

BRITISH STANDARD

Eyewear for protection against intense light sources used on humans and animals for cosmetic and medical applications –

Part 1: Specification for products

ICS 13.340.20



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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 March 2008. It was prepared by Technical Committee PH/2/3, *Eye protection against lasers*. A list of organizations represented on this committee can be obtained on request to its secretary.

Information about this document

This is a new standard, which has been written to fill a need for the standardization of protective eyewear for users of intense light source equipment.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

Protective eyewear for intense light source (ILS) equipment protects against excessive exposure to optical radiation during normal operation of the equipment and foreseeable accidental exposure due to equipment malfunctioning or human error. This includes accidental and cumulative exposure, and discomfort associated with viewing bright reflections.

1 Scope

This British Standard specifies performance, test methods and labelling of eye protectors used for ILS equipment used on humans and animals for cosmetic and medical applications against excessive exposure to optical radiation in the spectral range 180 nm to 3 000 nm, with the exception of laser radiation.

This standard is not applicable to eye protectors for use with tanning equipment, ophthalmic instruments or other medical/cosmetic devices, the safety issues of which are addressed through other European and British standards.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS EN 167:2002, *Personal eye-protection – Optical test methods*

BS EN 168:2002, *Personal eye-protection – Non-optical test methods*

3 Terms and definitions

For the purpose of this British Standard, the following terms and definitions apply.

3.1 blue light hazard

potential for a photochemically induced retinal injury resulting from optical radiation exposure in the wavelength range 300 nm to 700 nm

3.2 filter protection factor (FPF)

factor by which the filter attenuates the weighted ocular exposure

NOTE Mathematical expressions for FPF are given in Annex A and example calculations in Annex B and Annex C.

3.3 infra-red eye lens hazard

potential for a thermal injury to cornea and lens of the eye resulting from optical radiation exposure in the wavelength range 780 nm to 3 000 nm

3.4 intense light source (ILS)

device incorporating one or more non-laser sources of optical radiation of the wavelength range 180 nm to 3 000 nm and intended for creating biological effects in humans and animals

NOTE It may operate in continuous or pulsed regime

3.5 retinal thermal hazard

potential for a thermal retinal injury resulting from optical radiation exposure in the wavelength range 380 nm to 1 400 nm

3.6 ultra-violet hazard

potential for skin and ocular acute and chronic adverse effects resulting from optical radiation exposure in the wavelength range 180 nm to 400 nm

4 Spectral transmittance

The spectral transmittance $t(\lambda)$ of the eye protector material shall be determined for normal incidence. The wavelength shall be determined within ± 2 nm.

Filters with angular dependent transmittance shall be measured at angles of incidence between 0° and 45° .

5 Luminous transmittance

5.1 The luminous transmittance (t_v) of the protective filters intended for use by the ILS operator shall be determined as:

$$t_v = \frac{\sum_{\lambda=380}^{\lambda=780} V(\lambda)t(\lambda)E(\lambda)\Delta\lambda}{\sum_{\lambda=380}^{\lambda=780} V(\lambda)E(\lambda)\Delta\lambda}$$

where

$E(\lambda)$ is the spectral radiance flux of the illumination source;

$V(\lambda)$ is spectral luminous efficiency;

$\Delta\lambda$ is the wavelength interval of the measurements, in nm;

$t(\lambda)$ is the spectral transmittance of filter material at wavelength λ .

5.2 Luminous transmittance, as determined in **5.1**, shall be stated for a D65 standard illuminator.

NOTE There are no requirements for the luminous transmittance of the filters of eye protectors intended for use by ILS equipment patients/clients; these filters may be opaque.