NÍVEIS DE ILUMINÂNCIA RECOMENDADOS PARA ILUMINAÇÃO INTERIOR

CIE - Comissão Internacional de Iluminação - 2001

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
1. General building areas				
Entrance halls	100	22	60	
Lounges	200	22	80	
Circulation areas and corridors	100	28	40	At exits and entrances provide a transition zone and avoid sudden changes.
Stairs, escalators, travelators	150	25	40	
Loading ramps/bays	150	25	40	
Canteens	200	22	80	
Rest rooms	100	22	80	
Rooms for physical exercise	300	22	80	
Cloakrooms, washrooms, bathrooms, toilets	200	25	80	
Sick bay	500	19	80	
Rooms for medical attention	500	16	90	T_{cp} at least 4000 K
Plant rooms, switch gear rooms	200	25	60	

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
Post room, switchboard	500	19	80	
Store, stockrooms, cold store	100	25	60	200 lux if continuously occupied
Dispatch packing handling areas	300	25	60	
Control station	150	22	60	200 lux if continuously occupied
2. Agriculture building				
Loading and operating of goods handling equipment and machinery	200	25	80	
Building for livestock	50	28	40	
Sick animal pens, calving stalls	200	25	80	
Feed preparation, dairy, utensil washing	200	25	80	
3. Bakeries				
Preparation and baking	300	22	80	
Finishing, glazing, decorating	500	22	80	
4. Cement, concrete, & bricks industry				
Drying	50	28	20	Safety colours shall be recognisable.
Preparation of materials, work on kilns and mixers	200	28	40	
General machine work	300	25	80	For high-bay: see also clause 4.6.2.
Rough forms	300	25	80	For high-bay: see also clause 4.6.2.
5. Ceramics and glass industry				
Drying	50	28	20	
Preparation, general machine work	300	25	80	For high-bay: see also clause 4.6.2.
Enamelling, rolling, pressing, shaping simple parts, glazing, glass blowing	300	25	80	For high-bay: see also clause 4.6.2.
Grinding, engraving, glass polishing, shaping precision parts, manufacture of glass instruments	750	19	80	For high-bay: see also clause 4.6.2.
Decorative work	500	19	80	
Grinding of optical glass, crystal hand grinding and engraving, work on average goods	750	16	80	
Precision work e.g decorative grinding, hand painting	1000	16	90	T_{cp} at least 4000 K
Manufacture of synthetic precious stones	1500	16	90	T_{cp} at least 4000 K
6. Chemicals, plastics and rubber industry				
Remote operated processing installations	50		20	Safety colours shall be recognisable.
Processing installations with limited manual intervention	150	28	40	
Constantly manned work places in processing installations	300	25	80	
Precision measuring rooms, laboratories	500	19	80	
Pharmaceutical production	500	22	80	
Tyre production	500	22	80	
Colour inspection	1000	16	90	T_{cp} at least 6500 K
Cutting, finishing, inspection	750	19	80	

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
10. Hairdressers				
Hairdressing	500	19	90	
11. Jewellery manufacturing				
Working with precious stones	1500	16	90	T_{cp} at least 4000 K
Manufacture of jewellery	1000	16	90	
Watch making (manual)	1500	16	80	
Watch making (automatic)	500	19	80	
12. Laundries and dry cleaning				
Goods in, marking and sorting	300	25	80	
Washing and dry cleaning	300	25	80	
Ironing, pressing	300	25	80	
Inspection and repairs	750	19	80	
13. Leather industry				
Work on vats, barrels, pits	200	25	40	
Fleshing, skiving, rubbing, tumbling of skins	300	25	80	
Saddlery work, shoe manufacture stitching, sewing, polishing, shaping, cutting, punching	500	22	80	
Sorting	500	22	90	T_{cp} at least 4000 K
Leather dyeing (machine)	500	22	80	
Quality control	1000	19	80	
Colour inspection	1000	16	90	T_{cp} at least 4000 K
Shoe making	500	22	80	
Glove making	500	22	80	
14. Metal working and processing				
Open die forging	200	25	60	
Drop forging, welding, cold forming	300	25	60	
Rough and average machining: tolerances > 0,1 mm	300	22	60	
Precision machining: grinding: tolerances < 0,1 mm	500	19	60	
Scribing; inspection	750	19	60	
Wire & pipe drawing shapes	300	25	60	
Plate machining ≥5mm	200	25	60	
Sheet metalwork <5mm	300	22	60	
Tool making; cutting equipment manufacture	750	19	60	
Assembly:				
- rough	200	25	80	For high-bay: see also clause 4.6.2.
- medium	300	25	80	For high-bay: see also clause 4.6.2.
- fine	500	22	80	For high-bay: see also clause 4.6.2.
- precision	750	19	80	For high-bay: see also clause 4.6.2.
Galvanising	300	25	80	For high-bay: see also clause 4.6.2.
Surface preparation and painting	750	25	80	
Tool, template and jig making, precision mechanics, micro-mechanics	1000	19	80	
15. Paper industry				
Pulp mills, edge runners	200	25	80	For high-bay: see also clause 4.6.2.
Paper manufacture and processing, paper and corrugating machines, cardboard manufacture	300	25	80	For high-bay: see also clause 4.6.2.

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Standard book binding work, e.g. folding, sorting, gluing, cutting, embossing, sewing	500	22	60	
16. Power stations				
Fuel supply plant	50	28	20	Safety colours shall be recognisable.
Boiler house	100	28	40	
Machine halls	200	25	80	For high-bay: see also clause 4.6.2.
Auxiliary rooms, e.g pump rooms, condenser rooms, switchboard, etc.	200	25	60	
Control rooms	500	16	80	1. Control panels are often vertical. 2. Dimming may be required. 3. For VDT work see clause 4.10.
17. Printers				
Cutting, gilding, embossing, block engraving, work on stones and platens, printing machines, matrix making	500	19	80	
Paper sorting and hand printing	500	19	80	
Type setting, retouching, lithography	1000	19	80	
Colour inspection in multi-coloured printing	1500	16	90	T_{cp} 5000 K
Steel and copper engraving	2000	16	80	For directional light see clause 4.5.2.
18. Iron and steel works				
Production plants without manual intervention	50	28	20	Safety colours shall be recognisable.
Production plants with occasional manual operation	150	28	40	
Production plants with continuous manual operation	200	25	80	For high-bay: see also clause 4.6.2.
Slab store	50	28	20	Safety colours shall be recognisable.
Furnaces	200	25	20	Safety colours shall be recognisable.
Mill train, coiler, shear line	300	25	40	
Control platforms, control panels	300	22	80	
Test, measurement and inspection	500	22	80	
Underfloor man sized tunnels belt sections, cellars etc.	50	28	20	Safety colours shall be recognisable.
19. Textile industry				
Workplace and zones in baths, bale opening	200	25	60	
Carding, washing, ironing, drawing, combing, sizing, card cutting, pre-spinning, jute and hemp spinning	300	22	80	
Spinning, plying, reeling, winding warping, weaving, braiding, knitting	500	22	80	Prevent stroboscopic effects.
Sewing, fine knitting, taking up stitches	750	22	90	
Manual design, drawing patterns	750	22	90	T_{cp} at least 4000 K
Finishing, dyeing	500	22	80	
Drying room	100	28	60	
Automatic fabric printing	500	25	80	
Burling, picking, trimming	1000	19	80	
Colour inspection, fabric control	1000	16	90	T_{cp} at least 4000 K
Invisible mending	1500	19	90	T_{cp} at least 4000 K

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
Hat manufacturing	500	22	80	
20. Vehicle construction				
Body work and assembly	500	22	80	
Painting, spraying chamber, polishing chamber	750	22	80	
Painting: touch-up, inspection	1000	16	90	T_{cp} at least 4000 K
Upholstery manufacture (manned)	1000	19	80	
Final inspection	1000	19	80	
21. Wood working & furniture industry				
Automatic processing e.g. drying plywood manufacturing	50	28	40	
Steam pits	150	28	40	
Saw frame	300	25	60	Prevent stroboscopic effects.
Work at joiner's bench, gluing, assembly	300	25	80	
Polishing, painting, fancy joinery	750	22	80	
Work on wood working machines e.g. turning, fluting, dressing, rebating, grooving, cutting, sawing, sinking	500	19	80	Prevent stroboscopic effects.
Selection of veneer woods, maquetry, inlay work	750	22	90	T_{cp} at least 4000 K
Quality control	1000	19	90	T_{cp} at least 4000 K
22. Offices				
Filing, copying, circulation, etc.	300	19	80	
Writing, typing, reading, data processing	500	19	80	For VDT-work see clause 4.10.
Technical drawing	750	16	80	
CAD workstation	500	19	80	For VDT-work see clause 4.10.
Conference and meeting rooms	500	19	80	Lighting should be controllable.
Reception desk	300	22	80	
Archives	200	25	80	
23. Retailing				
Sales area small	300	22	80	
Sales area large	500	22	80	
Till area	500	19	80	
Wrapper table	500	19	80	
24. Restaurants and hotels				
Reception/cashier desk, porters desk	300	22	80	
Kitchen	500	22	80	
Restaurant, dining room, function room	200	22	80	The lighting should be designed to create intimate atmosphere.
Self-service restaurant	200	22	80	
Buffet	300	22	80	
Conference rooms	500	19	80	Lighting should be controllable.
Corridors	100	25	80	During night time lower levels are acceptable.
25. Places of entertainment				
Theatres & concert halls	200	22	80	
Multi purpose halls	300	22	80	

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
Practice rooms, dressing rooms	300	22	80	Glare free mirror lighting for make-up required.
Museums (general)	300	19	80	Lighting to suit the display requirements, protect against radiation effects. See Museum Lighting Guide.
26. Libraries				
Bookshelves	200	19	80	
Reading area	500	19	80	
Counters	500	19	80	
27. Public car parks (indoor)				
In/out ramps (during the day)	300	25	40	Safety colours shall be recognisable.
In/out ramps (at night)	75	25	40	Safety colours shall be recognisable.
Traffic lanes	75	25	40	Safety colours shall be recognisable.
Parking areas	75	28	40	A high vertical illuminance increases recognition of peoples faces and therefore the feeling of safety.
Ticket office	300	19	80	1. Avoid reflections in the windows. 2. Prevent glare from outside.
28. Educational buildings				
Play school room	300	19	80	
Nursery class	300	19	80	
Nursery craft room	300	19	80	
Classrooms, tutorial rooms	300	19	80	Lighting should be controllable.
Classroom for evening classes and adults education	500	19	80	
Lecture hall	500	19	80	Lighting should be controllable.
Black board	500	19	80	Prevent specular reflections.
Demonstration table	500	19	80	In lecture halls 750 lux
Art and craft rooms	500	19	80	
Art rooms in art schools	750	19	90	T_{cp} > 5000K
Technical drawing rooms	750	16	80	
Practical rooms and laboratories	500	19	80	
Teaching workshop	500	19	80	
Music practice rooms	300	19	80	
Computer practice rooms	500	19	80	For VDT-work see clause 4.10.
Language laboratory	300	19	80	
Preparation rooms and workshops	500	22	80	
Student common rooms and assembly halls	200	22	80	
Teachers rooms	300	22	80	
Sports halls, gymnasiums and swimming pools	300	22	80	For public access facilities see CIE 58 - 1983 and CIE 62 - 1984.
29. Health care premises				
Waiting rooms	200	22	80	Illuminance at floor level
Corridors: during the day	200	22	80	Illuminance at floor level
Corridors: during the night	50	22	80	Illuminance at floor level
Day rooms	200	22	80	Illuminance at floor level
Staff office	500	19	80	
Staff rooms	300	19	80	
Wards				
- General lighting	100	19	80	Illuminance at floor level
- Reading lighting	300	19	80	
- Simple examination	300	19	80	
Examination and treatment	1000	19	90	
Night lighting, observation lighting	5	19	80	

Type of interior, task or activity	$\overline{E_m}$ lux	UGR_L	R_a	Remarks
Bathrooms and toilets for patients	200	22	80	
Examination room general	500	19	90	
Ear and eye examination	1000		90	Local examination luminaire
Reading and colour vision test with vision charts	500	16	90	
Scanners with image enhancers and television systems	50	19	80	For VDT work see clause 4.10.
Dialysis rooms	500	19	80	
Dermatology rooms	500	19	90	
Endoscopy rooms	300	19	80	
Plaster rooms	500	19	80	
Medical baths	300	19	80	
Massage and radiotherapy	300	19	80	
Pre-op and recovery rooms	500	19	90	
Operating theatre	1000	19	90	
Operating cavity	Special			$\overline{E_m}$ =10000 lux – 100000 lux
Intensive care				
- General lighting	100	19	90	At floor level
- Simple examinations	300	19	90	At bed level
- Examination and treatment	1000	19	90	At bed level
- Night watch	20	19	90	
Dentists				
- General lighting	500	19	90	Lighting should be glare free for the patient.
- At the patient	1000		90	Local examination luminaire
- Operating cavity	5000		90	Values higher than 5000 lux may be required.
- White teeth matching	5000		90	$T_{cp} \geq 6000$ K
Colour inspection (laboratories)	1000	19	90	$T_{cp} \geq 5000$ K
Sterilisation rooms	300	22	80	
Disinfection rooms	300	22	80	
Autopsy rooms and mortuaries	500	19	90	
Autopsy table and dissecting table	5000		90	Values higher than 5000 lux may be required.
30. Airports				
Arrival and departure halls, baggage claim areas	200	22	80	For high-bay: see also clause 4.6.2.
Connecting areas, escalators, travelators	150	22	80	
Information desks, check-in desks	500	19	80	For VDT work see clause 4.10.
Customs and passport control desks	500	19	80	Vertical illuminance is important.
Waiting areas	200	22	80	
Luggage store rooms	200	28	60	
Security check areas	300	19	80	For VDT-work see clause 4.10.
Air traffic control tower	500	16	80	1. Lighting should be dimmable. 2. For VDT work see clause 4.10. 3. Glare from daylight should be avoided.
Air traffic rooms	500	16	80	1. Lighting should be dimmable. 2. For VDT work see clause 4.10.
Testing and repair hangars	500	22	80	For high-bay: see also clause 4.6.2.
Engine test areas	500	22	80	For high-bay: see also clause 4.6.2.
Measuring areas in hangars	500	22	80	For high-bay: see also clause 4.6.2.
Platforms and passenger subways (underpasses)	50	28	40	
Ticket hall and concourse	200	28	40	
Ticket and luggage offices and counters	300	19	80	

Type of interior, task or activity	E_m lux	UGR_L	R_a	Remarks
Waiting rooms	200	22	80	
31. Churches, mosques, synagogues and temples				
Body of church	100	25	80	
Chair, altar, pulpit	300	22	80	