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**Personal eye protection —
Mesh eye and face protectors**

прийнято як національний стандарт
методом підтвердження за позначенням

**ДСТУ EN 1731:2017
(EN 1731:2006, IDT)**

**Засоби індивідуального захисту очей.
Сітчасті засоби захисту очей та обличчя**

З наданням чинності від 2018-02-01

English Version

Personal eye protection - Mesh eye and face protectors

Protection individuelle de l'œil - Protecteurs de l'œil et du visage de type grillagé

Persönlicher Augenschutz - Augen- und Gesichtsschutzgeräte aus Gewebe

This European Standard was approved by CEN on 13 October 2006.

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.

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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 1731:2006) 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of an identical text or by endorsement, at the latest by May 2007, and conflicting national standards shall be withdrawn at the latest by May 2007.

This document supersedes EN 1731:1997.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Mesh eye and face protectors alone do not provide significant protection against radiation. For protection against infrared and/or ultraviolet radiation suitable additional or alternative oculars will be needed complying with EN 170:2002 and/or EN 171:2002 respectively.

1 Scope

This European Standard specifies materials, design, performance requirements, test methods and marking requirements for mesh eye and face protectors.

This standard is not applicable to eye and face protectors for use against liquid splash (including molten metal), hot solid risks, electrical hazards, infrared and ultra violet radiation.

Mesh eye and face protectors for use in sports such as ice hockey and fencing are excluded.

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 165:2005, *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 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin*

EN 12472, *Method for the simulation of wear and corrosion for the detection of nickel release from coated items*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 165:2005 apply.

4 Requirements

4.1 Materials

4.1.1 Resistance to corrosion

No metal parts of a mesh eye and face protector, including the mesh if made from metal, shall show a significant sign of corrosion when examined by a trained observer after having undergone the test for resistance to corrosion specified in 5.1.

4.1.2 Resistance to ignition

When tested according to 5.2 no part of a mesh eye and face protector shall ignite or continue to glow after removal of the heated rod.

4.1.3 Cleaning and disinfection

All parts of a mesh eye and face protector shall withstand cleaning and disinfection in accordance with the agents and procedures recommended by the manufacturer.

All the tests shall be carried out after subjecting the product to the cleaning and/or disinfection procedures recommended by the manufacturer.

4.1.4 Innocuousness of materials

Materials that come into contact with the wearer's skin shall not be known to be likely to cause irritation or any other adverse effect to health.

Testing shall be done in accordance with 5.7.

Those metal parts of mesh eye protectors and frames that come into direct and prolonged contact with the skin of the wearer shall have a nickel release of less than $0,5 \mu\text{g}/\text{cm}^2/\text{week}$ when tested according to EN 1811.

Coated items shall first be conditioned according to EN 12472.

4.1.5 Number of apertures in a mesh

The minimum number of apertures in the mesh shall be 15 per cm^2 .

Testing shall be done in accordance with 5.7.

4.2 Design and manufacture

4.2.1 General construction

Mesh eye and face protectors shall be free from projections, sharp edges or other defects which are likely to cause discomfort or injury to the wearer during use.

Testing shall be done in accordance with 5.7.

4.2.2 Headbands

Headbands used as the principal means of retention shall be at least 10 mm wide over any portion which may come into contact with the wearer's head, and shall be adjustable or self-adjusting.

Testing shall be done in accordance with 5.7.

4.2.3 Adjustability and/or replacement of components

Adjustable parts or components incorporated in mesh eye and face protectors shall be easily adjustable and where intended to shall be easily replaceable without the use of special tools.

Testing shall be done in accordance with 5.7.

4.2.4 Minimum area of coverage and field of vision of a mesh face screen

In the in-use position, the mesh face screen shall cover at least the facial region rectangle EFGH of the appropriate head form, defined in Figure 11 of EN 168:2001, when assessed in accordance with EN 168:2001, 10.2.

Field of vision requirements of EN 166:2001, 7.1.1 shall be met when the mesh face screen is tested according to EN 168:2001, Clause 18.

4.2.5 Minimum area of coverage and field of vision of a mesh eye protector

In the in-use position, the mesh eye protector shall cover at least the facial region rectangle ABCD of the appropriate head form, defined in Figure 11 of EN 168:2001, when assessed in accordance with EN 168:2001, 10.2.

Field of vision requirements shall be met when the mesh eye protector is tested according to EN 168:2001, Clause 18.

The minimum dimension of ocular area(s) shall be in accordance with 7.1.1 of EN 166:2001.

4.2.6 Comfort and retention in use

When subjected to the test procedure in 5.8, the mesh eye/face protector shall remain in its in-use position and shall not cause significant discomfort.

4.2.7 Contact with metal parts

When subjected to the test procedure in 5.8, metal parts of the mesh eye protector shall not come into direct contact with the head/face of the wearer.

4.3 Performance

4.3.1 Luminous transmittance

The luminous transmittance of the mesh ocular area shall be greater than 20,0 % when measured in accordance with 5.3.

4.3.2 Variations in luminous transmittance

The variations in luminous transmittance shall be in accordance with 7.1.2.2.3 of EN 166:2001.

4.3.3 Additional or alternative oculars

Additional or alternative oculars fitted to a mesh eye and face protector shall comply with 7.1 of EN 166:2001. The additional or alternative ocular shall meet or exceed the robustness or resistance to high speed particles requirements appropriate to the mesh eye protector to which it is fitted.

4.3.4 Robustness

The complete mesh eye and face protector shall be submitted to the impact of a steel ball striking the ocular area and the lateral protection at a specified speed. If the use of any cover and/or backing lens is recommended by the manufacturer the test shall be performed with a mesh face screen conforming to this recommendation.

Testing shall be done in accordance with 5.4.

The following defects shall not occur during testing:

a) Mesh fracture in the ocular area:

The mesh shall be considered to have fractured if the steel ball passes through the mesh or if at any point in the ocular area a gap or tear is produced which will allow a (300 ± 3) mm long and $(3,0 \pm 0,1)$ mm diameter steel rod with end faces which are flat and perpendicular to its longitudinal axis to pass through under its own weight in any orientation.

b) Ocular area deformation:

The mesh ocular area shall be considered to have been deformed when a mark appears on the white paper on the opposite side to that struck by the steel ball.

c) Failure of ocular housing, mesh face screen or frame:

An ocular housing or mesh face screen or frame shall be considered to have failed if it separates into two or more pieces, or if it is no longer capable of holding an ocular in position, or if an unbroken ocular detaches from the frame, or if the ball breaks through the housing, mesh face screen or frame.

4.4 Protection against high speed particles (optional)

The protector shall fulfil the requirements for protection against high speed particles in accordance with 7.2.2 of EN 166:2001. Defects noted at 4.3.4 a), b) and c) shall not occur.

A mesh face screen tested with an additional or alternative ocular shall be fitted with an ocular meeting the relevant high speed particle resistance requirements. If the use of any cover and/or backing lens is recommended by the manufacturer the test shall be performed with a mesh face screen conforming to this recommendation.

Testing shall be done in accordance with 5.5.

NOTE Eye-protectors offering protection against high-speed particles should provide lateral protection (see 7.2.8 of EN 166: 2001).

5 Test methods

5.1 Resistance to corrosion of metal parts

Testing shall be done in accordance with Clause 8 of EN 168:2001.

5.2 Resistance to ignition

Testing shall be done in accordance with Clause 7 of EN 168:2001.

5.3 Luminous transmittance

Testing shall be done in accordance with Clause 6 of EN 167:2001.

5.4 Robustness

Testing shall be done in accordance with 3.2 of EN 168:2001.

5.5 Protection against high speed particles (optional)

Testing shall be done in accordance with Clause 9 of EN 168:2001.

5.6 Allocation of test requirements and examination test schedule for mesh eye and face protectors

The allocation of test requirements and examination test schedule for mesh eye and face protectors shall be as given in Table 1.

5.7 Visual inspection

The visual inspection may entail a certain amount of dismantling in accordance with the manufacturer's instructions for maintenance. The visual inspection shall include the assessment of the device marking (if applicable) and information supplied by the manufacturer (if applicable) and any safety data sheets (if applicable) or declarations relevant to the materials used in its construction.

5.8 Test for comfort and security of fit

One device shall be adjusted appropriately and donned by two different test subjects. With the mesh eye/face protector in the in-use position, the following actions shall be undertaken, starting from a standing position.

- turn head fully left and right;
- tilt head fully back and forward;
- standing jump on the spot five times;
- bend forward at the hips to touch the toes, keeping the neck in line with the back. While bent over, turn the head from side to side;
- observe for direct contact between the wearer's head/face and any exposed metal components of the eye protector.

Note any significant discomfort or insecurity of the fit of the mesh eye/face protector.

Table 1 — Allocation of test requirements and examination test schedule for mesh eye and face protectors

Test order	Requirement	Test specimen Number											Allocation of test requirements	
		1	2	3	4	5	6	7	8	9	10	11	Mesh spectacles, goggles and face screens	Mesh eye protectors against high speed particles
1	Marking (see Clause 7)	X											Yes	Yes
2	Information supplied by the manufacturer (see Clause 8)	X											Yes	Yes
3	Cleaning and disinfection (see 4.1.3)	X	X	X	X	X	X	X	X	X	X	X	Yes	Yes
4	Number of apertures (see 4.1.5)	X											Yes	Yes
5	Design and manufacture (see 4.2)	X											Yes	Yes
6	Luminous transmittance (see 4.3.1)		X										Yes	Yes
7	Variations in luminous transmittance (see 4.3.2)			X									Yes	Yes
8	Robustness (see 4.3.4)				X	X	X	X					Yes	Yes
9	Protection against high speed particles (see 4.4)								X	X	X	X	No	Yes
10	Resistance to corrosion (see 4.1.1)		X										Yes	Yes
11	Resistance to ignition (see 4.1.2)			X									Yes	Yes
12	Comfort and retention in use (see 4.2.6)	X											Yes	Yes
13	Innocuousness of materials (see 4.1.4)	X											Yes	Yes

X Testing to be carried out on indicated specimen.

Empty field No testing specified.

NOTE 1 If testing requires the oculars to be mounted, then appropriate frames should be used.

NOTE 2 For testing, frames supplied without oculars fitted should, where necessary, be fitted with appropriate oculars.

NOTE 3 The sequence of tests 1 to 5 and 12 to 13 is not important and may be changed by the testing laboratory.

NOTE 4 Specimen on which the high speed particle test is to be conducted need not be subjected to the robustness test.

NOTE 5 Test evaluation should allow no defectives, and no account should be taken of measurement uncertainties.

6 Designation of the field of use of mesh eye and face protectors

The symbols given in Table 2 shall be used for the designation of the field of use of mesh eye and face protectors.

Table 2 — Symbols of the field of use of mesh eye and face protectors

Symbol	Field of use	Mechanical strength	Requirements in accordance with clause
S	basic use	robustness	4.3.4
F	high speed particles ^a	low energy impact	4.4
B		medium energy impact	4.4
A		high energy impact	4.4
^a If the symbols F, B and A are not common to both the mesh, the additional or alternative ocular and the frame then it is the lower level which shall be assigned to the complete mesh eye and face protector.			

EXAMPLE Designation of a mesh face screen for high speed particles and high energy impact (A):

Mesh face screen EN 1731:2005-A

7 Marking

In order to be able to identify and use a mesh eye and face protector as intended, it shall be permanently marked to indicate its possible field of use.

The marking shall be visible when the complete mesh eye and face protector is assembled and shall not encroach into the minimum visible aperture (ocular area) defined in 4.2.5 of this standard.

The number of this standard shall be applied to frames, housings and mesh oculars where separable. It shall not be applied to additional or alternative protective oculars.

The frame and ocular shall be marked separately. If the ocular and frame form a single unit, the complete marking shall be applied to the frame.

For examples of typical marking refer to 9.2 of EN 166:2001.

The marking of mesh eye and face protectors shall contain the following information:

- a) identification of the manufacturer;
- b) number of this standard;
- c) symbol of mechanical strength according to Table 2 of this standard.

Marking of mesh visors or additional or alternative oculars shall be in accordance with 9.2 of EN 166:2001.

8 Information supplied by the manufacturer

The manufacturer shall provide with each mesh eye and face protector at least the following information at least in the official language(s) of the country of destination:

- a) name and address of manufacturer;
- b) the number and year of this standard;
- c) mesh eye and face protector model identification;
- d) instructions for storage, use and maintenance;
- e) specific instructions for cleaning and disinfection;
- f) recommendations for fields of use, protection capabilities and performance characteristics;
- g) the obsolescence deadline or period of obsolescence, if applicable for the complete mesh eye and face protector and/or component parts;
- h) details of suitable accessories and spare parts with instructions for fitting;
- i) for mesh face screens with additional or alternative protective ocular(s) a recommendation for the specific ocular for specific applications;
- j) the meaning of the different marking on the specific mesh eye and face protector;
- k) a warning that the mesh eye and face protector does not protect against liquid splash (including molten metal), hot solids, electrical hazards, infrared and ultra violet radiation;
- l) a warning, in case that the markings on the components of the eye and face protector do not correspond (see footnote of Table 2);
- m) a warning that the mesh oculars and visors marked S should not be used when there is a foreseeable risk of any hard or sharp flying particles.

It is recommended to add additionally information on instructions on the management of packaging waste, and instructions on the proper separation of all components and its further management as waste after the product end-of-life.

Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC Personal Protective Equipment

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 89/686/EEC Personal Protective Equipment.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA — Correspondence between this European Standard and Directive 89/686/EEC Personal Protective Equipment

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/Notes
4.1.1	1.3.2 Lightness and design strength	
4.1.2	1.2.1 Absence of risk and other 'inherent' nuisance factors	
4.1.3	1.4. Information supplied by the manufacturer	
4.1.4	1.2.1.1 Suitable constituent materials	
4.1.5	1.2.1 Absence of risk and other 'inherent' nuisance factors	
4.2.1	1.2.1.2 Satisfactory surface condition of all PPE parts in contact with the user	
4.2.2	1.3.1 Adaptation of PPE to user morphology	
4.2.3	2.9 PPE incorporating components which can be adjusted or removed by the user	
4.2.4	1.2.1 Absence of risk and other 'inherent' nuisance factors	
4.2.4	2.3 PPE for the face, eyes and respiratory tracts	
4.2.5	1.2.1 Absence of risk and other 'inherent' nuisance factors	

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/Notes
4.2.5	2.3 PPE for the face, eyes and respiratory tracts	
4.2.6	1.1.1 Ergonomics	
4.2.6	1.1.2.1. Highest level of protection possible	
4.2.6	1.2.1.3. Maximum permissible user impediment	
4.2.6	2.1. PPE incorporating adjustment systems	
4.2.7	1.2.1.1 Suitable constituent materials	
4.3.1	2.3 PPE for the face, eyes and respiratory tracts	
4.3.2	1.2.1 Absence of risk and other 'inherent' nuisance factors	
4.3.3	3.1.1 Impact caused by falling or projecting objects and collision of parts of the body with an obstacle	
4.3.4	1.3.2 Lightness and design strength	
4.3.4	3.1.1 Impact caused by falling or projecting objects and collision of parts of the body with an obstacle	
4.4	1.1.2.2. Classes of protection appropriate to different levels of risk	
4.4	3.1.1 Impact caused by falling or projecting objects and collision of parts of the body with an obstacle	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

- [1] EN 169:2002, *Personal eye-protection - Filters for welding and related techniques - Transmittance requirements and recommended use.*
- [2] EN 170:2002, *Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use.*
- [3] EN 171:2002, *Personal eye-protection - Infrared filters - Transmittance requirements and recommended use.*