



SLOVENSKI STANDARD

SIST EN 169:2003

01-april-2003

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SIST EN 169:1996

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Personal eye-protection - Filters for welding and related techniques - Transmittance requirements and recommended use

Persönlicher Augenschutz - Filter für das Schweißen und verwandte Techniken -
Transmissionsanforderungen und empfohlene Anwendung

Protection individuelle de l'oeil - Filtres pour le soudage et les techniques connexes -
Exigences relatives au facteur de transmission et utilisation recommandée

Ta slovenski standard je istoveten z: EN 169:2002

ICS:

13.340.20 Varovalna oprema za glavo Head protective equipment

SIST EN 169:2003

en

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SIST EN 169:2003

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English version

Personal eye-protection - Filters for welding and related
techniques - Transmittance requirements and recommended
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Protection individuelle de l'oeil - Filtres pour le soudage et
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verwandte Techniken - Transmissionsanforderungen und
empfohlene Anwendung

This European Standard was approved by CEN on 2 October 2002.

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This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 169:2002) has been prepared by Technical Committee CEN/TC 85, "Eye-protective equipment", the secretariat of which is held by AFNOR.

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 May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

The annexes A and C are informative. Annex B is normative.

In the revision of this European Standard, and that of EN 379, which was performed concurrently, it was decided to remove from EN 379 welding filters with dual scale numbers and include them within this European Standard.

This document supersedes EN 169:1992.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies the scale numbers and transmittance requirements for filters intended to protect operators performing work involving welding, braze-welding, air-arc gouging and plasma jet cutting. It also includes requirements for welding filters with dual scale numbers.

The other applicable requirements for these types of filters are given in EN 166. The requirements for the frames/mountings to which they are intended to be fitted are given in EN 175.

Guidance on the selection and use of these filters are given in Annex A.

The specifications for welding filters with switchable luminous transmittance are given in EN 379.

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 (including amendments).

EN 165, *Personal eye-protection – Vocabulary*.

EN 166, *Personal eye-protection - Specifications*.

EN 167:2001, *Personal eye-protection – Optical test methods*.

ISO/CIE 10526:1999, *CIE standard illuminants for colorimetry*.

ISO/CIE 10527:1991, *CIE standard colorimetric observers*.

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 165 and the following apply.

3.1

welding filter with dual scale number

a protective filter with two different scale numbers (light and dark zones) which are divided into a maximum of three areas of the filter. The light zone is used for brief viewing when setting the electrode to the weld and igniting it. The dark zone is used for viewing the welding process

4 Designation and identification

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

The marking of oculars and frame is described in EN 166.

The scale number of these filters comprises only the shade number corresponding to the filter, from 1,2 to 16 (see Table 1).

5 Requirements

5.1 General

The requirements of EN 166 apply to welding filters. Only those requirements that are different from or supplement the EN 166 specifications are given in this European Standard.

5.2 Transmittance requirements

The definitions of transmittances are given in EN 165.

The determination of luminous transmittance is described in EN 167.

The transmittance requirements for filters used in welding and related techniques are given in Table 1.

Table 1 – Transmittance requirements

Scale number	Maximum spectral transmittance in the ultraviolet $\tau(\lambda)$		Luminous transmittance τ_v		Maximum mean spectral transmittance in the infrared τ_A
	313 nm %	365 nm %	Maximum %	Minimum %	780 nm to 1 400 nm %
1,2	0,0003	50	100	74,4	69
1,4	0,0003	35	74,4	58,1	52
1,7	0,0003	22	58,1	43,2	40
2	0,0003	14	43,2	29,1	28
2,5	0,0003	6,4	29,1	17,8	15
3	0,0003	2,8	17,8	8,5	12
4	0,0003	0,95	8,5	3,2	6,4
5	0,0003	0,30	3,2	1,2	3,2
6	0,0003	0,10	1,2	0,44	1,7
7	0,0003	0,050	0,44	0,16	0,81
8	0,0003	0,025	0,16	0,061	0,43
9	0,0003	0,012	0,061	0,023	0,20
10	0,0003	0,006	0,023	0,0085	0,10
11	0,0003	0,0032	0,0085	0,0032	0,050
12	0,0003	0,0012	0,0032	0,0012	0,027
13	0,0003	0,00044	0,0012	0,00044	0,014
14	0,00016	0,00016	0,00044	0,00016	0,007
15	0,000061	0,000061	0,00016	0,000061	0,003
16	0,000023	0,000023	0,000061	0,000023	0,003

Minimum and maximum values of luminous transmittance may be exceeded by taking into account the limits of “relative uncertainty” given in EN 167.

Additional requirements:

- a) for $210 \text{ nm} \leq \lambda \leq 313 \text{ nm}$, the spectral transmittance shall not exceed the value permitted for 313 nm;
- b) for $313 \text{ nm} < \lambda \leq 365 \text{ nm}$, the spectral transmittance shall not exceed the value permitted for 365 nm;
- c) for $365 \text{ nm} < \lambda \leq 380 \text{ nm}$, the spectral transmittance shall not exceed the luminous transmittance τ_v ;
- d) for $380 \text{ nm} < \lambda \leq 480 \text{ nm}$, the spectral transmittance shall not exceed the value observed at 480 nm.

NOTE 1 Luminous transmittance values are based on the spectral distribution of illuminant A and on the CIE (1931) standard observer (2°) (see ISO/CIE 10526:1999 and ISO/CIE 10527:1991).

NOTE 2 The IR transmittance values are determined by integration of the spectral data.

5.3 Oculars with enhanced colour recognition (optional)

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

The relative visual attenuation quotient Q, for signal lights red, yellow, green and blue shall be not less than 0,8.

5.4 Oculars with enhanced reflectance in the infrared (optional)

Oculars which are claimed to have enhanced reflectance in the infrared shall have a mean spectral reflectance greater than 60 % within the wavelength range 780 nm to 2 000 nm when measured in accordance with EN 167:2001, clause 8.

5.5 Additional requirements for welding filters with dual scale number

5.5.1 Difference in scale number

The difference in scale number between the light and dark zones shall be no more than five.

5.5.2 Transmittance

5.5.2.1 The requirements of 5.5.2.2 and 5.5.2.3 shall be satisfied when the transmittances are measured in accordance with EN 167.

5.5.2.2 The minimum luminous transmittance in the light zone shall be 0,16 %.

5.5.2.3 The spectral transmittance in the ultraviolet and the mean transmittance in the infrared given in Table 1 and the additional requirements a) to d) in 5.2 required for the dark zone shall also apply to the light zone.

5.5.3 Dimensions

The dark zone shall be at least 25 mm vertical depth across the horizontal length.

Any region separating the light and dark zones shall not exceed 2 mm vertical depth across the horizontal length. This region shall provide at least the same protection against radiation as the dark zone.

Annex A (informative)

Guidance on selection and use

A.1 General

For the personal protection of the operator the filter must be mounted in a suitable eye protector. Eye protector types are described in EN 175.

Many factors are involved in selecting the scale number of a protective filter which is suitable for welding or related techniques.

- **For gas welding and related techniques**, such as braze-welding, this European standard refers to the flow rate through the burners;
- **For arc welding, air-arc gouging, and plasma jet cutting**, the current is an essential factor in making an accurate choice possible.

In addition, for arc welding, the type of arc and the type of parent metal are also to be taken into consideration.

Other parameters have a significant influence, but it is difficult to evaluate their effect. These are, in particular:

- the position of the operator in relation to the flame or the arc. For example, depending on whether the operator leans over his work or adopts an arm's length position, a variation of at least one scale number can be necessary;
- local lighting;
- the human factor.

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For these various reasons, this European Standard only gives those scale numbers which confirmed practical experience has shown to be valid in normal circumstances for the personal protection of operators with normal sight, carrying out work of a specified type.

The scale number of the filter to be used can be read from the tables, at the intersection of the column, corresponding to the gas flow rate or the current, and the line, specifying the work to be carried out.

The Tables A.1 to A.3 are valid for average working conditions, in which the distance from the welder's eye to the pool of molten metal is approximately 50 cm and the average illuminance is approximately 100 lx.

A.1.1 Scale numbers to be used for gas welding and braze welding

The scale numbers to be used for gas welding and braze welding are given in Table A.1.