SLOVENSKI STANDARD
SIST EN 14458:2004

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Osebna oprema za varovanje oči - Ščitniki za obraz in vizirji za gasilce ter industrijske čelade z visoko stopnjo zaščite, katere uporabljajo gasilci, reševalci in osebje prve pomoči

Personal eye-equipment - Faceshields and visors for use with firefighters' and high performance industrial safety helmets used by firefighters, ambulance and emergency services

Persönlicher Augenschutz - Gesichtsschutzschilde und Visiere zur Verwendung mit Schutzhelmen für die Feuerwehr, Krankenwagenpersonal und Notfalldienste

Equipement de protection des yeux - Ecran facial et visiere des casques de sapeurs-pompiers et de protection a haute performance pour l'industrie, utilisés par les sapeurs-pompiers, les services d'ambulance et d'urgence

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Personal eye-equipment - Faceshields and visors for use with firefighters' and high performance industrial safety helmets used by firefighters, ambulance and emergency services

Equipement de protection des yeux - Ecran facial et visière utilisés avec des casques pour les sapeurs-pompiers et les services d'ambulance et d'urgence

Persönlicher Augenschutz - Gesichtsschutzschilde und Visiere zur Verwendung mit Schutzhelmen für die Feuerwehr, Krankenwagenpersonal und Notfalldienste

This European Standard was approved by CEN on 27 May 2004.

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Foreword

This document (EN 14458:2004) has been prepared by Technical Committee CEN/TC 85 “Personal eye-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of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by February 2005.

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.

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1 Scope

This document applies to visors designed specifically to be fitted to and/or used with helmets conforming to EN 443 when used by firefighters, or helmets which conform to EN 443 or prEN 14052 when used by ambulance and emergency services, as the situation dictates. They are intended to provide protection against the various hazards expected to be encountered in firefighting, ambulance and emergency service duties, except respiratory, smoke, and gas /vapour hazards.

Three types of visor are described in this document. One provides protection against general hazards; the second additionally provides protection against heat and flame. The third type of visor incorporates mesh oculars, and is intended for use in very limited circumstances. This document also describes two forms for all three types of visors; face guards that provide both eye and face protection; eye guards that are shorter and effectively provide only eye protection.

The requirements of this document do not apply to visors intended for use without a helmet. Such requirements are given in EN 166.

Visors with corrective effect are excluded from the scope of this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 165:1995, *Personal eye protection – Vocabulary*

EN 166:2001, *Personal eye protection – Specifications*

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

EN 168:2001, *Personal eye protection – Non-optical test methods*

EN 170:2002, *Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use*

EN 171:2002, *Personal eye-protection - Infrared filters - Transmittance requirements and recommended use*

EN 172:1994, *Personal eye protection - Sunglare filters for industrial use*

EN 443:1997, *Helmets for firefighters*

EN 659, *Protective gloves for firefighters*

EN 960, *Headforms for use in the testing of protective helmets*

EN 1731:1997, *Mesh type eye and face protectors for industrial and non-industrial use against mechanical hazards and/or heat*

EN ISO 6942, *Protective clothing - Protection against heat and fire - Method of test: Evaluation of materials and material assemblies when exposed to a source of radiant heat (ISO 6942:2002)*

EN 13087-10, *Protective helmets – Test methods – Part 10: Resistance to radiant heat*

prEN 14052, *High performance industrial helmets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 165:1995 and the following apply.

3.1
means of fixing
means by which the ocular of the visor is supported and interfaced with the designated helmet(s). This means may be an integral part of the helmet, may be fixed permanently or temporarily to it, or may be worn separately but at the same time as the helmet

3.2
face guard
visor which provides protection to the eyes and a substantial area of the face, when in the in-use position (see 5.2.12.1)

3.3
eye guard
visor which provides protection to essentially only the eyes, when in the in-use position (see 5.2.12.2)

4 Classification

Visors according to this document shall be classified as one of three types. Specific warning shall be included in the information provided by the manufacturer on the limitations on use of each type (see 8 f)), and the need to ensure that suitable helmet visor combinations are used (see 8 m)).

4.1 General use

Intended for use where there is no foreseeable exposure to significant levels of heat and / or flame. Such visors shall only be designated for use with high performance industrial safety helmets (see prEN 14052), or firefighters' helmets (see EN 443).

NOTE Helmets conforming to either prEN 14052 or EN 443 are considered potentially suitable for ambulance and emergency teams, where protection is required against the hazardous conditions to which such personnel may be exposed. Such activities may include making safe search, rescue and medical intervention at disaster sites where there is no expectation of exposure to heat and flame. Where there is also expectation of exposure to significant levels of heat and flame, or for structural fire fighting, only helmets conforming to EN 443 are considered appropriate.

4.2 Firefighters' use

Intended for use where exposure to significant levels of heat and/or flame is foreseeable. Such visors shall only be designated for use with firefighters' helmets (see EN 443).

4.3 Mesh

Intended for use by emergency services where there is no foreseeable need for protection against heat and/or flame, sparks, chemicals or liquid / molten materials, or electrical contact. Such visors shall only be designated for use with high performance industrial safety helmets (prEN 14052), or firefighters' helmets (see EN 443).

NOTE Mesh visors are included here specifically to cater for chainsaw use by emergency service teams during tree clearance and related activities. There will be few other situations where mesh visors can be considered suitable.

5 Performance requirements

5.1 General

Visors conforming to this document shall not be likely to increase the risks to the user under foreseeable conditions of use. Non-mesh visors conforming to this document shall meet the general requirements given in 5.2. Visors intended for use where there is a foreseeable risk of exposure to significant levels of heat and flame shall in addition meet the requirements of 5.3. Mesh visors shall meet the requirements of 5.4. Optional requirements are given in 5.5.

Helmets used in conjunction with these visors shall continue to meet the relevant requirements of their appropriate document, with the visor in both the in-use (protective) position, and the out-of-use (standby) position.

5.2 Requirements for general use

5.2.1 Construction

The visor shall be free from projections, sharp edges or other defects, which are likely to cause discomfort or injury during use. Test in accordance with 6.3.

5.2.2 Materials

No parts of the visor assembly, which may be in contact with the wearer shall be made of materials which, under foreseeable conditions of use, are known to be likely to cause skin irritation or any adverse effect on health. Test in accordance with 6.3.

5.2.3 Resistance to ageing

Oculars shall meet the requirements of EN 166:2001, 7.1.5.2 when tested according to Clause 6 of EN 168:2001.

5.2.4 Cleaning and disinfection

Substances and procedures recommended by the manufacturer for cleaning, maintenance or disinfection shall have no adverse effect on the exposed components of the helmet or visor, nor leave residues, which may enhance flammability. Neither shall they be known to be likely to have any adverse effect on the wearer when applied in accordance with the manufacturer's instructions. Test in accordance with 6.3. After cleaning and disinfection, the visor shall continue to meet the requirements of either 5.2.15 or 5.3.3.

5.2.5 Compatibility with other equipment

The visor shall integrate satisfactorily with:

a) the helmet with which it is designed to be used;

b) any respiratory protective devices designated for use with the helmet/visor assembly by the eye protector manufacturer;

c) any corrective eyewear designated for use with the helmet/visor by the eye protector manufacturer;

d) other items of PPE likely to be worn simultaneously during use.

Test in accordance with 6.3 and 6.4. The test report shall identify the specific items of other PPE used during these tests.

NOTE 1 Compatibility with other items of work equipment (e.g. medical devices, thermal imaging cameras) which may be required in situations where the helmet/visor is intended to be used, cannot be explicitly included in the assessment. Such compatibilities should be assessed by potential purchasers.

NOTE 2 Only frames for corrective eyewear which have been shown to be compatible with the visor / helmet should be used.

5.2.6 Resistance to extremes of temperature

The visor/helmet assembly shall show no apparent deformation when subjected to the series of thermal conditions according to Clause 6.2.4 of EN 443:1997. At the end of each of the periods a) to e) of that Clause, the raising/ lowering mechanism for the visor shall operate correctly in accordance with the manufacturer's instructions.

Optionally, period a) of the sequence may be conducted at –20 °C, -30 °C or 40 °C (all ± 2 °C). Where one of these lower temperatures is used, conditioning at -10°C is not required. The test report shall identify the temperature used.

Visors shall match or exceed the extremes of temperature against which designated helmets have been tested for thermal shock.

5.2.7 Resistance to corrosion

After having undergone the test for resistance to corrosion specified in Clause 8 of EN 168:2001, all metal parts of the visor and carrier assembly shall display smooth surfaces, free from corrosion, when they are examined by a trained observer.

5.2.8 Vision

The optical properties of the ocular shall meet the minimum requirements specified in Table 1.

Table 1 - General optical properties

Property	Minimum requirement	Test in accordance with
Refractive power	EN 166:2001, 7.1.2.1, Optical Class 2	EN 167:2001, Clause 3
Transmittance	EN 166:2001, 7.1.2.2	Depends on visor characteristics. See EN 166:2001, 7.1.2.2 for relevant documents
Diffusion of light	0.75 cd/m^2.lx	EN 167:2001, Clause 4
Quality of material surface	EN 166:2001, 7.1.3	EN 167:2001, Clause 5

The visor, marked in accordance with the requirements of 7, shall not reduce the available field of vision provided by the helmet(s) for which it is designated. Test in accordance with 6.4.

There shall be no undue distortion of vision as subjectively determined during testing in accordance with 6.4.

Where anti-fogging compounds are specified by the manufacturer they shall be compatible with the eyes, the skin, and the visor assembly under the foreseeable conditions of use. Test in accordance with 6.3. After application of anti-fogging compounds, the visor shall continue to meet the requirements of either 5.2.15 or 5.3.3.

5.2.9 Ergonomics

The visor/helmet assembly shall undergo practical performance tests under realistic conditions in accordance with 6.4. These general tests serve the purpose of checking for shortcomings that cannot be determined by the tests described elsewhere in this document.

Where practical performance tests show the visor/helmet assembly has shortcomings related to wearer acceptance, the test house shall provide full details of those parts of the practical performance tests, which revealed these imperfections. This will enable other test houses to duplicate the tests and assess the results thereof.

Specific aspects of the practical performance of the visor/helmet assembly, which shall be examined, are given in Clauses 5.2.10 and 5.2.11.

5.2.10 Fitting and adjustment

Where parts of the assembly are designed to be adjustable or replaceable, this shall be achievable by hand, without the aid of special tools. Test in accordance with 6.3.

5.2.11 Positioning and operation

The visor shall be moveable between an in-use (protective) position, and an out-of-use (standby) position. The visor shall park in the two positions, requiring a deliberate action on the part of the wearer to enable movement from one position to the other. If the visor is able to park in intermediate positions, a warning shall be provided in the information supplied (see Clause 8) that the stated levels of protection are only provided when the visor is fully in the in-use position.

Movement of the visor shall not cause contact of the viewing surface with any part of the helmet. This requirement shall also be met during assessment of the resistance of the equipment to extremes of temperature (5.2.6 or 5.3.5 as appropriate).

No part of the visor shall come into contact with the face of the wearer (or any designated corrective eyewear), in any position.

Use and positioning of the visor shall be achievable using both left and right hands, singly. For visors for firefighting use (see 5.3), this action shall be achievable without difficulty while wearing gloves conforming to EN 659.

Test in accordance with 6.4.

5.2.12 Area of coverage

Visors shall meet one of the following requirements for area of coverage.

5.2.12.1 Face guard

In the in-use position, the face guard in conjunction with designated helmet(s) shall cover at least the facial region rectangle EFGH of the appropriate headform, defined in Figure 11 of EN 168:2001, when assessed in accordance with EN 168:2001, 10.2.

5.2.12.2 Eye guard

In the in-use position, the eye guard, in conjunction with designated helmet(s) shall cover at least the rectangle CDEF of the appropriate headform, defined in Figure 11 of EN 168:2001, when assessed in accordance with EN 168:2001, 10.2.

NOTE Eye guards will offer little or no protection to substantial areas of the face. They should only be used where an adequate risk assessment indicates that facial protection is not required.

5.2.13 Electrical properties

Where a designated helmet satisfies any of the mandatory or optional requirements of EN 443 for electrical properties, the visor shall satisfy the requirements of 5.8.1 and 5.8.3 of EN 443:1997, when tested according to 6.5.1 and 6.5.2 respectively.

Where the designated helmet does not satisfy such requirements, the visor assembly may optionally satisfy the requirements of 5.8.1 and 5.8.3 of EN 443:1997, when tested according to 6.5.1 and 6.5.2 respectively.

5.2.14 Protection against high speed particles

Before testing for resistance to high-speed particles, the visor/designated helmet assemblies shall be subjected to the relevant series of conditions as described in Clauses 5.2.6 or 5.3.5, and subsequently allowed to return to ambient temperature.

The visor in the in-use position, in conjunction with designated helmet(s) shall meet at least the requirements of 7.2.2 of EN 166:2001 for Medium Energy Impact (class B), together with:

a) on impact, no part of the visor shall come into contact with any part of the headform (or any designated corrective eyewear);

b) after impact, the raising / lowering mechanism of the visor shall operate normally.

5.2.15 Flammability

When tested using the method described in 6.6 of EN 443:1997 (but conditioned only by 6.2.2 of that document after cleaning 5 times in accordance with 5.2.4 above, and final application of any anti-fogging compound, if specified), materials shall not show:

a) any drip during the whole test;

b) visible flame or glowing combustion 5s after removal from the test flame.

The outside centre and the lower edge of the visor, and on any exposed components of the raising / lowering mechanism and means of fixing shall be tested on two samples.

NOTE This flammability requirement need not be assessed for visors intended for firefighters' use. More stringent flammability requirements and tests are specified for these at Clause 5.3.3 and 6.8 below.

5.2.16 Resistance to chemicals

Visor assemblies shall be tested against at least the chemicals listed in Table 2, according to the procedure at 6.10. Visor assemblies shall continue to satisfy the following requirements:

a) there shall be no visible damage to the assembly;

b) optical properties of the ocular shall continue to meet the requirements of 5.2.8;

c) 6.4.4 b), c) and f) shall be reported again, and 6.4.4 (g) shall be retested;

d) protection against high-speed particles according to 5.2.14 or 5.5.3 (without the prior conditioning according to 5.2.6 or 5.3.5) and 5.5.4, as appropriate.

e) flammability according to 5.2.15 or 5.3.3 as appropriate (without further conditioning)

Where testing is carried out using chemicals in addition to those listed in Table 2, details shall be included in the information supplied with the equipment.

Table 2 - List of chemicals for resistance testing of visor assemblies

Chemical	Concentration weight %
Sulphuric acid	30 (aqueous)
Sodium hydroxide	10 (aqueous)
p-Xylene	Undiluted
Butan-1-ol	Undiluted
n-Heptane	Undiluted

5.3 Additional requirements for firefighters' use

In addition to relevant requirements of 5.2, visors for firefighters' use shall meet the following requirements.

5.3.1 Radiant heat resistance

5.3.1.1 In-use position

One visor shall be exposed according to 6.6.1. No part of the visor shall melt, drip or ignite, nor come into contact with any part of the headform.

After the exposure, and allowing the visor to cool to ambient temperature for at least 60 minutes, it shall continue to satisfy the requirements for protection against high-speed particles according to 5.2.14 (optionally 5.5.3 and / or 5.5.4), and there shall be no distortion of vision (5.2.8 and 6.4.4).

5.3.1.2 Out of use position

One visor shall be exposed according 6.6.2.

No part of the visor shall ignite or come into contact with the test headform.

5.3.2 Radiant heat protection

The visor, supported on its carrier and in the in-use position, shall be tested according to 6.7. Information on the performance achieved shall be included in the information supplied by the manufacturer (8 s)).

NOTE For most visor materials, radiant heat protection varies significantly with the temperature of the heat source. Provision of this information is essential to allow the user to select the optimum protective equipment for their application.

5.3.3 Flammability

When tested according to 6.8, no part of the visor or means of fixing shall show:

a) any drip during the whole test;

b) visible flame or glowing combustion 5s after removal from the test flame.

5.3.4 Resistance to molten metals and hot solids

Visors and their means of fixing to the designated helmet(s) shall meet the requirements of e), f) and g) of 7.2.3 of EN 166:2001.

5.3.5 Extremes of temperature

The visor/helmet assembly shall show no apparent deformation when subjected to the series of thermal conditions given in Clause 6.9. At the end of each of the periods a) to e), the raising/lowering mechanism for the visor shall operate correctly in accordance with the manufacturer's instructions.

Visors shall match or exceed the extremes of temperature against which designated helmets have been tested for thermal shock.