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

**Part 1:
General requirements**

Protection des yeux et du visage à usage professionnel —

Partie 1: Exigences générales

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 16321-1:2021

<https://standards.iteh.ai/catalog/standards/iso/9c22e3b5-dcf1-4f85-9d0f-3fdf3886008f/iso-16321-1-2021>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 16321-1:2021

<https://standards.iteh.ai/catalog/standards/iso/9c22e3b5-dcf1-4f85-9d0f-3fdf3886008f/iso-16321-1-2021>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 General requirements for protectors	2
4.1 Ambient temperatures	2
4.2 Physiological compatibility	2
4.3 Construction and adjustment	3
4.4 Cleaning and/or disinfection	3
4.5 Headform(s)	3
4.6 Mandatory and optional requirements	3
5 Geometrical optical requirements for protectors	4
5.1 Field of view	4
5.2 Refractive power and prismatic power for plano lenses	4
5.2.1 Spherical and cylindrical power	4
5.2.2 Spatial deviation	4
5.2.3 Prismatic power for unmounted plano lenses covering one eye	5
5.2.4 Prism imbalance of complete eye protectors or plano lenses covering both eyes	5
5.3 Mounted prescription lenses	5
5.3.1 Optical	5
5.3.2 Positioning	5
5.4 Single-vision ready-to-wear near-vision lenses (lenses with positive spherical power)	5
5.5 Enhanced optical performance (optional requirement)	5
6 Physical optical requirements for protectors	6
6.1 Detection of signal lights	6
6.2 Luminous transmittance of lenses without deliberate filter action	6
6.3 Specific requirements for different types of filter	6
6.3.1 Ultraviolet protective filters	6
6.3.2 Infrared protective filters	7
6.3.3 Sunglare filters for occupational use	9
6.3.4 Filters for use in glass blowing	11
6.4 Uniformity of luminous transmittance and transmittance matching	12
6.5 Scattered light	12
6.6 Frame transmittance	12
6.7 Anti-reflective coated lenses (optional requirement)	13
7 Physical and mechanical requirements for protectors	13
7.1 Area to be protected	13
7.1.1 General	13
7.1.2 Area to be protected by eye protectors	18
7.1.3 Area to be protected by face protectors	18
7.1.4 Lateral protection	18
7.2 Headbands and harnesses	18
7.3 Quality of material and surface of mounted and unmounted lenses, visors and filters	18
7.4 Basic impact level of complete protectors	19
7.4.1 Complete protectors	19
7.4.2 Failure criteria	19
7.4.3 Protectors with inserts to carry prescription lenses	20
7.5 Resistance to thermal exposure	20
7.6 Resistance to UV radiation	20
7.7 Resistance to corrosion	21
7.8 Resistance to ignition	21

7.9	Penetration of vents and gaps.....	21
7.10	High-speed impact resistance, impact level C, D, E (optional requirement)	21
7.10.1	Protection at normal ambient temperatures	21
7.10.2	Protection at extremes of temperature.....	22
7.11	High mass impact, impact level HM (optional requirement).....	23
7.11.1	Protection at normal ambient temperatures	23
7.11.2	Protection at extremes of temperature.....	23
7.12	Resistance to surface damage due to flying fine particles (optional requirement).....	24
7.13	Resistance to fogging of lenses or filters (optional requirement)	24
7.14	Protection against molten metals and hot solids (optional requirement).....	24
7.15	Protection against droplets (optional requirement).....	24
7.16	Protection against streams of liquids (Optional requirement).....	25
7.17	Protection against large dust particles (optional requirement)	25
7.18	Protection against gases and fine dust (optional requirement).....	25
7.19	Protection against radiant heat (optional requirement).....	25
7.20	Chemical resistance (optional requirement)	25
7.21	Use in explosive atmospheres (optional requirement)	26
8	Marking of protectors	26
8.1	General.....	26
8.2	Mandatory markings on lenses/filters.....	27
8.3	Mandatory markings on frames.....	27
8.4	Optional markings on lenses/filters.....	28
8.5	Optional markings on frames.....	28
8.6	Examples of markings.....	29
9	Information to be supplied by the manufacturer.....	29
10	Allocation of requirements, test samples and application.....	30
10.1	General test samples	30
10.2	Test samples for prescription lenses for eye protectors.....	37
10.2.1	Single-vision lenses.....	37
10.2.2	Multifocal lenses.....	38
10.2.3	Power-variation lenses.....	38
10.2.4	Information to be provided by the frame manufacturer.....	38
Annex A (informative) Summary of mechanical impact levels in eye and face protection for sunglass, occupational and sports use.....		39
Bibliography		40

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 of the voluntary nature of standards, 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 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).

This document cancels and replaces ISO 4849:1981, ISO 4851:1979, ISO 4852:1978 and ISO 4856:1982.

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.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[ISO 16321-1:2021](https://standards.itih.ai/catalog/standards/iso/9c22e3b5-dcf1-4f85-9d0f-3fdf3886008f/iso-16321-1-2021)

<https://standards.itih.ai/catalog/standards/iso/9c22e3b5-dcf1-4f85-9d0f-3fdf3886008f/iso-16321-1-2021>