



SLOVENSKI STANDARD
SIST EN 170:1996

01-december-1996

Osebno varovanje oči - Ultravijolični filtri - Zahteve za prepustnost in priporočena uporaba

Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use

Persönlicher Augenschutz - Ultraviolettschutzfilter - Transmissionsanforderungen und empfohlene Verwendung

Protection individuelle de l'oeil - Filtres pour l'ultraviolet - Spécifications de transmission et utilisation recommandée

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13.340.20 Varovalna oprema za glavo Head protective equipment

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en

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EUROPEAN STANDARD

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English version

Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard was drawn up by the Technical Committee CEN/TC 85 "Eye protection equipment", the secretariat of which is held by AFNOR.

The international standard ISO 4851 'Personal eye-protectors - Ultraviolet filters - Utilisation and transmittance requirements' drawn up by the ISO/TC 94/SC 6 'Personal eye protection' was used as a basis for this European Standard.

This European Standard supersedes EN 170:1986.

In accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 1993, and conflicting national standards shall be withdrawn at the latest by April 1993.

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1 Object and field of application

This European Standard specifies the scale numbers and transmittance requirements for filters for protection against ultraviolet radiation. The other applicable requirements for these types of filters are given in EN 166. Guidance on the selection and use of these filters are given in Annex A.

Note:

The protective filters specified in this standard are not suitable for the direct or indirect observation of an electric arc. For this purpose a welding filter appropriate to the source being observed should be used.

Such a filter would not have a scale number less than 6.

2 Normative references

- EN 165 Personal eye-protection - Vocabulary
 EN 166 Personal eye-protection - Specifications
 EN 167 Personal eye-protection - Optical test methods
 EN 169 Personal eye-protection - Filters for welding and related techniques - Transmittance requirements and recommended use
 CIE 17 International lighting vocabulary

3 Designation and identification

The complete table of numbering of filters is given in clause 5 of EN 166.

The tables concerning the identification of oculars and frame from the subject of clause 9 of EN 166.

The scale number of ultraviolet filters comprises the code number 2 or 3 and the shade number corresponding to the filter, from 1.2 to 5 (see table 1).

4 Transmittance requirements

The definitions of transmittance are given in EN 165.

The determination of luminous transmittance is described in clause 6 of EN 167.

The transmittance requirements for filters used for protection against ultraviolet radiation are given in table 1.

Additional requirements:

- For $210 \text{ nm} \leq \lambda \leq 313 \text{ nm}$ the spectral transmittance shall not exceed the value specified for 313 nm.
- For $313 \text{ nm} < \lambda \leq 365 \text{ nm}$ the spectral transmittance shall not exceed the value specified for 365 nm.
- For $365 \text{ nm} < \lambda \leq 405 \text{ nm}$ the spectral transmittance shall not exceed the luminous transmittance.
- In the wavelength range between 405 nm and 610 nm, the spectral transmittance for the scale numbers 3 - 1.2 to 3 - 5 shall not deviate from the luminous transmittance by more than 70 % of that value.

NOTE. Luminous transmittance values are based on the spectral distribution of CIE illuminant A (see CIE publication 17).

Table 1. Transmittance requirements

Scale number	Maximum spectral transmittance in the ultraviolet $\tau(\lambda)$		Luminous transmittance τ_v		Transmittance in infra-red spectrum
	313 nm	365 nm	maximum	minimum	
	%	%	%	%	
2 - 1.2	0,0003	0,3	100	74,4	No specification
2 - 1.4	0,0003	0,3	74,4	58,1	
3 - 1.2	0,0003	50	100	74,4	
3 - 1.4	0,0003	35	74,4	52,1	
3 - 1.7	0,0003	22	58,1	43,2	
3 - 2	0,0003	14	43,2	29,1	
3 - 2.5	0,0003	6,4	29,1	17,8	
3 - 3	0,0003	2,8	17,8	8,5	
3 - 4	0,0003	0,95	8,5	3,2	
3 - 5	0,0003	0,30	3,2	1,2	

Annex A (informative)**Guidance on selection and use**

A.1 For protection against ultraviolet radiation, filters should be selected from those classified by code numbers 2 or 3 (see table 2). Code number 2 filters can have a yellowish tinge which can modify colour perception.

The choice of a suitable UV filter depends on the amount of glare.

Note:

The guidelines given in table 2 of this annex A (typical applications) are not applicable to persons with photophobia or to those under medical treatment that can increase the sensitivity of the eyes to optical radiation.

Scale number	Colour perception	Typical applications	Typical sources ¹⁾
2 – 1.2	May be impaired	For use with sources which emit predominantly ultra violet radiation and when glare is not an important factor	Low pressure mercury lamps such as lamps used to stimulate fluorescence or 'black lights'
2 – 1.4	May be impaired	For use with sources which emit predominantly ultra violet radiation and when some definite absorption of visible radiation is required	Low pressure mercury lamps such as actinic lamps
3 – 1.2 3 – 1.4 3 – 1.7	No significant degradation	For use with sources which emit predominantly ultra violet radiation at wavelengths shorter than 313 nm and when glare is not an important factor. This covers the UVC and most of the UVB bands ²⁾	Low pressure mercury lamps such as germicidal lamps
3 – 2.0 3 – 2.5	No significant degradation	For use with sources which emit intense radiation in both the UV and visible spectral regions and therefore require the attenuation of visible radiation	Medium pressure mercury lamps such as photo-chemical lamps
3 – 3 3 – 4			High pressure mercury lamps and metal halide lamps such as sun lamps for solaria
3 – 5			High and very high pressure mercury and xenon lamps such as sun lamps, solaria, pulsed lamp systems

1) The examples given are for general guidance.
2) The wavelengths of these bands are as recommended by CIE (that is, 280 nm to 315 nm for UVB and 100 nm to 280 nm for UVC).