanks . . . .10	1
Tint laying, masking . . . . .E		Storage rooms or warehouses		Rough sawing and bench work . . . . .D		Coal storage piles, ash dumps . . . . .2	0.2
Receiving and shipping (see Materials handling)		Inactive . . . . .B		Sizing, planing, rough sanding, medium quality machine and bench work, . . . . .D			
Railroad yards (see Part IV, Outdoor Facilities)				gluing, veneering, cooperage . . . . .D			
Rubber goods — mechanical (see Fig. 50) <sup>21</sup>				Fine bench and machine work, fine sanding and finishing . . . . .E			
Rubber tire manufacturing (see Fig 50) <sup>21</sup>				Central station (see Electric generating stations — exterior)			

Area/Activity	Foot Lux Candles	Area/Activity	Foot Lux Candles	Area/Activity	Foot Lux Candles	Area/Activity	Foot Lux Candles
Hydroelectric		Piers		Landscape highlights	.50 5	Step well and adjacent ground area	.100 10
Powerhouse roof, stairs, platform and intake decks	.50 5	Freight	.200 20	Ship yards		Fare box	.150 15
Inlet and discharge water area	.2 0.2	Passenger	.200 20	General	.50 5	General lighting (for seat selection and movement)	
Intake structures		Active shipping area surrounds	.50 5	Ways	.100 10	City and intercity buses at city stop	.100 10
Deck and laydown area	.50 5	Prison yards	.50 5	Fabrication areas	.300 30	Inter-city bus at country stop	.20 2
Value pits	.20 2	Quarries	.50 5	Smokestacks with advertising messages (see Bulletin and poster boards)		School bus while moving	.150 15
Inlet water area	.2 0.2	Railroad yards		Storage yards		School bus at stops	.300 30
Parking areas		Retarder classification yards		Active	.200 20	Advertising cards	.300 30
Main plant		Receiving yard		Inactive	.10 1	Back-lighted advertising cards (see Rail conveyances)	
parking	.20 2	Switch points	.20 2	Water tanks with advertising messages (see Bulletin and poster boards)		Reading	.300 <sup>3</sup> 30 <sup>3</sup>
Secondary		Body of yard	.10 1			Emergency exit (school bus)	.50 5
parking	.10 1	Hump area (vertical)	.200 20	<b>V. TRANSPORTATION VEHICLES</b>			
Substation		Control tower and retarder area (vertical)	.100 10	Aircraft		Ships	
Horizontal		Head end	.50 5	Passenger compartment		Living Areas	
Vertical tasks	.50 5	Body	.10 1	General	.50 5	Staterooms and Cabins	
Transformer yards		Pull-out end	.20 2	Reading (at seat)	.200 20	General lighting	
Horizontal		Dispatch or forwarding yard	.10 1	Airports		writing	
general area	.20 2	Hump and car rider classification yard		Hangar apron	.10 1	.300 <sup>15,3</sup> 30 <sup>16,3</sup>	
Vertical tasks	.50 5	Receiving yard		Terminal building apron		Prolonged seeing	
Turbine areas		Switch points	.20 2	Parking area	.5 0.5	.700 <sup>16,3</sup> 70 <sup>16,3</sup>	
Building		Body of yard	.10 1	Loading area	.20 <sup>14</sup> 2 <sup>14</sup>	Baths (general lighting)	
surrounds	.20 2	Hump area	.50 5	Rail conveyances			
Turbine and heater decks, unloading bays	.50 5	Flat switching yards		Boarding or exiting	.100 10	Baths (general lighting)	
Entrances, stairs and platforms	.50 <sup>9</sup> 5 <sup>9</sup>	Side of cars (vertical)	.50 5	Fare box (rapid transit train)	.150 15	Mirrors (personal grooming)	
Flags, floodlighted (see Bulletin and poster boards)		Switch points	.20 2	Vestibule (commuter and intercity trains)	.100 10	.500 50	
Gardens <sup>19</sup>		Trailer-on-flatcars		Aisles	.100 10	Barber shop and beauty parlor	
General lighting	.5 0.5	Horizontal surface of flatcar	.50 5	Advertising cards (rapid transit and commuter trains)	.300 30	.500 50	
Path, steps, away from house	.10 1	Hold down points (vertical)	.50 5	Back-lighted advertising cards (rapid transit and commuter trains)—860 cd/m <sup>2</sup> (250 fl.) average	.300 <sup>3</sup> 30 <sup>3</sup>	On Subject .1000 100	
Backgrounds—fences, walls, trees, shrubbery	.20 2	Container-on flatcars	.30 3	Reading	.300 <sup>3</sup> 30 <sup>3</sup>	Day rooms	
Flower beds, rock gardens	.50 5	Sawmills (see also Logging)		Rest room (inter-city train)	.200 20	General lighting	
Trees, shrubbery, when emphasized	.50 5	Cut off saw	.100 10	Dining area (inter-city train)	.500 50	.200 <sup>15</sup> 20 <sup>15</sup>	
Focal points, large	.100 10	Log haul	.20 2	Food preparation (inter-city train)	.700 70	.500 <sup>16,3</sup> 50 <sup>16,3</sup>	
Focal points, small	.200 20	Log hoist (side lift)	.20 2	Lounger (inter-city train) General lighting	.200 20	Dining rooms and messrooms	
Gasoline station (see Service stations in Part II)		Primary log deck	.100 10	Table games	.300 30	.200 20	
Loading and unloading platforms	.200 20	Barker in-feed	.300 30	Sleeping car		Enclosed promenades	
Freight car interiors	.100 10	Green chain	.300 <sup>26</sup> 30 <sup>26</sup>	General lighting	.100 10	General lighting	
Logging (see also Sawmills)		Lumber		Normal reading	.300 <sup>3</sup> 30 <sup>3</sup>	.100 10	
Yarding	.30 3	strapping	.200 <sup>26</sup> 20 <sup>26</sup>	Prolonged seeing	.700 <sup>3</sup> 70 <sup>3</sup>	Entrances and passageways	
Log loading and unloading	.50 5	Lumber handling areas	.20 2	Road Conveyances		General lighting	
Log stowing (water)	.5 0.5	Lumber loading areas	.50 5			.100 10	
Active log storage area (land)	.5 0.5	Wood chip storage piles	.5 0.5			.300 30	
Log booming area (water) — foot traffic	.10 1	Service station (at grade)				.300 30	
Active log handling area (water)	.20 2	Dark surrounding				.300 <sup>16</sup> 30 <sup>16</sup>	
Log grading — water or land	.50 5	Approach	.15 15			.500 <sup>16</sup> 50 <sup>16</sup>	
Log bins (land)	.20 2	Driveway	.15 15			.300 <sup>16</sup> 30 <sup>16</sup>	
Lumber yards	.10 1	Pump island area	.200 20			.20000 2000	
		Building faces (exclusive of glass)	.100 <sup>14</sup> 10 <sup>14</sup>			Wards	
		Service areas	.30 3			General lighting	
		Landscape highlights	.20 2			.100 10	
		Light surrounding				.300 30	
		Approach	.30 3			.200 20	
		Driveway	.50 5			Libraries and lounges	
		Pump island area	.300 30			General lighting	
		Building faces (exclusive of glass)	.300 <sup>14</sup> 30 <sup>14</sup>			.200 20	
		Service areas	.70 7				

Area/Activity	Foot Lux Candles	Area/Activity	Foot Lux Candles
Prolonged seeing . . . . .700 <sup>16,3</sup>	70 <sup>16,3</sup>	stores) . . . . .50	5
Purser's office . . .200 <sup>16</sup>	20 <sup>16</sup>	Laundries	
Shopping areas . .200	20	General . . . . .200 <sup>16</sup>	20 <sup>16</sup>
Smoking rooms . .150	.15	Machine and press finishing, sorting . . . . .500	50
Stairs and foyers .200	20	Lockers . . . . .50	5
Recreation areas		Offices	
Ball rooms . . . . .150 <sup>15</sup>	15 <sup>15</sup>	General . . . . .200	20
Cocktail lounges . . . . .150 <sup>15</sup>	15 <sup>15</sup>	Reading . . . . .500 <sup>16,3</sup>	50 <sup>16,3</sup>
Swimming pools		Passenger counter . . . . .50 <sup>16,3</sup>	50 <sup>16,3</sup>
General . . . . .150 <sup>15</sup>	15 <sup>15</sup>	Storerooms . . . . .50	5
Underwater		Telephone exchange . . . . .200	20
Outdoors — 600 [60] lamp lumens/square meter [foot] of surface area		Operating Areas	
Indoors —1000 [100] lamp lumens/square meter [foot] of surface area		Access and casing . . . . .100	10
Theatre		Battery room . . . . .100	10
Auditorium		Boiler rooms . . . . .200 <sup>16</sup>	200 <sup>16</sup>
General . . . . .100 <sup>15</sup>	10 <sup>15</sup>	Cargo handling	
During picture .1	0.1	Control stations (except navigating areas)	
Navigating Areas		General Control consoles. . . . .200	20
Chart room		Gauge and control boards . . . . .300	30
General . . . . .100	10	Switchboards . . .300	30
On chart table . . . . .500 <sup>16,3</sup>	50 <sup>16,3</sup>	Engine rooms . . . . .200 <sup>16</sup>	20 <sup>16</sup>
Gyro room . . . . .200	20	Generator and switchboard rooms . . . . .200 <sup>16</sup>	20 <sup>16</sup>
Radar room . . . . .200	20	Fan rooms (ventilation & air conditioning) . . .100	10
Radio room . . . . .100 <sup>16</sup>	10 <sup>16</sup>	Motor rooms . . . . .200	20
Radio room, passenger foyer . . . . .100	10	Motor generator rooms (cargo handling) . . . . .100	10
Ship's offices		Pump room . . . . .100	10
General . . . . .200 <sup>16</sup>	20 <sup>16</sup>	Shaft alley . . . . .100	10
On desks and work tables . . . . .500 <sup>16,3</sup>	50 <sup>16,3</sup>	Shaft alley escape . . . . .30	3
Wheelhouse . .100	10	Steering gear room . . . . .200	20
Service Areas		Windlass rooms . . .100	10
Food preparation		Workshops	
General . . . . .200 <sup>16</sup>	20 <sup>16</sup>	General . . . . .300 <sup>16</sup>	30 <sup>16</sup>
Butcher shop . .200 <sup>16</sup>	20 <sup>16</sup>	On top of work bench . . . . .50 <sup>16</sup>	50 <sup>16</sup>
Gallery . . . . .300 <sup>16</sup>	300 <sup>16</sup>	Tailor shop . . . . .500 <sup>16</sup>	50 <sup>16</sup>
Pantry . . . . .200 <sup>16</sup>	20 <sup>16</sup>	Cargo holds	
Thaw room. . .200 <sup>16</sup>	20 <sup>16</sup>	Permanent luminaires . . .30 <sup>16</sup>	3 <sup>16</sup>
Sculleries. . . . .200 <sup>16</sup>	20 <sup>16</sup>	Passageways and trunks . . .100	10
Food storage (non-refrigerated) . .100	10		
Refrigerated spaces (ship's			

- <sup>1</sup> Include provisions for higher levels for exhibitions.
- <sup>2</sup> Specific limits are provided to minimize deterioration effects.
- <sup>3</sup> Task subject to veiling reflections. Illuminance listed is not an ESI value. Currently, insufficient experience in the use of ESI target values precludes the direct use of Equivalent Sphere Illumination in the present consensus approach to recommend illuminance values. Equivalent Sphere Illumination may be used as a tool in determining the effectiveness of controlling veiling reflections and as a part of the evaluation of lighting systems.
- <sup>4</sup> Illuminance values are listed based on experience and consensus. Values relate to needs during various religious ceremonies.
- <sup>5</sup> Degradation factors: Overlays — add 1 weighting factor for each overlay; Used material — estimate additional factors.
- <sup>6</sup> Provide higher level over food service or selection areas.
- <sup>7</sup> Supplying illumination as in delivery room must be available.
- <sup>8</sup> Illuminance values developed for various degrees of store area activity.
- <sup>9</sup> Or not less than 1/3 the level in the adjacent areas.
- <sup>10</sup> Only when actual equipment service is in process. May be achieved by a general lighting system or portable equipment.
- <sup>11</sup> For color matching, the spectral quality of the color of the light source is important.
- <sup>12</sup> Veiling reflections may be produced on glass surfaces. It may be necessary to treat plus weighting factors as minus in order to obtain proper illuminance.
- <sup>13</sup> Especially subject to veiling reflections. It may be necessary to shield the task or to re-orient it.
- <sup>14</sup> Vertical.
- <sup>15</sup> Illuminance values may vary widely, depending upon the effect desired, the decorative scheme, and the use made of the room.
- <sup>16</sup> Supplementary lighting should be provided in this space to produce the higher levels required for specific seeing tasks involved.
- <sup>17</sup> Good to high color rendering capability should be considered in these areas. As lamps of higher luminous efficacy and higher color rendering capability become available and economically feasible they should be applied in all areas of health care facilities.
- <sup>18</sup> Variable (dimming or switching).
- <sup>19</sup> Values based on a 25 per cent reflectance which is average for vegetation and typical outdoor surfaces. These figures must be adjusted to specific reflectances of materials lighted for equivalent brightnesses. Levels give satisfactory brightness patterns when viewed from dimly lighted terraces or interiors. When viewed from dark areas they may be reduced by at least 1/2, or they may be doubled when a high key is desired.
- <sup>20</sup> General lighting should not be less than 1/3 of visual task illuminance nor less than 200 lux [20 footcandles].
- <sup>21</sup> Industry representatives have established a table of single illuminance values which in their opinion can be used in preference to employing reference 6. Illuminance values for specific operations can also be determined using illuminance categories of similar tasks and activities found in this table and the application of the appropriate weighting factors in Fig. 56.
- <sup>22</sup> Special lighting such that (1) the luminous area is large enough to cover the surface which is being inspected and (2) the luminance is within the limits necessary to obtain comfortable contrast conditions. This involves the use of sources of large area and relatively low luminance in which the source luminance is the principal factor rather than the illuminance produced at a given point.
- <sup>23</sup> Maximum levels — controlled system.
- <sup>24</sup> Additional lighting needs to be provided for maintenance only.
- <sup>25</sup> Color temperature of the light source is important for color matching.
- <sup>26</sup> Select upper level for high speed conveyor systems. For grading redwood lumber 3000 lux [300 footcandles] is required.