

DIN EN 12464-1:2021-11 (E)

Light and lighting - Lighting of work places - Part 1: Indoor work places

Contents		Page
	European foreword	5
	Introduction	7
1	Scope	8
2	Normative references	8
3	Terms and definitions	9
4	Symbols and abbreviations	9
5	Lighting design criteria	10
5.1	Luminous environment	10
5.2	Luminance distribution	11
5.2.1	General	11
5.2.2	Reflectance of surfaces	12
5.2.3	Illuminance on surfaces	12
5.3	Illuminance	12
5.3.1	General	12
5.3.2	Scale of illuminance	12
5.3.3	Illuminances on the task area or activity area	13
5.3.4	Illuminance on the immediate surrounding area	14
5.3.5	Illuminance on the background area	15
5.3.6	Illuminance uniformity	15
5.4	Illuminance grid	16
5.5	Glare	18
5.5.1	General	18
5.5.2	Limiting luminaire luminance	19
5.5.3	Discomfort glare	20
5.5.4	Veiling reflections and reflected glare	22
5.6	Lighting in the interior space	22
5.6.1	General	22
5.6.2	Cylindrical illuminance requirement in the activity space	22
5.6.3	Modelling	22
5.6.4	Directional lighting of visual tasks	23
5.7	Colour aspects	23
5.7.1	General	23
5.7.2	Colour appearance of the light	23
5.7.3	Colour rendering	24
5.8	Flicker and stroboscopic effects	24
5.8.1	General	24
5.8.2	Flicker	24
5.8.3	Stroboscopic effect	25
5.9	Lighting of work stations with Display Screen Equipment (DSE)	25
5.9.1	General	25
5.9.2	Luminaire luminance limits with downward flux	25
6	Lighting design considerations	26
6.1	General	26
6.2	Illuminance requirements and recommendations	27
6.2.1	General	27

6.2.2	Lighting of the task area or activity area and its immediate surrounding area (see 5.3)	27
6.2.3	Lighting of the space	27
6.2.4	Adjustability of the lighting system	28
6.3	Maintenance factor	28
6.4	Energy efficiency requirements	29
6.5	Additional benefits of daylight	29
6.6	Variability of light	30
6.7	Room brightness	30
7	Schedule of specific lighting requirements	30
7.1	Composition of the tables	30
7.2	Schedule of task and activity areas	31
7.3	Lighting requirements for task areas, activity areas, room and space brightness	33
8	Verification procedures	91
8.1	General	91
8.2	Illuminances	91
8.3	Unified Glare Rating	91
8.4	Colour rendering and colour appearance	91
8.5	Luminaire luminance	91
8.6	Maintenance schedule	91
Annex A (informative) Recommended practice regarding implementation of UGR tabular method for 'non-standard' situations		92
A.1	General	92
A.2	Recommended Practices	92
A.2.1	Deviating luminaire sizes	92
A.2.2	Irregular area shapes	92
A.2.3	Irregular luminaire placement patterns	92
A.2.4	Deviating room reflectances	92
A.2.5	Multiple luminaire types	93
A.2.6	luminaires with (only) up-lighting or luminous ceilings	93
A.2.7	Room dimensions smaller or larger than the tabular values	93
Annex B (informative) Additional information on visual and non-visual (non-image forming) effects of light		94
B.1	General	94
B.2	Perceived room brightness	94
B.3	Alternative parameters	94
B.3.1	General	94
B.3.2	Mean ambient illuminance, amb (Govén et al.)[1]	94
B.3.3	Mean room surface luminous exitance, Mrs (Cuttle)[2]	95
B.3.4	Visual lightness and interest - 40 degree band luminance (Loe et al.)[3]	95
B.4	Adaptation luminance within the normal visual field	96
B.5	The influence of spectral power distribution on non-image forming effects	96
B.6	Varying lighting conditions	96
B.7	Daylight provision	97
Annex C (informative) Lighting design considerations - Examples		98
C.1	Example for offices	98
C.2	Example for industry machine workshop	99
C.3	Example for industrial machine workshop with inspection area	101
C.4	Example for electronics industry	102
Annex D (informative) Transportation areas - Railway installations		104
D.1	Platform edge	104
D.2	Limitation of glare for train drivers	104
D.3	Maintenance sheds	104

D.4 Circulation areas 104
Annex E (informative) A-deviations 105
Bibliography 106
Index 109