

Fluorescent ultraviolet lamps used for tanning -
Measurement and specification method

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 61228:2021 sisaldab Euroopa standardi EN IEC 61228:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 61228:2021 consists of the English text of the European standard EN IEC 61228:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.12.2020.	Date of Availability of the European standard is 18.12.2020.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 17.240, 29.140.01, 97.170

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Fluorescent ultraviolet lamps used for tanning - Measurement
and specification method
(IEC 61228:2020)**

Lampes fluorescentes à ultraviolet utilisées pour le
bronzage - Méthode de mesure et de spécification
(IEC 61228:2020)

UV-Leuchtstofflampen für Bräunungszwecke - Verfahren
zur Messung und Beschreibung
(IEC 61228:2020)

This European Standard was approved by CENELEC on 2020-12-09. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

European foreword

The text of document 34A/2213/FDIS, future edition 3 of IEC 61228, prepared by SC 34A "Electric light sources" of IEC/TC 34 "Lighting" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61228:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-09-09
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-12-09

This document supersedes EN 61228:2008 and all of its amendments and corrigenda (if any).

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

Endorsement notice

The text of the International Standard IEC 61228:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60081:1997	NOTE	Harmonized as EN 60081:1998 (not modified)
IEC 60081:1997/A1:2000	NOTE	Harmonized as EN 60081:1998/A1:2002
IEC 60081:1997/A2:2003	NOTE	Harmonized as EN 60081:1998/A2:2003 (not modified)
IEC 60081:1997/A3:2005	NOTE	Harmonized as EN 60081:1998/A3:2005 (not modified)
IEC 60081:1997/A4:2010	NOTE	Harmonized as EN 60081:1998/A4:2010 (not modified)
IEC 60081:1997/A5:2013	NOTE	Harmonized as EN 60081:1998/A5:2013 (not modified)
IEC 60081:1997/A6:2017	NOTE	Harmonized as EN 60081:1998/A6:2017
IEC 60901:1996	NOTE	Harmonized as EN 60901:1996 (not modified)
IEC 60901:1996/A1:1997	NOTE	Harmonized as EN 60901:1996/A1:1997 (not modified)
IEC 60901:1996/A2:2000	NOTE	Harmonized as EN 60901:1996/A2:2000 (not modified)
IEC 60901:1996/A3:2004	NOTE	Harmonized as EN 60901:1996/A3:2004 (not modified)
IEC 60901:1996/A4:2007	NOTE	Harmonized as EN 60901:1996/A4:2008 (not modified)
IEC 60901:1996/A5:2011	NOTE	Harmonized as EN 60901:1996/A5:2012 (not modified)
IEC 60901:1996/A6:2014	NOTE	Harmonized as EN 60901:1996/A6:2017 (modified)
IEC 61195	NOTE	Harmonized as EN 61195
IEC 61199	NOTE	Harmonized as EN 61199
IEC 62471:2006	NOTE	Harmonized as EN 62471:2008 (modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60061-1	-	Lamp caps and holders together with gauges for the control of interchangeability and safety. Part 1: Lamp caps	EN 60061-1	-
IEC 60081	-	Double-capped fluorescent lamps - Performance specifications	EN 60081	-
IEC 60155	-	Glow-starters for fluorescent lamps	EN 60155	-
IEC 60335-2-27	-	Household and similar electrical appliances - Safety - Part 2-27: Particular requirements for appliances for skin exposure to optical radiation	EN 60335-2-27	-
IEC 60921	-	Ballasts for tubular fluorescent lamps - Performance requirements	EN 60921	-
IEC 60929	-	AC and/or DC-supplied electronic control gear for tubular fluorescent lamps - Performance requirements	EN 60929	-
IEC 61049	-	Capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements	EN 61049	-
ISO/CIE 28077	2016	Photocarcinogenesis action spectrum (non-melanoma skin cancers)	-	-
CIE 63	1984	The spectroradiometric measurement of light sources	-	-

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Fluorescent ultraviolet lamps used for tanning – Measurement and specification method

Lampes fluorescentes à ultraviolet utilisées pour le bronzage – Méthode de mesure et de spécification



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Fluorescent ultraviolet lamps used for tanning – Measurement and specification method

Lampes fluorescentes à ultraviolet utilisées pour le bronzage – Méthode de mesure et de spécification

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.240; 29.140.01; 97.170

ISBN 978-2-8322-9009-5

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 General test conditions	7
4.1 Ageing	7
4.2 Operating position	7
4.3 Ambient temperature	8
4.4 Test voltage	8
4.5 Ballast	9
5 Test requirements	9
5.1 General	9
5.2 Spectroradiometric measuring system	9
6 Measurement and evaluation procedure	9
6.1 Measurement	9
6.1.1 General	9
6.1.2 Double capped fluorescent UV Lamps	9
6.1.3 Single capped fluorescent UV Lamps	10
6.2 Calculation of the total effective UV irradiance	10
6.3 Ambient temperature adjustment	11
6.4 Reflector angle	11
6.5 Determination of the lamp maintenance code	11
7 Lamp specification	11
8 Lamp marking	12
Annex A (normative) Determination of the optimum UV irradiance of fluorescent UV lamps	13
Annex B (normative) Ultraviolet action spectra	14
Annex C (normative) Method of test for irradiance maintenance	16
C.1 General	16
C.2 Lamps for operation on AC mains frequencies	16
C.3 Lamps for operation on high frequency	16
Annex D (normative) Reflector gauge	17
Annex E (normative) Lamp datasheets for measurement	18
Bibliography	19
Figure 1 – Measurement position of single capped lamps	8
Figure 2 – Test circuit	8
Figure 3 – Location of measurement points on lamps with more than one layer	10
Figure B.1 – UV action spectra for erythema and NMSC	14
Figure D.1 – Reflector gauge	17
Table B.1 – Weighting factors $S(\lambda)$ for erythema and NMSC action spectrum	15
Table E.1 – Lamp dimensions	18

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FLUORESCENT ULTRAVIOLET LAMPS USED FOR TANNING –
MEASUREMENT AND SPECIFICATION METHOD**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61228 has been prepared by subcommittee 34A: Electric light sources, of IEC technical committee 34: Lighting.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) maintenance code: description of the depreciation of the UV irradiance lamp during operation;
- b) operating position: information added for single capped lamps;
- c) spectroradiometric measuring system: new information about distance between sensor and lamp axis;
- d) measurement and evaluation procedure: separated detailed information for double capped fluorescent UV lamps and single capped fluorescent UV lamps;
- e) Annex C (normative), Method of test for irradiance maintenance: new information added;
- f) Annex D (normative), Reflector gauge: new information added;

g) Annex E (normative), Lamp datasheets for measurement: complementary information added.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
34A/2213/FDIS	34A/2220/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.