



NSAI
Standards

Irish Standard
I.S. EN 12464-1:2021

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

I.S. EN 12464-1:2021

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 12464-1:2021

Published:

2021-08-25

This document was published under the authority of the NSAI and comes into effect on:

2021-09-13

ICS number:

91.160.10

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 12464-1:2021 is the adopted Irish version of the European Document EN 12464-1:2021, Light and lighting - Lighting of work places - Part 1: Indoor work places

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN 12464-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2021

ICS 91.160.10

Supersedes EN 12464-1:2011

English Version

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

Lumière et éclairage - Éclairage des lieux de travail -
Partie 1 : Lieux de travail intérieurs

Licht und Beleuchtung - Beleuchtung von
Arbeitsstätten - Teil 1: Arbeitsstätten in Innenräumen

This European Standard was approved by CEN on 9 May 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN 12464-1:2021 (E)

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, \bar{E}_{amb} (Govén et al.)[1]	94
B.3.3	Mean room surface luminous exitance, M_{rs} (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

EN 12464-1:2021 (E)

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

European foreword

This document (EN 12464-1:2021) has been prepared by Technical Committee CEN/TC 169 “Light and lighting”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12464-1:2011.

The original standard EN 12464-1:2002 was already further developed in its first revision EN 12464-1:2011. It specifies the requirements for good lighting solutions rather than giving design guidelines. With the experience of applying the standard next steps are taken in the development of this new edition and human and user needs are given broader acknowledgement. Lighting requirements for task areas to fulfil visual tasks are given a close relation to the space in which they are carried out. Technologically LED has taken over as the main light source from previous technologies. The main changes with respect to the previous edition are:

- The recommendations given in the tables in Clause 7 take user needs more into account than in the past. Thus, the requirements for necessary illuminance according to Clause 7 are more differentiated.
- The impact of visual and non-visual (non-image forming) effects of light on people's performance and well-being are elaborated in the new informative Annex B.
- Requirements for walls, ceilings and cylindrical illuminances are moved from the main text to the tables in Clause 7 for increased visibility and usability.
- A new chapter on design considerations (Clause 6) gives advice on how to apply the requirements when designing lighting for visual tasks and activities within a space.
- Relation between task area and its immediate surround and the background area is more detailed (5.3.3, 5.3.4, 5.3.5).
- Glare requirements have been clarified for improved usability including clarification for shielding in 5.5 and recommended practices for UGR in non-standard situations has been added in a new informative Annex A.
- Flicker and stroboscopic effect is updated (5.8).
- A new informative Annex C is introduced including examples on how to derive the requirements in different applications (office/industry) for designing lighting.
- A new informative Annex D is introduced to provide additional information on the specific requirements for railway installations that are given in Table 61.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

EN 12464-1:2021 (E)

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Adequate and appropriate lighting enables people to perform visual tasks efficiently and accurately including tasks performed over a prolonged time period or of a repetitive nature. The degree of visibility and comfort required in a wide range of work places is governed by the type and duration of the activity. The lighting also affects circadian rhythms and mood as well as improving our performance and well-being.

The final designed, installed and operated lighting system should provide efficient and effective good quality lighting for the user needs tailored to their visual capacity, e.g. elderly users in workplaces.

It is important that all clauses of this document are followed although the target values for lighting criteria and specific requirements, depending of each type of task/activity, are tabulated in the schedule of lighting requirements (see Clause 7).

This document reflects the generally recognized best practice.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-