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

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**UV erythema reference action spectrum, standard erythema
dose and UV index**

紫外红斑效应参照谱、标准红斑剂量和紫外指数

(English Translation)

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Table of Contents

Foreword	
Introduction	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Reference spectrum of ultraviolet erythema effect	
6 UV index	
7 Exposure level	

Foreword

This standard modification adopts the international standard ISO 17166.:1999/CIES007/E-1998 "Erythema Effect Reference Spectrum and Standard Erythema Dose".

This standard makes appropriate revisions to partially repeated text and individual formulas that are not easily understood in the ISO 17166:1999 text. On hold on the basis of all terms, definitions and descriptions of ISO 17166:1999, this standard refers to the World Health Organization, the World Meteorological Organization, the United the "UV Index. A Practical Guide" [1] issued jointly by the National Environment Program and the International Non-Nuclear Radiation Protection Commission specifies the UV radiation bands the wavelength range of the standard, and the calculation method of the ultraviolet index specified in the guideline is included in the provisions of this standard. This standard uses ISO 17166:1999 to and the wavelength range of the ultraviolet radiation band and the calculation method of the ultraviolet index specified by the International Organization for Standardization are introduced into the national standard system, which is conducive to enhancing our the international comparability of national ultraviolet radiation measurement data and ultraviolet radiation forecast service products.

The differences between this standard and ISO 17166:1999 are described as follows.

a) Since ISO 17166:1999 is equivalent to the use of CIES007/E-1998, in addition to the ISO preface, the original text also includes the foreword and introduction of CIE, this part has quite a lot of repetition, and contains some non-technical instructions, accounting for the original text Nearly 1/3 of the width. It is obviously inappropriate to delete all of them, but if all of them are retained, it will be cumbersome and complies with the compilation of our national standards.

The writing requirements are inconsistent. This standard incorporates all of this content into the introduction to this standard, and deletes duplicates and technical regulations.

Specify irrelevant text.

b) "Erhythmicerececectrum" and "Erhythmicactrum" in the original ISO 17166, Corresponding to the "UV erythema effect reference spectrum" and "erythema effect spectrum" in this standard. Here, the term "UV erythema effect parameter" the word "UV" is preceded by the word "UV" in order to clarify the relationship between the effect spectrum and UV radiation.

The standard English title is also titled "UV". In order to better distinguish the two, this standard specifies the "UV erythema effect reference spectrum" the symbol (Ser(λ)) is capitalized to show that it is different from the "erythema effect spectrum" (Xerer(λ)).

c) This standard gives a total of 11 terms and their definitions, of which 6 are from ISO 17166, and the remaining 5 are from "UV Index. Practical Guide" [1] introduced.

d) Paragraphs 4 and 5 of ISO 17166 give definitions of terms and further explanation and explanation of relevant terms. These two paragraphs not only is there much duplication between each other, but it also does not meet the relevant requirements for the preparation of national standards in my country. To this end, the writing team will Paragraphs and paragraph 5 are merged to delete redundant text in the original text that overlaps, and those texts in the original text that are not suitable as definitions are said it is given as a note.

e) The expression of the definition of the minimum erythema dose (MED) in paragraph 4 of the original ISO 17166 (corresponding to 3.4 of this standard) does not conform to me the narrative requirements in the national standard of the country, so this standard gives a text definition, and the original definition is used as a comment.

f) The exposure period of the minimum erythema dose (MED) in paragraph 4 of the original ISO 17166 (corresponding to 3.4 of this standard) in terms of separation, it only mentions "the typical time interval is 24h". According to the opinion of our skin experts, this time interval is generally $24\text{h} \pm 2\text{h}$, so this standard clearly gives the range of change.

g) The formula (2) of 5.1 in the original ISO 17166 text (corresponding to the formula (8) of this standard) is obviously wrong from a dimensional point of view. I We have made appropriate revisions while understanding the connotation of the original text.

h) The statement about skin type in the "Note" in 5.3 of the original ISO 17166 original text is "Type I to Type IV". According to my country's skin specialist According to the opinion of the family, at present, types I to VI are widely used in the world, and this standard has been revised accordingly.

i) In order to make this standard more practical, refer to the World Health Organization, the World Meteorological Organization, the United Nations Environment Programme and the International Non-Ionization the relevant provisions in the "UV Index. A Practical Guide" [1] issued jointly by the Radiation Protection Committee, for UV-A, UV-B and UV-C the band division standard has been clearly defined, for which this standard adds 3.7, 3.8, 3.9 and other three definitions; also refer to this Practical Guide [1] The current calculation method of UV index and the basis of UV index in the international information about UV radiation the divided exposure levels have been stipulated, and the two definitions 3.10 and 3.11 and chapters 6 and 7 have been added accordingly.

GB/T 21005-2007

j) In order to facilitate users to better understand the harmful effects of ultraviolet radiation on human body and its protection, this standard is also given in Appendix A Related presentations.

Appendix A of this standard is an informative appendix.

This standard was proposed by the China Meteorological Administration.

This standard is under the jurisdiction of the China Meteorological Administration.

Introduction

In 1998, the International Commission on Illumination (CIE) made formal recommendations on the original photobiological effects, dose relationships and measurements --- "Purple the effect spectrum of erythema caused by external lines in human skin" (published in CIE publication 106/4-1993, reprinted from CIE Journal 6/117-221987) After careful review and research, CIE S007/E-1998 "Erythema Effect Reference Spectrum and Standard Erythema Dose" was proposed. The standard covers light the latest knowledge in the field of biological effects, dose relationship and measurement, but it does not mean that the safety responsibility of human testers and other related responsibility. After being approved by the national committees of the member states of CIE, CIE S2007/E-1998 replaced CIE's original proposal.

The CIE 07/E-1998 standard, prepared for the purpose of harmonizing internationally to form a unified definition, is data on light and lighting the concise documentation of the definition is also a basic data source generally accepted and recognized internationally, and can be introduced into any standard system without amendment. Yes, the International Organization for Standardization directly adopted CIE S007/E-1998 as the international standard ISO 17166:1999.

The difficulty in measuring the photobiological radiation dose of the skin lies in the ability of ultraviolet radiation to cause erythema in human skin as the wavelength changes.

Significant changes, this change can reach a maximum of 4 orders of magnitude in the

wavelength range of 250nm ~ 400nm. Therefore, purple cannot be used External radiation dose to express the effect of erythema on the skin of the irradiated subject. Such as. receiving 10kJ/m² of UV-A radiation, except those no erythema response will be produced in the body with high sensitivity; under unfiltered high-pressure mercury lamp or daylight fluorescent lamp, the same dose of UV Radiation will form dark red spots on the skin of most individuals with white skin tones. For a long time, photobiologists believed that Weighted radiation dose to express the degree of exposure [2].

The term minimum erythema dose (MED) was widely used as a measure of erythema radiation, which is inappropriate. Because MED is definitely not this standard measure, on the contrary, contains the variable factors of the individual's sensitivity to ultraviolet radiation. Factors affecting the MED include. the light source Optical properties and radiation measurement properties; exposure quantification, such as increasing rate and range, etc.; skin properties, such as pigmentation, whether they have been photographed before Shots and anatomical parts, etc.; judgment factors, such as the definition of the end point, the time of judgment reflection after irradiation, and the lighting of the test environment, etc.

In order to avoid further misuse of the word MED and the confusion caused thereby, only the term is reserved for observing humans and other activities in the study of biological substances, the standard erythema dose (SED) is used as the standard measure of ultraviolet radiation that causes erythema.

GB/T 21005-2007

UV erythema effect reference spectrum, standard erythema dose and UV index

1 Scope

This standard specifies the ultraviolet erythema effect reference spectrum, standard erythema dose, ultraviolet radiation band range, ultraviolet index, exposure level, etc.

Language and its related content.

This standard is applicable to the measurement of erythema dose and the expression, application and publication of UV index.

2 Normative references

The clauses in the following documents become the clauses of this standard through the quotation of this standard. For dated references, all subsequent documents the amendments (not including errata content) or revisions are not applicable to this standard, however, all parties to agreements based on this standard are encouraged to study is the latest version of these files available? For the cited documents without date, the latest version applies to this standard.