
**Eye and face protection for
occupational use —**

**Part 3:
Additional requirements for mesh
protectors**

Protection des yeux et du visage à usage professionnel —

*Partie 3: Exigences complémentaires relatives aux protecteurs
grillagés*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 94, *Personal safety — Personal protective equipment*, Subcommittee SC 6, *Eye and face protection*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 85, *Eye protective equipment*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 16321 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The family of documents comprised of the ISO 16321 series, the ISO 18526 series and the ISO 18527 series was developed in response to the worldwide stakeholders' demand for minimum requirements and test methods for eye and face protectors traded internationally. ISO 4007 gives the terms and definitions for all the various product types. The test methods are given in the ISO 18526 series, while the requirements for occupational eye and face protectors are given in the ISO 16321 series. Eye protectors for specific sports are mostly dealt with by the ISO 18527 series. A guidance document, ISO 19734, for the selection, use and maintenance of eye and face protectors is under preparation.

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Eye and face protection for occupational use —

Part 3: Additional requirements for mesh protectors

1 Scope

This document specifies additional performance and marking requirements for mesh protectors designed to provide protection for the eyes and faces of persons against mechanical hazards such as impacts from flying particles and fragments. The other applicable requirements for mesh protectors and the frames/mountings to which they are intended to be fitted are given in ISO 16321-1.

This document also applies to mesh protectors used in educational establishments.

This document also applies to those eye and face protectors used for occupational-type tasks that are performed similarly to an occupation, e.g. "do-it-yourself".

This document is not applicable to protectors for use against liquid splash (including molten metal), hot solid risks, infrared and ultraviolet radiation. For protection against these hazards suitable additional or alternative protectors according ISO 16321-1 will be needed.

This document does not apply to mesh protectors used in sports such as fencing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 4007, *Personal protective equipment — Eye and face protection — Vocabulary*

ISO 16321-1:2021, *Eye and face protection for occupational use — Part 1: General requirements*

ISO 18526-2:2020, *Eye and face protection — Test methods — Part 2: Physical optical properties*

ISO 18526-3:2020, *Eye and face protection — Test methods — Part 3: Physical and mechanical properties*

ISO 18526-4, *Eye and face protection — Test methods — Part 4: Headforms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4007 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Requirements

4.1 General

Only those requirements that are different from or supplement the ISO 16321-1 specifications are given in this document.

The following requirements from ISO 16321-1:2021 shall be met:

- 4.2 to 4.6: General requirements for protectors;
- 5.1: Field of view;
- 7.1: Area to be protected;
- 7.2: Headbands and harnesses;
- 7.4: Basic Impact Level of complete protectors;
- 7.5: Resistance to thermal exposure;
- 7.7: Resistance to corrosion, where applicable;
- 7.8: Resistance to ignition;
- 7.9: Penetration of vents and gaps, where applicable;
- 7.10: High-speed impact resistance, Impact Level C, D, E, optional;
- 7.11: High mass impact, Impact Level HM, optional.

The additional requirements given in this document shall be met.

Mesh protectors¹⁾ described in this document are intended for use at normal ambient temperatures (23 ± 5) °C. In order to ensure that critical aspects of protection are not compromised due to temperatures towards the extremes of the normal range of occupational environments (from -5 °C to $+55$ °C), physical and mechanical requirements at the extremes of temperature are included (sometimes optionally) in this document. These physical and mechanical requirements can also be provided by manufacturers for validation of claims for protection at temperatures below -5 °C and/or above $+55$ °C.

4.2 Luminous transmittance of mesh protectors

The luminous transmittance of mesh providing all areas in the field of view shall be greater than 20,0 % when measured in accordance with ISO 18526-2:2020, Clause 7.

NOTE The light source for this calculation is not specified since all will give the same result.

4.3 Number of apertures in mesh protectors

The minimum number of apertures in the mesh shall be 15 per cm^2 for mesh face shields and mesh goggles and 50 per cm^2 for spectacles when tested in accordance with ISO 18526-3:2020, 11.1.

4.4 Contact with metal parts of mesh protectors

Metal parts of the mesh protector shall not come into direct contact with the head/face of the wearer, when tested in accordance with ISO 18526-3:2020, 11.2.

1) For the purposes of this document, “mesh protector” is used as a synonym for mesh visors and frames/mountings to which they are intended to be fitted.

4.5 Reflection from mesh protectors

The luminous reflectance, ρ_v , of the mesh surface on the eye side of the mesh protector shall not exceed 10 %, when tested in accordance ISO 18256-2:2020, 13.3.

4.6 Additional or alternative lenses

Additional or alternative lenses fitted to a mesh protector shall comply with ISO 16321-1. The additional or alternative lens shall meet or exceed the Impact Level requirements appropriate to the mesh protector to which it is fitted.

5 Marking of mesh protectors

5.1 General

When checked according to ISO 18526-3:2020, Clause 8, all markings should be clear and sufficiently durable to remain legible throughout the intended lifetime of the mesh protector.

The marking shall be fully visible when the complete mesh protector is assembled. The marking shall not encroach into the minimum field of view. If the mesh and frame front form a single unit, the complete marking shall be applied to the frame front or to the mesh.

For mesh protectors that claim compliance with this document, the marking shall show only those aspects from those listed in ISO 16321-1:2021, Table 18, that have been proved by testing.

5.2 Mandatory markings on mesh

For mesh, the sequence of markings shall be:

- a) number of this document (i.e. 16321);
- b) manufacturer's identifying mark or manufacturer's trade mark;
- c) impact level.

NOTE Specific national or regional regulations with regard to marking could be observed.

5.3 Mandatory markings on frames

For frames, the sequence of markings shall be:

- a) number of this document (i.e. 16321);
- b) manufacturer's identifying mark or manufacturer's trade mark;
- c) impact level;
- d) applicable head size.

If the manufacturer wishes to indicate the size of the various headform(s) (according to ISO 18526-4) that the protector will fit, the following symbols shall be added to the product marking:

- a single size is given by its respective symbol: 1-C12, 1-S, 1-M, 1-L, or 2-S, 2-M, 2-L;
- multiple sizes are given by the symbol of the smallest and the largest sizes respectively, divided by a slash e.g. 1-M/1-L.

NOTE Specific national or regional regulations with regard to marking could be observed.

5.4 Optional markings on mesh

For mesh, where applicable and tested, the sequence of additional possible markings is:

- a) model identification;
- b) extremes of temperature for mechanical tests.

NOTE Specific national or regional regulations with regard to marking might make these optional markings mandatory.

5.5 Optional markings on frames

For frames, where applicable and tested, the sequence of additional possible markings is:

- a) model identification;
- b) extremes of temperature for mechanical tests.

NOTE Specific national or regional regulations with regard to marking might make these optional markings mandatory.

5.6 Example of markings

16321 XX C					
16321	XX	C			
document number	manufacturer's identification	Impact level C			

6 Information to be supplied by the manufacturer

The manufacturer shall provide with each mesh protector at least the following printed information which is to be assessed in accordance with ISO 18526-3:2020, Clause 9:

NOTE Specific national or regional regulations with regard to information to be supplied by the manufacturer might have additional and/or different mandatory requirements. For example, different wording of the warning statements but with the same intent may be permissible.

- a) name and address of the manufacturer;
- b) number of this document (i.e. ISO 16321-3:2021);
- c) model identification of the mesh protector;
- d) instructions for storage, use and maintenance;
- e) specific instructions for cleaning and/or disinfection;
- f) details of the field of use, ambient range of intended use, protection capabilities and performance characteristics;
- g) applicable headforms according to ISO 18526-4, e.g. "This protector is appropriate for the headform 1-S." This information shall be in the form of either markings on the frame, see 5.3, or separate information on labels, packaging, hang tags, etc., that accompanies the mesh protector at the point of sale.
- h) any specific warnings called up in this document;
- i) details of any aspects of performance that have been assessed at extreme temperatures and the corresponding temperature limits;

- j) details of suitable accessories and spare parts; instructions for fitting shall be included with the original mesh protector/ or with the spare part or accessory;
- k) explanation of the meaning of the marking on the mesh protector according to [Clause 5](#);
- l) how to recognize when the mesh protector shall be repaired or replaced.

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