

ICS 29.140
CCS K 70



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 20145-2006

**Photobiological safety of lamps and lamp systems
(English Translation)**

Issued on: March 6, 2006

Implemented on: November 1, 2006

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

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Foreword

This Standard equivalently adopted CIE S 009/E.2002 Photobiological Safety of Lamps and Lamp Systems (English version).

In addition, this Standard made the following editorial modifications.

- a) Change "this International Standard" into "this Standard";
- b) Use decimal point "." to replace the comma "," that is used as decimal point;
- c) Delete the Foreword of CIE S 009/E.2002.

The Appendixes A, B, and C of this Standard are informative.

This Standard was proposed by China National Light Industry Council.

This Standard shall be under the jurisdiction of National Technical Committee on Lighting Appliances of Standardization Administration of China (SAC/TC 224).

Drafting staffs of this Standard. National Lighting Test Center (Beijing); and Zhejiang University SENSING Instruments Co., Ltd.

Chief drafting staffs of this Standard. Zhang Ying, Hua Shuming, Mu Tongsheng.

This Standard is first-time formulated.

1 Scope

This Standard gives guidance for evaluating the photobiological safety of lamps and lamp systems including luminaires. Specifically, it specifies the exposure limits, reference measurement technique and classification scheme for the evaluation and control of photobiological hazards from all electrically powered incoherent broadband sources of optical

radiation, including LEDs but excluding lasers, in the wavelength range from 200 nm through

2 Normative References

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

CIE 17.4.1987 International lighting vocabulary (ILV) - Joint publication IEC/CIE

3 Definitions, Symbols and Abbreviations

For the purposes of this standard, the following definitions, symbols and abbreviations apply.

Visual angle subtended by the apparent source at the eye of an observer or at the point of measurement. In this Standard, subtended angles are denoted by the full included angle, not the half angle.

4 Exposure Limits

The exposure limits in this standard apply to continuous sources where the exposure duration

is not less than 0.01 ms and not more than any 8-hour period, and should be used as guides in

the control of exposure. The values should not be regarded as precisely defined lines between

safe and unsafe levels.

5 Measurement of Lamps and Lamp Systems

The measurement of optical radiation for the purpose of computing photobiological radiation

values poses significant challenges for the radiometrist. Typical photobiological action spectra

such as $SUV(\lambda)$ have rapidly changing values with slight change in wavelength.

Operation of the test lamp shall be provided in accordance with the appropriate IEC lamp standard. If no standard for the lamp type exists, the lamp manufacturer's recommendation for

operation should be used.

6 Lamp Classification

The classification of this Standard was developed by reference of the provisions of CIE TC 6-

47 This joint effort was deemed important so that issues concerning risk group classification

and distance at which the photobiological hazard values due to lamp radiation are reported could be agreed upon.

Annex A

(Informative)

Summary of Biological Effect

Bioeffect datasheet #1. Infrared cataract

Annex B

(Informative)

Measurement Method

Modern broadband detectors, when calibrated against the appropriate action spectrum, and with

appropriate precaution, may be used. When faced with short duration pulsed or low intensity

sources, they are convenient to use. Broadband hazard sensors normally attempt to match the

weighting spectra by the use of filters.

Annex C

(Informative)

Uncertainty Analysis

The analysis of uncertainty requires that all sources of uncertainty be quantitatively evaluated.

The first step in uncertainty analysis is identifying the various uncertainty sources. Below is a

list that can be the start of the evaluation of uncertainty for measurements used in classifying

lamps and lamp systems. See further details in CIE 53.1982 Methods of characterizing the performance of radiometers and photometers.

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