



NSAI
Standards

Irish Standard Recommendation
S.R. CEN/TS 16599:2014

Photocatalysis - Irradiation conditions for testing photocatalytic properties of semiconducting materials and the measurement of these conditions

S.R. CEN/TS 16599:2014

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:

CEN/TS 16599:2014

Published:

2014-03-26

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

2014-04-05

ICS number:

25.220.20

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

TECHNICAL SPECIFICATION

CEN/TS 16599

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

March 2014

ICS 25.220.20

English Version

Photocatalysis - Irradiation conditions for testing photocatalytic properties of semiconducting materials and the measurement of these conditions

Photocatalyse - Détermination des conditions d'irradiation pour tester les propriétés photocatalytiques de matériaux semi-conducteurs

Photokatalyse - Bestrahlungsbedingungen zum Prüfen photokatalytischer Eigenschaften von halbleitenden Werkstoffen und die Messung dieser Bedingungen

This Technical Specification (CEN/TS) was approved by CEN on 14 October 2013 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, 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: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Symbols and abbreviations	5
3 Specification of spectral areas and irradiance values	5
4 Lamp types and filters	6
4.1 Examples of different lamp types	6
4.1.1 Xenon lamps.....	6
4.1.2 Halogen lamps	7
4.1.3 Fluorescence lamps	7
4.1.4 Mercury vapour lamps	7
4.1.5 Light emitting diodes (LED)	8
4.1.6 Sunlight.....	8
4.2 Controlling of the ageing behaviour of the used lamp	8
4.3 Filters	8
4.3.1 Cut-on/Cut-off-filters for irradiation of large areas	8
4.3.2 Band-pass-filters for irradiation of small areas	8
4.3.3 Interference filters.....	9
5 Diffusers	9
6 Measuring systems	9
6.1 General.....	9
6.2 Thermopile-Sensors	10
6.3 Calibrated Si-Photodiodes	10
6.4 Quantum counter based on fluorescence.....	11
6.5 Chemical actinometry	11
6.6 Spectral radiometers	11
7 Homogeneous irradiation of areas	11
7.1 Homogeneity of intensity	11
7.2 Number and local positions of the measurement points	12
7.3 Position of the measurement plane	13
8 Test report	14
Annex A (informative) Informative examples and definitions.....	15
A.1 Informative Terms and definitions	15
A.1.1 Standard irradiation conditions	15
A.1.2 Irradiation conditions for specific applications.....	15
A.2 Examples for available cut-on-filters	16
A.3 Examples for available band-pass-filters	17
A.4 Examples for available light emitting diodes (LED)	18
A.5 Example of different angle distribution of various diffusor types.....	19
A.6 Examples for spectra of different fluorescence tubes.....	19
Bibliography	21

Foreword

This document (CEN/TS 16599:2014) has been prepared by Technical Committee CEN/TC 386 "Photocatalysis", the secretariat of which is held by AFNOR.

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

CEN (the European Committee for Standardization) is a European committee of national standards bodies (CEN member bodies). The work of preparing European Standards is normally carried out through CEN Technical Committees. Each member body interested in a subject for which a Technical Committee has been established has the right to be represented on that committee.

European organizations, governmental and non-governmental, in liaison with CEN, also take part in the work. The main task of Technical Committees is to prepare European Standards. Drafts adopted by the Technical Committees are circulated to the member bodies for voting. Publication as a European Standard requires approval by at least 71 % of the member bodies casting a vote.

Safety statement

Persons using this document should be familiar with the normal laboratory practice, if applicable. This document cannot address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any regulatory conditions.

Environmental statement

It is understood that some of the material permitted in this standard may have negative environmental impact. As technological advantages lead to better alternatives for these materials, they will be eliminated from this standard to the extent possible.

At the end of the test, the user of the standard will take care to carry out an appropriate disposal of the wastes, according to local regulation.

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

CEN/TS 16599:2014 (E)

Introduction

Photocatalysis is a very efficient advanced oxidation technique which enables the production of hydroxyl radicals ($\cdot\text{OH}$) or perhydroxyl radicals ($\cdot\text{OOH}$), capable of partly or completely mineralising/oxidising the majority of organic compounds. Its principle is based on the simultaneous actions of photons and of a catalytic layer which allows degradation of molecules. The most commonly used photocatalyst is titanium dioxide (TiO_2), the latter being thermodynamically stable, non-toxic and economical. It can be used in powder form or deposited on a substrate (glass fibre, fabrics, plates/sheets, etc.). The objective is to introduce performance standards for photo-induced effects (including photocatalysis). These standards will mainly concern test and analysis methods.

1 Scope

This Technical Specification prescribes the conditions for irradiating photocatalytic surfaces in order to perform photocatalytic efficiency tests. In addition, the measurement and documentation of these irradiation conditions with respect to the spectral distribution, irradiance and homogeneity are given.

2 Symbols and abbreviations

<i>APD</i>	avalanche photodiode
<i>A</i> (λ)	decadic absorbance
<i>CA</i>	chemical actinometry
<i>E</i>	irradiance
<i>FWHM</i>	full width at half maximum
h_d	height difference
h_{max}	maximum height difference
h_s	measurement plane
<i>LED</i>	light emitting diode
<i>PC-A</i>	photocatalytic amber
<i>PC-B</i>	photocatalytic blue
<i>PC-C</i>	photocatalytic cyan
<i>PC-G</i>	photocatalytic green
<i>PC-R</i>	photocatalytic red
<i>PC-U</i>	photocatalytic ultraviolet
<i>PC-UC</i>	photocatalytic ultraviolet C
<i>PC-V</i>	photocatalytic violet
$QP_{abs}(\lambda)$	total amount of absorbed photons
$q_p^\circ(\lambda)$	incident photon flux
λ	wavelength
$\phi(\lambda)$	quantum yield

In Annex A, further examples concerning literature, terms and definitions, quantities and figures are listed for information.

3 Specification of spectral areas and irradiance values

As shown in Table 1, different spectral areas in combination with the specified irradiance should be used for irradiation during photocatalytical analysis. The test procedures themselves are described in their according standards, e.g. ISO 22197-1 [6] for the abatement of nitrogen monoxide.

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
-