

**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		Computerized radiotomography section	
High contrast media; india ink, plastic leads, soft graphite leads . . . . .E <sup>3</sup>		Anesthetizing . . . . .E		Hematology . . . . .E		Scanning room . . . . .B	
Low contrast media: hard graphite leads . . . . .F <sup>3</sup>		Autopsy and morgue <sup>17,18</sup>		Linens		Equipment maintenance room . . . . .E	
Vellum		Autopsy, general . . . . .E		Sorting soiled linen . . . . .D		Solarium	
High contrast . . . . .E <sup>3</sup>		Autopsy table . . . . .G		Central (clean)		General . . . . .C	
Low contrast . . . . .F <sup>3</sup>		Morgue, general . . . . .D		linen room . . . . .D		Local for reading . . . . .D	
Tracing paper		Museum . . . . .E		Sewing room, general . . . . .D		Stairways . . . . .C	
High contrast . . . . .E <sup>3</sup>		Cardiac function lab . . . . .E		Sewing room, work area . . . . .E		Surgical suite <sup>17</sup>	
Low contrast . . . . .F <sup>3</sup>		Central sterile supply		Linen closet . . . . .B		Operating room, general <sup>18</sup> . . . . .F	
Overlays <sup>2</sup>		Inspection, general . . . . .E		Lobby . . . . .C		Scrub room <sup>18</sup> . . . . .E	
Light table . . . . .C		Inspection . . . . .F		Locker rooms . . . . .C		Instruments and sterile supply room . . . . .D	
Prints		At sinks . . . . .E		Medical illustration studio <sup>17,18</sup> . . . . .F		Clean up room, instruments . . . . .E	
Blue line . . . . .E		Work areas, general . . . . .D		Medical records . . . . .E		Anesthesia storage . . . . .C	
Blueprints . . . . .E		Processed storage . . . . .D		Nurseries <sup>17</sup>		Substerilizing room . . . . .C	
Sepia prints . . . . .F		Corridors <sup>17</sup>		General <sup>18</sup> . . . . .C		Surgical induction room <sup>17,18</sup> . . . . .E	
Educational facilities		Nursing areas — day . . . . .C		Observation and treatment . . . . .E		Surgical holding area <sup>17,18</sup> . . . . .E	
Classrooms		Nursing areas — night . . . . .B		Nursing stations <sup>17</sup>		Toilets . . . . .C	
General (see Reading)		Operating areas, delivery, recovery, and laboratory suites and service . . . . .E		General . . . . .D		Utility room . . . . .D	
Drafting (see Drafting)		Critical care areas <sup>17</sup>		Desk . . . . .E		Waiting areas <sup>17</sup>	
Home economics		General . . . . .C		Corridors day . . . . .C		General . . . . .C	
Science laboratories . . . . .E		Examination . . . . .E		Corridors night . . . . .A		Local for reading . . . . .D	
Lecture rooms		Surgical task lighting . . . . .H		Medication station . . . . .E		Hospitals (see Health care facilities)	
Audience (see Reading)		Handwashing . . . . .F		Obstetric delivery suite <sup>17</sup>		Kitchens (see Food service facilities)	
Demonstration . . . . .F		Cystoscopy room <sup>17,18</sup> . . . . .E		Labor rooms			
Music rooms (see Reading)		Dental suite <sup>17</sup>		General . . . . .C			
Shops (see Part III, Industrial Group)		General . . . . .D		Local . . . . .E			
Sight saving rooms . . . . .F		Instrument tray . . . . .E		Birthing room . . . . .F <sup>7</sup>			
Study halls (see Reading)		Oral cavity . . . . .H		Delivery area			
Typing (see Reading)		Prosthetic laboratory, general . . . . .D		Scrub, general . . . . .G			
Sports facilities (see Part V, Sports and Recreational Areas)		Prosthetic laboratory, work bench . . . . .E		General . . . . .G			
Cafeterias (see Food Service facilities)		Prosthetic laboratory, local . . . . .F		Resuscitation . . . . .G			
Dormitories (see Residences)		Recovery room, general . . . . .C		Post-delivery recovery area . . . . .E			
Elevators, freight and passenger . . . . .C		Recovery room, emergency examination . . . . .E		Substerilizing room . . . . .B			
Exhibition halls . . . . .C <sup>1</sup>		Dialysis unit, medical <sup>17</sup> . . . . .F		Work area, general . . . . .D			
Fire halls (see Municipal buildings)		Elevators . . . . .C		Work tables or benches . . . . .E			
		EKG and specimen room <sup>17</sup>		Patients rooms <sup>17</sup>			
		General . . . . .B		General <sup>17</sup> . . . . .B			
		On equipment . . . . .C		Observation . . . . .A			
		Emergency outpatient <sup>17</sup>		Critical examination . . . . .E			
		General . . . . .E		Reading . . . . .D			
		Local . . . . .F		Toilets . . . . .D			
		Endoscopy rooms <sup>17,18</sup>		Pharmacy <sup>17</sup>			
		General . . . . .E		General . . . . .E			
		Peritoneoscopy . . . . .D		Alcohol vault . . . . .D			
		Culdoscopy . . . . .D		Laminar flow bench . . . . .F			
				Night light . . . . .A			
				Parenteral solution room . . . . .D			
				Physical therapy departments			
				Gymnasiums . . . . .D			
				Tank rooms . . . . .D			
				Treatment cubicles . . . . .D			

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



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)	Leather manufacturing Cleaning tanning and stretching, vats ..... D Cutting, fleshing and stuffing ..... D Finishing and scarfing ..... 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	
					Electric generating stations — exterior (see Part IV, Outdoor Facilities)	Farms — poultry (see Poultry Industry)	Leather manufacturing Cleaning tanning and stretching, vats ..... D Cutting, fleshing and stuffing ..... D Finishing and scarfing ..... 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
					Elevators (see Service spaces)	Flour mills Rolling, sifting, purifying ... E Packing ..... D Product control ..... F Cleaning, screens, man lifts, aisleways and walkways, bin checking. . . D	Leather working Pressing, winding, glazing ... F Grading, matching, cuffing, scarfing, sewing ..... G	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
					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, nitators ..... D	Forge shops ..... E	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	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
					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	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	Leather manufacturing Cleaning tanning and stretching, vats ..... D Cutting, fleshing and stuffing ..... D Finishing and scarfing ..... E	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
						Garages — service Repairs ..... E Active traffic areas ..... C Write-up ..... D	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	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
						Glass works Mix and furnace rooms, pressing and lehr, glass-blowing machines. . C Grinding, cutting, silvering ..... D	Leather manufacturing Cleaning tanning and stretching, vats ..... D Cutting, fleshing and stuffing ..... D Finishing and scarfing ..... E	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

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</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 (calendaring, 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, calendaring, 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	
Horizontal		Dispatch or forwarding yard	.10 1	Airports		lighting	.100 10
general area	.20 2	Hump and car rider classification yard		Hangar apron	.10 1	Reading and writing	.300 <sup>15,3</sup> 30 <sup>16,3</sup>
Vertical tasks	.50 5	Receiving yard		Terminal building apron		Prolonged seeing	.700 <sup>16,3</sup> 70 <sup>16,3</sup>
Turbine areas		Switch points	.20 2	Parking area	.5 0.5	Baths (general lighting)	.100 10
Building		Body of yard	.10 1	Loading area	.20 <sup>14</sup> 2 <sup>14</sup>	Mirrors (personal grooming)	.500 50
surrounds	.20 2	Hump area	.50 5			Barber shop and beauty parlor	.500 50
Turbine and heater decks, unloading bays	.50 5	Flat switching yards		Rail conveyances		On Subject	.1000 100
Entrances, stairs and platforms	.50 <sup>9</sup> 5 <sup>9</sup>	Side of cars (vertical)	.50 5	Boarding or exiting	.100 10	Day rooms	
		Switch points	.20 2	Fare box (rapid transit train)	.150 15	General	
Flags, floodlighted (see Bulletin and poster boards)		Trailer-on-flatcars		Vestibule (commuter and intercity trains)	.100 10	lighting	.200 <sup>15</sup> 20 <sup>15</sup>
		Horizontal surface of flatcar	.50 5	Aisles	.100 10	Desks	.500 <sup>16,3</sup> 50 <sup>16,3</sup>
Gardens <sup>19</sup>		Hold down points (vertical)	.50 5	Advertising cards (rapid transit and commuter trains)	.300 30	Dining rooms and messrooms	.200 20
General lighting	.5 0.5	Container-on flatcars	.30 3	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>	Enclosed promenades	
Path, steps, away from house	.10 1	Sawmills (see also Logging)		Reading	.300 <sup>3</sup> 30 <sup>3</sup>	General	
Backgrounds—fences, walls, trees, shrubbery	.20 2	Cut off saw	.100 10	Rest room (inter-city train)	.200 20	lighting	.100 10
Flower beds, rock gardens	.50 5	Log haul	.20 2	Dining area (inter-city train)	.500 50	Entrances and passageways	
Trees, shrubbery, when emphasized	.50 5	Log hoist (side lift)	.20 2	Food preparation (inter-city train)	.700 70	General	
Focal points, large	.100 10	Primary log deck	.100 10	Lounger (inter-city train) General	.200 20	lighting	.500 <sup>16</sup> 50 <sup>16</sup>
Focal points, small	.200 20	Barker in-feed	.300 30	lighting	.200 20	Doctor's office	.300 <sup>16</sup> 30 <sup>16</sup>
Gasoline station (see Service stations in Part II)		Green chain	.300 <sup>26</sup> 30 <sup>26</sup>	Table games	.300 30	Operating table	.20000 2000
		Lumber		Sleeping car		Wards	
Loading and unloading platforms	.200 20	strapping	.200 <sup>26</sup> 20 <sup>26</sup>	General		General	
Freight car interiors	.100 10	Lumber handling areas	.20 2	lighting	.100 10	lighting	.100 10
		Lumber loading areas	.50 5	Normal reading	.300 <sup>3</sup> 30 <sup>3</sup>	Reading	.300 30
Logging (see also Sawmills)		Wood chip storage piles	.5 0.5	Prolonged seeing	.700 <sup>3</sup> 70 <sup>3</sup>	Toilets	.200 20
Yarding	.30 3	Service station (at grade)		Road Conveyances		Libraries and lounges	
Log loading and unloading	.50 5	Dark surrounding				General	
Log stowing (water)	.5 0.5	Approach	.15 15			lighting	.200 20
Active log storage area (land)	.5 0.5	Driveway	.15 15				
Log booming area (water) — foot traffic	.10 1	Pump island area	.200 20				
Active log handling area (water)	.20 2	Building faces (exclusive of glass)	.100 <sup>14</sup> 10 <sup>14</sup>				
Log grading — water or land	.50 5	Service areas	.30 3				
Log bins (land)	.20 2	Landscape highlights	.20 2				
Lumber yards	.10 1	Light surrounding					
		Approach	.30 3				
		Driveway	.50 5				
		Pump island area	.300 30				
		Building faces (exclusive of glass)	.300 <sup>14</sup> 30 <sup>14</sup>				
		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			
Indoors —1000 [100] lamp lumens/square meter [foot] of surface area		Operating Areas	
Theatre		Access and casing . . . . .100	10
Auditorium		Battery room . . . . .100	10
General . . . . .100 <sup>15</sup>	10 <sup>15</sup>	Boiler rooms . . . . .200 <sup>16</sup>	200 <sup>16</sup>
During picture .1	0.1	Cargo handling	
Navigating Areas		Control stations (except navigating areas)	
Chart room		General Control consoles. . . . .200	20
General . . . . .100	10	Gauge and control boards . . . . .300	30
On chart table . . . . .500 <sup>16,3</sup>	50 <sup>16,3</sup>	Switchboards . . .300	30
Gyro room . . . . .200	20	Engine rooms . . . .200 <sup>16</sup>	20 <sup>16</sup>
Radar room . . . .200	20	Generator and switchboard rooms . . . . .200 <sup>16</sup>	20 <sup>16</sup>
Radio room . . . .100 <sup>16</sup>	10 <sup>16</sup>	Fan rooms (ventilation & air conditioning) . .100	10
Radio room, passenger foyer . . . . .100	10	Motor rooms . . . .200	20
Ship's offices		Motor generator rooms (cargo handling) . . . . .100	10
General . . . . .200 <sup>16</sup>	20 <sup>16</sup>	Pump room . . . . .100	10
On desks and work tables . . . . .500 <sup>16,3</sup>	50 <sup>16,3</sup>	Shaft alley . . . . .100	10
Wheelhouse . .100	10	Shaft alley escape . . . . .30	3
Service Areas		Steering gear room . . . . .200	20
Food preparation		Windlass rooms . .100	10
General . . . . .200 <sup>16</sup>	20 <sup>16</sup>	Workshops	
Butcher shop .200 <sup>16</sup>	20 <sup>16</sup>	General . . . . .300 <sup>16</sup>	30 <sup>16</sup>
Gallery . . . . .300 <sup>16</sup>	300 <sup>16</sup>	On top of work bench . . . . .50 <sup>16</sup>	50 <sup>16</sup>
Pantry . . . . .200 <sup>16</sup>	20 <sup>16</sup>	Tailor shop . . . . .500 <sup>16</sup>	50 <sup>16</sup>
Thaw room. . .200 <sup>16</sup>	20 <sup>16</sup>	Cargo holds	
Sculleries. . . . .200 <sup>16</sup>	20 <sup>16</sup>	Permanent luminaires . . .30 <sup>16</sup>	3 <sup>16</sup>
Food storage (non-refrigerated) . .100	10	Passageways and trunks . .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.