



SLOVENSKI STANDARD
SIST EN 172:1996

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Personal eye protection - Sunglare filters for industrial use

Personal eye protection - Sunglare filters for industrial use

Persönlicher Augenschutz - Sonnenschutzfilter für den betrieblichen Gebrauch

Protection individuelle de l'oeil - Filtres de protection solaire pour usage industriel

Ta slovenski standard je istoveten z: EN 172:1994

[SIST EN 172:1996](https://standards.iteh.ai/catalog/standards/sist/e943c8a9-7393-4a1e-ac0e-a6deb8d024f8/sist-en-172-1996)

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ICS:

13.340.20 Varovalna oprema za glavo Head protective equipment

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en

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EUROPEAN STANDARD

EN 172

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 1994

ICS 13.340.20

Descriptors: Accident prevention, eyes, radiation protection, solar radiation, sunlight, optical filters, designation, specifications, physical properties, transmittance, tests, labelling

English version

Personal eye protection - Sunglare filters for industrial use

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This European Standard was approved by CEN on 1994-12-05. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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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 prepared by the Technical Committee CEN/TC 85 "Eye-protective equipment" of which the secretariat is held by AFNOR.

This European Standard has been prepared under a Mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements or EC Directive(s).

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 June 1995, and conflicting national standards shall be withdrawn at the latest by June 1995.

According to the CEN/CENELEC Internal Regulations, 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, United Kingdom.

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1 Scope

This European Standard specifies the scale numbers, transmittances and related requirements for sunglare filters for industrial use. Other valid requirements for these types of filters are specified in prEN 166.

Selection criteria and information on use of these filters are given in Annex A.

This standard does not apply to filters for protection against radiation from artificial light sources such as those used in solarium. EN 170 applies for these filters.

This standard does not apply to ski goggles for which a separate standard is in preparation or for other types used for leisure activities.

A separate standard for sunglasses and sunglare filters for general use is in preparation.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

prEN 165	Personal eye protection - Vocabulary
prEN 166	Personal eye protection - Specifications
prEN 167	Personal eye protection - Optical test methods
prEN 168	Personal eye protection - Non-optical test methods
EN 169	Personal eye protection - Filters for welding and related techniques
EN 170	Personal eye protection - Ultra-violet filter - Transmittance requirements and recommended use

CIE Publication 15 Colorimetry

3 Designation and marking

A complete table of filter designation and marking is given in clauses 4 and 9 of prEN 166.

The scale number of a sunglare filter contains the code numbers 5 (filter with no requirement for protection in the infra-red) or 6 (filter with a requirement for protection in the infra-red) and the shade number of the filter (see clause 4 and Annex A.2).

4 Requirements

The requirements of prEN 166 apply to sunglare filters for industrial use. Only those requirements that are different from or supplement the prEN 166 specifications are given in the following.

4.1 Permissible transmittance and scale numbers

4.1.1 Filters with code number 5

Table 1 : Permissible transmittance for filters without a requirement for infra-red protection

Scale number	Ultraviolet spectral range			Visible spectral range	
	Maximum value of spectral transmittance τ (λ)		Maximum mean value of spectral transmittance	Range of luminous transmittance	
	from 280 nm to 315 nm	over 315 nm to 350 nm		from τ_v %	to over τ_v %
5-1,1 ¹⁾				100	80,0
5-1,4				80,0	58,1
5-1,7	0,1 τ_v	τ_v	τ_v	58,1	43,2
5-2				43,2	29,1
5-2,5				29,1	17,8
5-3,1	0,01 τ_v	0,5 τ_v	0,5 τ_v	17,8	8,0
5-4,1				8,0	3,0

¹⁾ This scale number only applies to certain photochromic sunglare filters in their clear condition and for the high luminous transmittance range of gradient filters.

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4.1.2 Filters with code number 6

Table 2 : Permissible transmittance for filters with a requirement for infra-red protection

Scale number	Ultraviolet spectral range		Maximum mean value of spectral transmittance from 315 nm to 380 nm	Visible spectral range		Infra-red spectral range
	Maximum value of spectral transmittance $\tau(\lambda)$ from 280 nm to 315 nm	Maximum value of spectral transmittance over 315 nm to 350 nm		Range of luminous transmittance τ_v from %	to over %	
6-1,1 ¹⁾				100	80,0	
6-1,4				80,0	58,1	
6-1,7	0,1 τ_v	τ_v	τ_v	58,1	43,2	τ_v
6-2				43,2	29,1	
6-2,5				29,1	17,8	
6-3,1	0,01 τ_v	0,5 τ_v	0,5 τ_v	17,8	8,0	
6-4,1				8,0	3,0	

¹⁾ This scale number only applies to certain photochromic sunglare filters in their clear condition and for the high luminous transmittance range of gradient filters.

4.2 General transmittance requirements

4.2.1 Spectral transmittance

Between 500 nm and 650 nm the spectral transmittance shall not be less than $0,2 \tau_v$.

4.2.2 Uniformity of luminous transmittance

Apart from a marginal zone 5 mm wide, the relative difference in luminous transmittance value between any two points on the filter within a circle of 40 mm diameter around the reference point shall not be greater than 10 % of the higher luminous transmittance value.

Where the filter consists of a spectacle lens with zero dioptric power, the visual centre shall be taken as the reference point; if this is not known, the geometric centre is used as the reference point.

In the case of gradient filters, this requirement applies in a section perpendicular to the gradient.

For mounted filters the relative difference between the luminous transmittance value of the filters at the reference point for the right and left eye shall not exceed 20 % (relative to the lightest filter).

The locations of the visual centres of eye-protectors with afocal lenses are defined in figure 2 of prEN 167.

Changes of luminous transmittance which are caused by thickness variations due to the design of the lens (e.g. for prescription lenses) are permitted.

4.2.3 Recognition of signal lights

As sunglasses are often worn while driving, filters of scale numbers 5-1,1 to 5-3,1 and 6-1,1 to 6-3,1 shall meet the requirements for recognition of signal lights in addition to the protection requirements.

The relative visual attenuation quotient for signal lights red, yellow, green and blue filters of these scale numbers shall not be less than 0,8.

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4.3 Special transmittance requirements

4.3.1 Photochromic filters

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The luminous transmittance value of the filter in its clear state τ_0 and after 15 min. irradiation τ_1 determine the scale numbers. In both states, the requirements specified in 4.1.1 to 4.1.2 shall be met.

For photochromic filters $\frac{\tau_0}{\tau_1}$ shall be $\geq 1,25$.

When tested in accordance with Annex E.3, the change in luminous transmittance value relative to that measured initially as described in E.2, shall not be greater than $\pm 5\%$ for the clear state nor $\pm 20\%$ for the dark state.

NOTE : When checking photochromic filter materials for the other requirements of this standard, this test need not be repeated if corresponding results are available, e.g. from the manufacturer of the raw material.

4.3.2 Polarizing filters

Where sunglasses are fitted with polarizing filters, these shall be fitted in the frame so that the plane of polarization does not deviate from the vertical, or the nominal direction if different from the vertical, by more than $\pm 3^\circ$.

For polarizing filters, the ratio of the luminous transmittance values parallel and perpendicular to the plane of polarization shall be greater than 20:1.

4.3.3 Gradient filters

The scale number for gradient filters shall be determined by the lightest and darkest spot within a circle of 15 mm radius around the geometric centre for the non-mounted filters or the visual centre for the mounted filters.

5 Test method

prEN 167 and prEN 168 contain test methods for sunglare filters for industrial use. The following describes only those test methods that are not included in the above standards or require supplementing.

5.1 Permissible transmittance and scale numbers

5.1.1 Luminous transmittance

The spectral distribution of a beam of standard illuminant D_{65} and the standard spectral values of the colorimetric 2° standard observer CIE 1931 shall be used to determine the luminous transmittance.

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For details, see Annexes B and C.

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5.1.2 Infra-red transmittance

The infra-red transmittance τ_{SIR} is calculated from the spectral transmittance values using the values given in Annex B.3.