



International Commission on Illumination
Commission Internationale de l'Eclairage
Internationale Beleuchtungskommission

PRESS RELEASE

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**Joint ISO/CIE Standard
ISO/CIE 17166:2019**

**Erythema reference action spectrum and standard
erythema dose**

This document was prepared by the International Commission on Illumination (CIE) in cooperation with Technical Committee ISO/TC 274, *Light and lighting*.

This first edition of ISO/CIE 17166 cancels and replaces ISO 17166:1999 | CIE S 007-1998, of which it constitutes a minor revision. The document has been editorially revised as per current ISO and CIE rules and the references have been updated.

The document specifies the erythema reference action spectrum, $s_{er}(\lambda)$, and the standard erythema dose (SED).

The problem of dosimetry in skin photobiology lies in the fact that the ability of ultraviolet (UV) radiation to elicit erythema in human skin depends strongly on wavelength, encompassing a range of four orders of magnitude between 250 nm and 400 nm. Thus, a statement that a subject received an exposure dose of $1 \text{ J}\cdot\text{cm}^{-2}$ ($10^4 \text{ J}\cdot\text{m}^{-2}$) of UV radiation conveys nothing about the consequences of that exposure in terms of erythema. If the radiation source was a UV-A fluorescent lamp, no erythematous response would be seen apart from in people exhibiting severe, abnormal pathological photosensitivity. The same dose delivered from an unfiltered mercury arc lamp or fluorescent sun-lamp would result in marked violaceous erythema in most white-skinned individuals. Consequently, photobiologists have long recognized the need to express the exposure as an erythemally weighted quantity.

The term "minimal erythema dose (MED)" has been used widely as a measure of erythemal radiation. This is unreasonable because the MED is not a standard measure of anything but, on the contrary, encompasses the variable nature of individual sensitivity to UV radiation. Variables that affect the MED include: optical and radiometric characteristics of the source; determinants of the exposure, such as dose increment and field size; nature of the skin, such as pigmentation, previous light exposure and anatomical site; and observational factors, such as definition of the endpoint, time of reading after exposure and ambient illumination.

To avoid further confusing misuse of the term MED, it is proposed that this term be reserved solely for observational studies in humans and other animals, and that the term "standard erythema dose (SED)" be used as a standardized measure of erythemogenic UV radiation.

The publication is written in English, with a short summary in French and German. It consists of 12 pages and is readily available from the [CIE Webshop](#) or from the National Committees of the CIE.

The price of this publication is EUR 42,- (Members of a National Committee of the CIE receive a 66,7 % discount on this price – please approach your NC for information on accessing this discount).