

# Recommendations for good lighting

## 4.1 Indoor workplaces

Type of task or activity	$E_m$	UGR <sub>L</sub>	R <sub>a</sub>
<b>Traffic zones and general areas inside buildings</b>			
<b>Traffic Zones</b>			
Circulation areas and corridors	100	28	40
Stairs, escalators, travelators	150	25	40
Loading ramps/bays	150	25	40
<b>Rest, sanitation and first aid rooms</b>			
Canteens, pantries	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
<b>Control rooms</b>			
Plant rooms, switch gear rooms	200	25	60
Post room, switchboard	500	19	80
<b>Store rooms, cold stores</b>			
Store and stockrooms	100	25	60
Dispatch packing handling areas	300	25	60
<b>Storage rack areas</b>			
Gangways : unmanned	20	-	40
Gangways : manned	150	22	60
Control stations	150	22	60
<b>Industrial activities and crafts</b>			
<b>Agriculture</b>			
Loading and operating of goods, handling equipment and machinery	200	25	80
Buildings for livestock	50	-	40
Sick animal pens, calving stalls	200	25	80
Food preparation, dairy, utensil washing	200	25	80
<b>Bakeries</b>			
Preparation and baking	300	22	80
Finishing, glazing, decorating	500	22	80
<b>Cement, cement goods, concrete, bricks</b>			
Drying	50	28	20
Preparation of materials, work on kilns and mixers	200	28	40
General machine work	300	25	80
Rough forms	300	25	80
<b>Ceramics, tiles, glass, glassware</b>			
Drying	50	28	20
Preparation, general machine work	300	25	80
Enamelling, rolling, pressing, shaping simple parts, glazing, glass blowing	300	25	80
Grinding, engraving, glass polishing, shaping precision parts, manufacture of glass instruments	750	19	80
Grinding of optical glass, crystal, hand grinding and engraving	750	16	80
Precision work e.g. decorative grinding, hand painting	1000	16	90
Manufacture of synthetic precious stones	1500	16	90

## 4.1 Indoor workplaces (continued)

Type of task or activity	E <sub>m</sub>	UGR <sub>L</sub>	R <sub>a</sub>
Chemical, plastics and rubber industry			
Remote-operated processing installations	50	-	20
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
Cutting, finishing, inspection	750	19	80
Electrical industry	300	25	80
Cable and wire manufacture	300	25	80
Winding			
-Large coils	300	25	80
-Medium-sized coils	500	22	80
-Small coils	750	19	80
Coil impregnating	300	25	80
Galvanising	300	25	80
Assembly work			
-Rough e.g. large transformers	300	25	80
-Medium e.g. switchboards	500	22	80
-Fine e.g. telephones	750	19	80
-Precision e.g. measuring equipment	1000	16	80
Electronic workshops, testing, adjusting	1500	16	80
Food stuffs and luxury food industry			
Work places and zone in			
-Breweries, malting floor	200	25	80
-For washing, barrel filling, cleaning, sieving, peeling	200	25	80
-Cooking in preserve and chocolate factories	200	25	80
-Work places and zones in sugar factories	200	25	80
-For drying and fermenting raw tobacco, fermentation cellar	200	25	80
Sorting and washing of products, milling, mixing, packing	300	25	80
Work places and critical zones in slaughter houses, butchers, dairies mills, on filtering floor in sugar refineries	500	25	80
Cutting and sorting of fruit and vegetables	300	25	80
Manufacture of delicatessen foods, kitchen work, manufacture of cigars and cigarettes	500	22	80
Inspection of glasses and bottles, product control, trimming, sorting, decoration	500	22	80
Laboratories	500	19	80
Colour inspection	1000	16	90
Foundries and metal casting			
Man-size underfloor tunnels, cellars, etc.	50	-	20
Platforms	100	25	40
Sand preparation	200	25	80
Dressing room	200	25	80
Work places at cupola and mixer	200	25	80
Casting bay	200	25	80
Shake out areas	200	25	80
Machine moulding	200	25	80

## 4.1 Indoor workplaces (continued)

Type of task or activity	$E_m$	UGR <sub>s</sub>	R <sub>a</sub>
Hand and core moulding	300	25	80
Die casting	300	25	80
Model building	500	22	80
<b>Hairdressers</b>			
Hairdressing	500	19	90
<b>Jewellery manufacturing</b>			
Working with precious stones	1500	16	90
Manufacture of jewellery	1000	16	90
Watch making (manual)	1500	16	80
Watch making (automatic)	500	19	80
<b>Laundries and dry cleaning</b>			
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
<b>Leather and leather goods</b>			
Work on vats, barrels, pits	200	25	40
Fleshing, skiving, rubbing, tumbling of skins	300	25	80
Saddlery work, shoe manufacturer, stitching, sewing, polishing, shaping, cutting, punching	500	22	80
Sorting	500	22	90
Leather dyeing (machine)	500	22	80
Quality control	1000	19	80
Colour inspection	1000	16	90
Shoe making	500	22	80
Glove making	500	22	80
<b>Metal working and processing</b>			
Open die forging	200	25	60
Drop forging	300	25	60
Welding	300	25	60
Rough and average machining: tolerances $\geq 0.1$ mm	300	22	60
Precision machining, grinding: tolerances $< 0.1$ mm	500	19	60
Scribing, inspection	750	19	60
Wire and pipe drawing shops, cold forming	300	25	60
Plate machining: thickness $\geq 5$ mm	200	26	60
Sheet metalwork: thickness $< 5$ mm	300	22	60
Tool making, cutting equipment manufacture	750	19	60
<b>Assembly</b>			
• Rough	200	25	80
• Medium	300	25	80
• Fine	500	22	80
• Precision	750	19	80
Galvanising	300	25	80
Surface preparation and painting	750	25	80
Tool, template and jig making, precision mechanics, micromechanics	750	25	80
<b>Paper and paper goods</b>			
Edge runners, pulp mills	200	25	80
Paper manufacture and processing, paper and corrugating machines, cardboard manufacture	300	25	80
Standard bookbinding work e.g. folding, sorting, gluing, cutting, embossing, sewing	500	22	80

## 4.1 Indoor workplaces (continued)

Type of task or activity	E <sub>m</sub>	UGR <sub>t</sub>	R <sub>v</sub>
<b>Power stations</b>			
Fuel supply plant	50	-	20
Boiler house	100	28	40
Machine halls	200	25	80
Side rooms e.g. pump rooms, condenser rooms, etc., switchboards (inside buildings)	200	25	60
Control rooms	500	16	80
Outdoor switch gear	20	-	20
<b>Printers</b>			
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 multicoloured printing	1500	16	90
Steel and copper engraving	2000	16	80
<b>Rolling mills, iron and steel works</b>			
Production plants without manual operation	50	-	20
Production plants with occasional manual operation	150	28	40
Production plants with continuous manual operation	200	25	80
Slab store	50	-	20
Furnaces	200	25	20
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	-	20
<b>Textile manufacture and processing</b>			
Work places and zones in baths, bale opening	200	25	60
Carding, washing, ironing, devilling machine work, drawing, combing, sizing, card cutting, pre-spinning, jute and hemp spinning	300	22	80
Spinning, plying, reeling, winding	500	22	80
Warping, weaving, braiding, knitting	500	22	80
Sewing, fine knitting, taking up stitches	750	22	80
Manual design, drawing patterns	750	22	90
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
Invisible mending	1500	19	90
Hat manufacturing	500	22	80
<b>Vehicle construction</b>			
Body work and assembly	500	22	80
Painting, spraying chamber, polishing chamber	750	22	80
Painting, touch-up, inspection	1000	19	90
Upholstery manufacture (manned)	1000	19	80
Final inspection	1000	19	80
<b>Wood working and processing</b>			
Automatic processing e.g. drying, plywood manufacturing	50	28	40
Steam pits	150	28	40
Saw frame	300	25	60
Work at joiners bench, gluing, assembly	300	25	80

## 4.1 Indoor workplaces (continued)

Type of task or activity	$E_m$	UGR <sub>t</sub>	R <sub>a</sub>
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
Selection of veneer woods	750	22	90
Marquetry, inlay work	750	22	90
Quality control, inspection	1000	19	90
<b>Offices</b>			
Offices			
Filing, copying, etc.	300	19	80
Writing, typing, reading, data processing	500	19	80
Technical drawing	750	16	80
CAD work stations	500	19	80
Conference and meeting rooms	500	19	80
Reception desk	300	22	80
Archives	200	25	80
<b>Retail premises</b>			
Retail premises			
Sales area	300	22	80
Till area	500	19	80
Wrapper table	500	19	80
<b>Places of public assembly</b>			
General areas			
Entrance halls	100	22	80
Cloakrooms	200	25	80
Lounges	200	22	80
Ticket offices	300	22	80
<b>Restaurants and hotels</b>			
Reception/cashier desk, porters desk	300	22	80
Kitchen	500	22	80
Restaurant, dining room, function room	-	-	80
Self-service restaurant	200	22	80
Buffet	300	22	80
Conference rooms	500	19	80
Corridors	100	25	80
<b>Theatres, concert halls, cinemas</b>			
Practice rooms, dressing rooms	300	22	80
<b>Trade fairs, exhibition halls</b>			
General lighting	300	22	80
<b>Libraries</b>			
Bookshelves	200	19	80
Reading area	500	19	80
Counters	500	19	80
<b>Public car parks (indoor)</b>			
In/out ramps (during the day)	300	25	20
In/out ramps (at night)	75	25	20
Traffic lanes	75	25	20
Parking areas	75	-	20
Ticket office	300	19	80

## 4.1 Indoor workplaces (continued)

Type of task or activity	$E_m$	UGR <sub>t</sub>	R <sub>a</sub>
<b>Educational premises</b>			
Nursery school, play school			
Play room	300	19	80
Nursery	300	19	80
Handicraft room	300	19	80
<b>Educational buildings</b>			
Classrooms, tutorial rooms	300	19	80
Classroom for evening classes and adult education	500	19	80
Lecture hall	500	19	80
Black board	500	19	80
Demonstration table	500	19	80
Art rooms	500	19	80
Art rooms in art schools	750	19	90
Technical drawing rooms	750	16	80
Practical rooms and laboratories	500	19	80
Handicraft rooms	500	19	80
Teaching workshop	500	19	80
Music practice rooms	300	19	80
Computer practice rooms (menu driven)	300	19	80
Language laboratory	300	19	80
Preparation rooms and workshops	500	22	80
Entrance halls	200	22	80
Circulation areas, corridors	100	25	80
Stairs	150	25	80
Student common rooms and assembly halls	200	22	80
Teachers rooms	300	19	80
Library: bookshelves	200	19	80
Library: reading areas	500	19	80
Stock rooms for teaching materials	100	25	80
Sports halls, gymnasiums, swimming pools (general use)	300	22	80
School canteens	200	22	80
Kitchen	500	22	80
<b>Health care premises</b>	500	22	80
<b>Rooms for general use</b>	750	22	80
Waiting rooms	200	22	80
Corridors (during the day)	200	22	80
Corridors (at night)	50	22	80
Day rooms	200	22	80
<b>Staff rooms</b>			
Staff office	500	19	80
Staff rooms	300	19	80
<b>Wards, maternity wards</b>			
General lighting	100	19	80
Reading lighting	300	19	80
Simple examinations	300	19	80
Examination and treatment	1000	19	90
Night lighting, observation lighting	5	-	80
Bathrooms and toilets for patients	200	22	80

## 4.1 Indoor workplaces (continued)

Type of task or activity	$E_m$	UGR <sub>1</sub>	$R_a$
<b>Examination rooms (general)</b>			
General lighting	500	19	90
Examination and treatment	1000	19	90
<b>Eye examination rooms</b>			
General lighting	300	19	80
Examination of the outer eye	1000	-	90
Reading and colour vision tests with vision charts	500	16	90
<b>Ear examination rooms</b>	750	22	80
General lighting	300	19	80
Ear examination	1000	-	90
<b>Scanner rooms</b>			
General lighting	300	19	80
Scanners with image enhancers and television systems	50	19	80
<b>Delivery rooms</b>			
General lighting	300	19	80
Examination and treatment	1000	19	80
<b>Treatment rooms (general)</b>			
Dialysis	500	19	80
Dermatology	500	19	90
Endoscopy rooms	300	19	80
Plaster rooms	500	19	80
Medical baths	300	19	80
Massage and radiotherapy	300	19	80
<b>Operating areas</b>			
Pre-op and recovery rooms	500	19	90
Operating theatre	1000	19	90
<b>Intensive care unit</b>			
General lighting	100	19	90
Simple examinations	300	19	90
Examination and treatment	1000	19	90
Night watch	20	19	90
<b>Dentists</b>	200	25	80
General lighting	500	19	90
At the patient	1000	-	90
Operating cavity	5000	-	90
White teeth matching	5000	-	90
<b>Laboratories and pharmacies</b>			
General lighting	500	19	80
Colour inspection	1000	19	90
<b>Decontamination rooms</b>	300	22	80
Sterilisation rooms	300	22	80
Disinfection rooms	300	22	80
<b>Autopsy rooms and mortuaries</b>			
General lighting	500	19	90
Autopsy table and dissecting table	5000	-	90

## 4.1 Indoor workplaces (continued)

Type of task or activity	$E_m$	UGR <sub>l</sub>	R <sub>s</sub>
<b>Transportation areas</b>	<b>300</b>	<b>22</b>	<b>80</b>
<b>Airports</b>			
Arrival and departure halls, baggage claim areas	200	22	80
Connecting areas, escalators, travelators	150	22	80
Information desks, check-in desks	500	19	80
Customs and passport control desks	500	19	80
Waiting areas	200	22	80
Luggage store rooms	200	25	80
Security check areas	300	19	80
Air traffic control tower	500	16	80
Testing and repair hangers	500	22	80
Measuring areas in hangers	500	22	80
<b>Railway installations</b>			
Covered platforms and passenger subways	50	28	40
Ticket hall and concourse	200	28	40
Ticket and luggage offices and counters	300	19	80
Waiting rooms	200	22	80