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

**Part 2:
Requirements for eye protectors
for squash and eye protectors for
racquetball and squash 57**

Protection des yeux et du visage à usage sportif —

*Partie 2: Exigences relatives aux protecteurs de l'œil pour le squash et
aux protecteurs de l'œil pour le racquetball et le squash 57*



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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 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 Technical Committee 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 of ISO 18527 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

This 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 protection 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 sports use —

Part 2:

Requirements for eye protectors for squash and eye protectors for racquetball and squash 57

1 Scope

This document applies to all eye protectors intended for eye protection against hazards during playing or instructing in the sports of squash, racquetball and squash 57 and sports with similar hazards and no greater risks. It applies to eye protectors that incorporate prescription lenses but has no specific tests for eye protectors designed for use over spectacles.

It specifies requirements and testing for materials, performance, marking of eye protectors and information to be supplied by the manufacturer.

Information on the selection and use of eye protectors for squash, racquetball and squash 57 is given in [Annex A](#).

This document does not apply to

- a) sports eye protectors designed for use over prescription spectacles,
- b) eye protectors for other occupational applications,
- c) eye protectors without lenses,
- d) eye protectors for sports where the hazards are unrelated to the hazards in or involve greater risks than squash, racquetball and squash 57, and
- e) eye protectors with gradient-tinted lenses because they are not appropriate for squash, racquetball or squash 57.

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 8980-5, *Ophthalmic optics — Uncut finished spectacle lenses — Part 5: Minimum requirements for spectacle lens surfaces claimed to be abrasion-resistant*

ISO 11664-2, *Colorimetry — Part 2: CIE standard illuminants*

ISO 18526-1:2020, *Eye and face protection — Test methods — Part 1: Geometrical optical properties*

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*

ISO 21987, *Ophthalmic optics — Mounted spectacle lenses*

3 Terms and definitions

For the purposes of this document, the terms and the 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 General requirements for eye protectors¹⁾

4.1 Physiological compatibility

Eye protectors shall be designed and manufactured in such a way that, when used under the conditions and for the purposes intended, they will not compromise the health or safety of the wearer. The risks posed by substances leaking or evaporating from the eye protector that can come into prolonged contact with the wearer, shall be reduced by the manufacturer to within the limits of any applicable regulatory requirement.

Special attention shall be given to substances that are allergenic, carcinogenic, mutagenic or toxic to reproduction.

NOTE 1 Excessive pressure due to a poor fit on the head, chemical irritation or allergy are known to produce reactions. Rare or idiosyncratic reactions to any material are known to occur and the individual wearer is well advised to avoid those types of frame materials.

Substances recommended for cleaning, maintenance or disinfection shall be known to be unlikely to have any adverse effect upon the wearer, when applied in accordance with the instructions given in the information to be supplied by the manufacturer.

Manufacturers/suppliers shall perform an appropriate risk analysis on potentially harmful substances contained in the eye protector such that, when the protector is used under the conditions and for the purposes intended, the health (and safety) of the wearer shall not be compromised.

The following are examples of documents that represent the appropriate information:

- a) specification of the material(s);
- b) safety data sheets relating to the materials;
- c) information relating to the suitability of the materials for use with food, in medical devices, or other relevant applications;
- d) information relating to toxicological, allergenic, carcinogenic, toxic to reproduction, or mutagenic investigations on the materials.

NOTE 2 Specific national regulations with regard to the restriction of certain chemical substances need to be observed, for example release of nickel.

4.2 Construction and adjustment

Areas of the eye protectors that may, during intended use, come into contact with the wearer or other players on the court shall be smooth, without sharp protuberances that may cause discomfort or injury to the wearer or other players on the court.

1) For the purposes of this document, “eye protector” is used to mean eye protectors for squash, racquetball and squash 57.

Any part of the eye protectors that can be adjusted or removed by the wearer for the purpose of replacement (in accordance with the instructions given in the information to be supplied by the manufacturer) shall facilitate adjustment, removal and attachment without the use of tools.

Any adjustment system incorporated in the eye protectors shall maintain the intended fit for the foreseeable conditions of use.

The test shall be carried out by physical inspection according to ISO 18526-3:2020, 6.1.

4.3 Cleaning and/or disinfection

The eye protector shall be cleaned only once according to the cleaning and/or disinfection procedures in the information to be supplied by the manufacturer before being subjected to testing.

4.4 Lens material and surface quality

In a circular area $30^{+0,5}_{-0}$ mm diameter centred on the reference point(s) but excluding a marginal area $5^{+0}_{-0,5}$ mm wide around the edge of the lens if this overlaps with the circular area, lenses shall be free from defects likely to impair vision in use (such as bubbles, scratches, inclusions, dull spots, pitting, mould marks, scouring, grains, pocking, scaling and undulation) when examined according to ISO 18526-3:2020, 6.6.

4.5 Headform(s)

Unless the manufacturer specifies the headform(s) according to ISO 18526-4 that is/are compatible with the eye protector, the test methods where (a) headform(s) is/are required shall use the headform 1-M according to ISO 18526-4 as the default.

4.6 Retention by headband and harnesses (sit and fit)

Eye protectors shall sit in the intended position during normal use and shall adapt to the contours of the face. The surfaces in contact with the face shall be made of soft flexible material. Any headband shall be designed to be flexible or adjustable and sit securely on the back of the head. Any headband assembly shall not cause any discomfort nor exhibit any insecurity when tested in accordance with ISO 18526-3:2020, 6.5.

4.7 Mandatory and optional requirements

In this document both optional and mandatory requirements are described. Depending on the intended use and/or the manufacturer's claimed specification, some requirements marked as optional become mandatory.

5 Transmittance of the lenses

5.1 General

Transmittance values shall be determined in accordance with ISO 18526-2:2020, Clauses 6 to 11 as appropriate. Luminous transmittance shall be calculated using CIE standard illuminant D65 in accordance with ISO 11664-2 (see also ISO 4007:2018, 3.10.1.32).

5.2 Transmittance categories

Depending upon the mean luminous transmittance, $\tau_{v,D65}$, at their reference points and at $(23 \pm 1)^\circ\text{C}$ in the case of temperature sensitive transmittance, lenses for squash, racquetball and squash 57 use shall be attributed to one of the five tint categories in [Table 1](#).

The ranges of the luminous transmittance, $\tau_{v,D65}$, of these five categories are given by the values in Table 1. An overlap of the transmittance values shall be not more than ± 2 % absolute between the categories 0, 1, 2 and 3. There is no overlap in transmittance values between categories 3 and 4.

If the manufacturer and/or supplier declares a luminous transmittance value, the maximum deviation for this value shall be ± 3 % absolute for the transmittance values falling in categories 0 to 3 and ± 30 % relative to the stated value for the transmittance values falling in category 4.

When describing the transmittance properties of lenses with changeable tint, e.g. photochromic, two categories for luminous transmittance values are generally used. These two values correspond to the highest and lowest luminous transmittance state of the lens.

5.3 Solar ultraviolet transmittance

When tested within a 10 mm radius circle centred on the reference point according to ISO 18526-2:2020, Clause 8, the solar UV-A, $\tau_{SUV A}$, solar UV-B, $\tau_{SUV B}$, and mean spectral (380 to 400) nm, $\tau_{m380-400}$, transmittances shall conform with the requirements in Table 1, based on the mean luminous transmittance, $\tau_{v,D65}$, at the reference points of the lens(es).

Table 1 — Transmittance requirements for the lenses of squash, racquetball and squash 57 eye protectors

Tint category	Wavelength range from 280 nm to 400 nm			Visible spectral range
	Maximum solar UV-B transmittance τ_{SUVB} $280\text{ nm} \leq \lambda \leq 315\text{ nm}$ (%)	Maximum solar UV-A transmittance $\tau_{SUV A,380}$ $315\text{ nm} \leq \lambda \leq 380\text{ nm}$ (%)	Maximum mean 380 nm to 400 nm spectral transmittance $\tau_{m380-400}$ $380\text{ nm} \leq \lambda \leq 400\text{ nm}$ (%)	Luminous transmittance $\tau_{v,D65}$ $380\text{ nm} \leq \lambda \leq 780\text{ nm}$ (%)
S0, R0 or SR0	0,03 $\tau_{v,D65}$	0,30 $\tau_{v,D65}$	0,75 $\tau_{v,D65}$	$\tau_{v,D65} > 80$
S1, R1 or SR1				$43 < \tau_{v,D65} \leq 80$
S2, R2 or SR2			0,50 $\tau_{v,D65}$	$18 < \tau_{v,D65} \leq 43$
S3, R3 or SR3		$8 < \tau_{v,D65} \leq 18$		
S4, R4 or SR4		0,15 $\tau_{v,D65}$	0,5 % absolute or 0,15 $\tau_{v,D65}$ whichever is greater	$3 < \tau_{v,D65} \leq 8$
NOTE 1 Some national requirements can stipulate a different requirement for the long wavelength limit of UV-A.				
NOTE 2 The code letter "S" applies to protectors designed for squash, "R" for racquetball and squash 57, "SR" for both.				

5.4 General transmittance requirements

5.4.1 Uniformity of luminous transmittance and transmittance matching

Lenses shall appear to be visually uniform within circles $30_{-0}^{+0,5}$ mm diameter centred on the reference points or to the edge of the lens less the marginal zone $5_{-0}^{+0,5}$ mm wide (whichever is greater), and appear to have the same transmittance at the two reference points when inspected against a white background in accordance with ISO 18526-3:2020, 6.6. Where there is visible non-uniformity, then, when tested according to ISO 18526-2:2020, 7.4, the relative difference in the luminous transmittance values between any two points of the lens within these areas shall not be greater than 15 % (relative to the higher value), except for tint category S4, R4 or SR4 where it shall not be greater than 20 %.

Where there are visibly mismatched transmittances at the reference points, when measured in accordance with ISO 18526-2:2020, 7.5, the difference in luminous transmittance values at the reference points for the right and left eyes shall not exceed 15 % (relative to the higher transmittance).

5.4.2 Variations due to thickness variations

Changes of luminous transmittance that are caused by thickness variations due to the design of the lens are permitted. For verification, the test method in ISO 18526-2:2020, 7.4.1.4 shall be used.

5.5 Special transmittance requirements

5.5.1 Photochromic lenses

The tint categories of photochromic lenses shall be determined by the luminous transmittance in the faded state, $\tau_{v,0}$, and the luminous transmittance in the darkened state, $\tau_{v,1}$, measured according to ISO 18526-2:2020, Clause 16, at a temperature of $(23 \pm 1)^\circ\text{C}$. In both states, the requirements specified in 5.2 and 5.3 shall be met. The photochromic response $PR = \tau_{v,0}/\tau_{v,1}$ shall be $\geq 1,25$.

5.5.2 Polarizing lenses

5.5.2.1 Plane of transmission

If the lenses in the eye protector are claimed to be polarizing, the lenses shall be fitted in the frame so that their planes of transmission, when tested according to ISO 18526-2:2020, 15.1, shall not deviate from the vertical by more than $\pm 5^\circ$. When the eye protector is fitted with two separate lenses, any misalignment between the planes of transmission of the left and right lenses shall not be greater than 6° .

5.5.2.2 Polarizing efficiency

When tested according to ISO 18526-2:2020, 15.2, the polarizing efficiency, P , shall be $\geq 78\%$ for tint categories 2, 3, 4 and $\geq 60\%$ for tint category 1.

NOTE 1 These values are equivalent to ratios of the luminous transmittance values parallel and perpendicular to the plane of transmission of approximately 8:1 and 4:1 respectively.

NOTE 2 Lenses of tint category 0 do not have any useful polarizing effect.

5.5.3 Gradient-tinted lenses

No provision is made for gradient-tinted lenses because they are not appropriate for squash, racquetball and squash 57.

5.6 Claimed transmittance and reflectance properties (optional requirements)

5.6.1 General

In the case where specific transmittance values are claimed, these claims shall be according to 5.6.2 and 5.6.3. These requirements shall apply within a 10 mm radius circle centred on the reference point.

5.6.2 Solar blue-light absorption/transmittance

- a) **Solar blue-light absorption** – In the case where it is claimed that a lens has $x\%$ solar blue-light absorption, the solar blue-light transmittance, τ_{SB} , of the lens, measured according to ISO 18526-2:2020, 9.1 shall not exceed $(100,5 - x)\%$.

- b) **Solar blue-light transmittance** – In the case where it is claimed that a lens has less than x % solar blue-light transmittance, the solar blue-light transmittance, τ_{SB} , of the lens, measured according to ISO 18526-2:2020, 9.1 shall not exceed $(x + 0,5)$ %.

For the calculation of the solar blue-light transmittance, the values of ISO 18526-2:2020, Table D.1 shall be used.

5.6.3 Solar UV absorption/transmittance

Requirements for the maximum transmittance of lenses in the UV-A and UV-B shall be as given in [Table 1](#) as appropriate. In cases where it is claimed that a lens provides a certain percentage of UV absorption or UV transmittance that is better than the requirement in [Table 1](#), the corresponding requirements shall apply.

For the calculation of the values of UV absorption/transmittance the values of ISO 18526-2:2020, Table D.1 shall be used.

- a) **Solar UV absorption** – In the case where it is claimed that a lens has x % solar UV absorption, the solar UV transmittance of the lens, $\tau_{\text{SUV},380}$, measured according to ISO 18526-2:2020, 8.3 shall not exceed $(100,5 - x)$ %.
- b) **Solar UV transmittance** – In the case where it is claimed that a lens has less than x % solar UV transmittance, the solar UV transmittance of the lens, $\tau_{\text{SUV},380}$, measured according to ISO 18526-2:2020, 8.3 shall not exceed $(x + 0,5)$ %.
- c) **Solar UV-A absorption** – In the case where it is claimed that a lens has x % solar UV-A absorption, the solar UV-A transmittance of the lens, $\tau_{\text{SUVA},380}$, measured according to ISO 18526-2:2020, 8.4 shall not exceed $(100,5 - x)$ %.
- d) **Solar UV-A transmittance** – In the case where it is claimed that a lens has less than x % solar UV-A transmittance, the solar UV-A transmittance of the lens, $\tau_{\text{SUVA},380}$, measured according to ISO 18526-2:2020, 8.4 shall not exceed $(x + 0,5)$ %.
- e) **Solar UV-B absorption** – In the case where it is claimed that a lens has x % solar UV-B absorption, the solar UV-B transmittance of the lens, τ_{SUVB} , measured according to ISO 18526-2:2020, 8.5 shall not exceed $(100,5 - x)$ %.
- f) **Solar UV-B transmittance** – In the case where it is claimed that a lens has less than x % UV-B transmittance, the solar UV-B transmittance of the lens, τ_{SUVB} , measured according to ISO 18526-2:2020, 8.5 shall not exceed $(x + 0,5)$ %.

5.6.4 Anti-reflective coated lenses

In the case where lenses are claimed to have an anti-reflective coating, the luminous reflectance, ρ_v , of the lens, measured from the eye-side according to ISO 18526-2:2020, Clause 13 with the specular-included geometry specified in ISO 18526-2:2020, 12.2.2 and using CIE standard illuminant D65 according to ISO 11664-2, shall be less than 2,5 %.

NOTE This optional claim is applicable to lenses with an anti-reflective coating on the back surface.

5.6.5 Reduced reflection coated lenses

In the case where lenses are claimed to have reduced reflections, the luminous reflectance, ρ_v , of the lens measured from the eye-side according to ISO 18526-2:2020, Clause 13 with the specular-included geometry specified in ISO 18526-2:2020, Clause 12.2.2 and using CIE standard illuminant D65 according to ISO 11664-2, shall be less than 8,0 %.

NOTE This optional claim is applicable to tint category 1 or 2 lenses having a mirror coating on the front surface and an anti-reflective coating on the back surface to reduce the increased inter-reflections due to the mirror coated front surface.

6 Scattered light

When tested in accordance with ISO 18526-2:2020, 14.1, the wide angle scattered light of the lenses measured at the reference points shall not exceed the value of 3 %.

7 Refractive power

7.1 Non-prescription eye protectors

The complete eye protector shall be tested in the as-worn position in accordance with ISO 18526-1:2020, 6.1.

The interpupillary distance shall be appropriate to the headform(s) identified in 4.5. Alternatively, a different interpupillary distance may be used if specified by the manufacturer.

7.1.1 Spherical and cylindrical power

The spherical power and cylindrical power at the left and right lens reference points shall not exceed the tolerances given in Table 2, where F_1 and F_2 are the two principal meridional powers.

Table 2 — Spherical and cylindrical power

Spherical power	Cylindrical power	Difference in power
Mean value of the focal powers (F_1 , F_2) in the two principal meridians.	Absolute difference between the focal powers (F_1 , F_2) in the two principal meridians.	The maximum difference between the measured spherical powers of the right and left lenses
$(F_1 + F_2)/2$ dioptries (D)	$ F_1 - F_2 $ dioptries (D)	$ F_R - F_L $ dioptries (D)
$\pm 0,12$	$\leq 0,12$	$\leq 0,18$

7.1.2 Spatial deviation

If during the measurements according to ISO 18526-1:2020, 6.1, a doubling or other aberration of the image is observed, then the lens shall be further assessed according to ISO 18526-1:2020, 6.3.

The lens shall be free from irregular distortions likely to impair vision.

7.1.3 Prism imbalance

The complete eye protector shall be tested in the as-worn position according to the test method described in ISO 18526-1:2020, 6.2.

The prism imbalance shall not exceed the values in Table 3.

Table 3 — Prism imbalance

Horizontal		Vertical
Base out prism dioptries (Δ)	Base in prism dioptries (Δ)	prism dioptries (Δ)
1,00	0,25	0,25

7.2 Prescription eye protectors

Prescription eye protectors shall conform to the refractive power, prism imbalance and positioning requirements of ISO 21987.

8 Mechanical strength

8.1 Mechanical strength of squash eye protectors

Squash eye protectors shall be tested with a yellow dot squash ball with the following specifications:

Diameter		(40,0 ± 0,5) mm
Mass		(24,0 ± 1,0) g
Stiffness at 23 °C		(3,2 ± 0,4) N/mm
Seam strength		minimum 6,0 N/mm
Rebound resilience - from 254 cm	at (23 ± 3) °C	minimum 15 %
	at (45 ± 3) °C	30 % – 35 %

NOTE These specifications are consistent with the competition ball specified by the World Squash Federation^[2].

The ball is projected at (40 ± 2) m/s as specified in ISO 18526-3:2020, 7.3.2.

8.2 Mechanical strength of racquetball and squash 57 eye protectors

Racquetball and squash 57 eye protector shall be tested with a racquetball ball with the following specifications:

Diameter		(57,3 ± 0,5) mm
Mass		(39,2 ± 1,5) g
Hardness at 23 °C		(3,2 ± 0,4) N/mm
Rebound resilience - from 254 cm	at (25 ± 3) °C	67 % – 72 %

NOTE These specifications are consistent with the ball specified by Racquetball Canada^[4] and the US Racquetball Association^[3] and very similar to the ball specified for squash 57 by the World Squash Federation^[5].

The ball is projected at (40 ± 2) m/s as specified in ISO 18526-3:2020, 7.3.2.

8.3 Failure criteria after impact

When tested according to ISO 18526-3:2020, 7.3.2 but using the balls specified in 8.1 or 8.2, the following defects of the lenses (plano and prescription), goggles or frame shall not be allowed when inspected according to ISO 18526-3:2020, 6.1:

- cracking through the entire thickness into two or more pieces;
- the eye protector separates into two or more pieces;
- the lens has become dislodged from its normal position;
- material becomes detached from the surface opposite to that impacted;
- the ball passes through the eye protector; or
- an indication that there has been contact of the ball or the eye protector with the eye of the headform.

This requirement also applies to the lens portions of complete eye protectors where the frame and lenses are integral parts of each other.

Replacement lenses shall be tested after being mounted in the frame type for which they are intended in accordance with ISO 18526-3:2020, 7.3.1.

9 Resistance to solar ultraviolet radiation

After exposure according to ISO 18526-3:2020, 6.8.2:

- the change in the luminous transmittance relative to the initial value shall not be greater than the values shown in [Table 4](#);
- for photochromic lenses, the permissible relative change applies to the faded state, $\tau_{v,0}$. See ISO 18526-2:2020, 16.2, for conditioning requirements;
- the value of wide angle scatter shall not exceed 3 %;
- any applicable UV and/or IR requirements shall continue to be satisfied;
- all claimed transmittance requirements shall continue to be met, if applicable.

Table 4 — Permissible relative change in the luminous transmittance following exposure to solar ultraviolet radiation

Tint category	Relative change in luminous transmittance ^a %
S0, R0 or SR0	±3
S1, R1 or SR1	±5
S2, R2 or SR2	±8
S3, R3 or SR3	±10
S4, R4 or SR4	±10

^a The relative change is $\Delta\tau_v/\tau_v = (\tau'_v - \tau_v)/\tau_v$, where τ_v is the original luminous transmittance, τ'_v is the transmittance after irradiation.

10 Resistance to ignition

When eye protectors (excluding the headband) are tested according to ISO 18526-3:2020, 6.10, they shall not ignite or continue to glow after removal of the heated rod.

11 Field of view

When tested in accordance with ISO 18526-3:2020, 6.2 and measured at the centre at the corneal apex of the headform, eye protectors, in the as-worn position, shall have a minimum unobstructed field of view in front of each eye of the values given in [Table 5](#).

Table 5 — Minimum field of view

Field of view	Minimum	
	Non-prescription degrees (°)	Prescription degrees (°)
Temporal	80	50
Nasal	45	40

Table 5 (continued)

Field of view	Minimum	
	Non-prescription degrees (°)	Prescription degrees (°)
Superior	45	20
Inferior	60	40

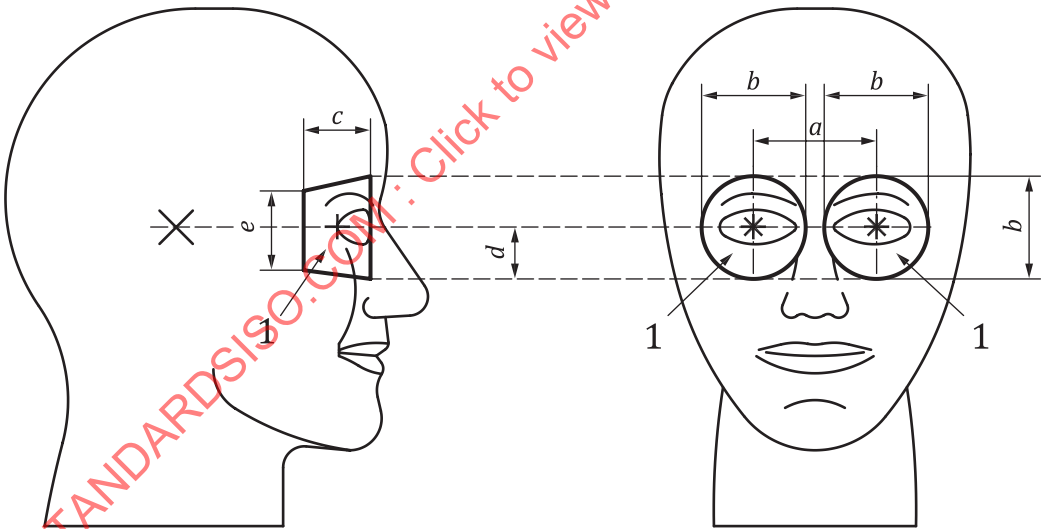
12 Minimum area to be protected

12.1 Assessment of frontal protection

When tested according to ISO 18526-3:2020, 6.3, the eye protector shall cover two circles projected onto the appropriate headform(s) (see 4.5), as defined in Table 6 and Figure 1. These circles have a diameter of b , the centres of which are separated by dimension a and symmetrically placed on either side of the centre of the bridge of the headform's nose, i.e. the vertical axis of symmetry midway between the corneal apices.

12.2 Assessment of lateral protection

When tested from each side according to ISO 18526-3:2020, 6.4, the eye protectors shall cover the area projected on to the headform(s) (see 4.5), as defined in Table 6 and Figure 1. This area is a trapezium with parallel sides vertical and centred on the horizontal line through the corneal apex. The longer side of the trapezium is in the plane of the corneal apex and of length b . The shorter side is a distance e in length. The trapezium is a distance c in width.



- Key**
- 1 areas to be protected
 - * corneal apices and pupil centres
 - + lateral canthus
 - X the point where the top of the ear meets the head
 - $a - e$ are defined in Table 6

NOTE A different interpupillary distance can be used if specified by the manufacturer in which case the values of b , c , d , and e are adjusted in proportion.

Figure 1 — Minimum areas to be protected

Table 6 — Dimensions of minimum areas to be protected as illustrated in Figure 1Tolerances on dimensions $\pm 0,5$ mm

Dimensions	Headform dimensions			
	mm			
	1-C12	1-S	1-M	1-L
a^a	58	60	64	68
b	39	45	50	52
c	36	40	45	47
d	20	22	25	26
e	13	18	20	21
		2-S	2-M	2-L
a^a		63	64	70
b		41	43	49
c		37	39	44
d		21	22	25
e		16	17	20

^a Dimension a is the same as dimension D in ISO 18526-4:2020, Table 2 and 3.

NOTE There are no dimensions available for headform 2-C12.

13 Optional requirements

13.1 Resistance to fogging

When tested according to ISO 18526-3:2020, 6.11, the lens shall remain fog free for a period of at least 30 s. An initial fogging for $\leq 0,5$ s shall not constitute a failure.

NOTE This is a test of the lens alone. There is no accepted test method for the resistance to fogging of assembled eye protectors under all conditions of use.

13.2 Resistance to abrasion

Lenses or lens surfaces that are claimed to provide a basic level of abrasion resistance shall meet the requirements of ISO 8980-5.

A lens claimed to be abrasion-resistant shall meet the requirement on both surfaces. If only one surface is claimed to be abrasion-resistant, it shall be specified in the information that is supplied by the manufacturer with the eye protector.

The surface form of the lens is restricted for testing; however, test results are applicable to claims for lenses and lens surfaces with identical properties other than the surface radius.

NOTE This document does not attempt to define the properties of lens surfaces with abrasion resistance superior to the basic level.

14 Marking and information to be supplied by the manufacturer

14.1 Assessment

When assessed by visual inspection according to ISO 18526-3:2020, Clauses 8 and 9, all markings should be clear and sufficiently durable to remain legible throughout the intended lifetime of the product.

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

The marking shall show only those aspects that have been proved by testing.

14.2 Mandatory markings on eye protectors

The frame shall be marked with:

- a) manufacturer's identifying mark or manufacturer's trade mark;
- b) the letter(s) according to eye protector type, i.e. S for conformity with [8.1](#), R for conformity with [8.2](#) or SR for conformity with both;
- c) the number of this document, i.e. ISO 18527-2.

The lenses shall be marked with:

- a) manufacturer's identifying mark or manufacturer's trade mark;
- b) the letter(s) according to eye protector type, i.e. S for conformity with [8.1](#), R for conformity with [8.2](#) or SR for conformity with both.

Where the eye protectors comprise lens(es) and frame manufactured in one piece, the information may be on either the lens(es) or the frame.

14.3 Information to be supplied with each eye protector by the manufacturer

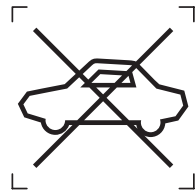
The manufacturer shall provide information for the user with each eye protector. This information shall be in the form of markings on the frame or separate information on labels, packaging, etc. that accompanies the eye protectors at the point of sale. Where graphical symbols are used, an explanation of the significance of these graphical symbols shall also be available.

This information shall include:

- a) an identification as a squash eye protector (S) or a racquetball and squash 57 eye protector (R) or suitable for both categories (SR);
- b) an identification of the model;
- c) the identifying mark or trade mark and address of the manufacturer or supplier;
- d) the applicable headform(s) and size(s) according to ISO 18526-4;
- e) "Not recommended for use over prescription spectacles" (not required for head mounted visor-type eye protectors);
- f) the type of lens if photochromic and/or polarizing;
- g) the number of the claimed tint category (in both the faded and darkened states for photochromic lenses);
- h) the description of the claimed tint category in the form of the designation as given in [Table 1](#);
- i) the number of this document, i.e. ISO 18527-2:2021;
- j) the instructions for care and cleaning; warning(s) about cleaning or other products that might damage the eye protector; list of damaging products not suitable for cleaning;
- k) the restrictions on use, which shall include at least the following warnings.
 - 1) "Not for driving or road use." and/or one of the graphical symbols in [Figure 2](#) at least 5 mm high.

- 2) “Not for direct observation of the sun.”
- 3) “Not for protection against artificial light sources e.g. solaria.”
- 4) Any other restrictions deemed appropriate by the manufacturer.

NOTE Specific national or regional regulations with regard to information to be provided might have additional mandatory requirements.



a) ISO 7000-2952 Version A



b) ISO 7000-2952 Version B

Figure 2 — Graphical symbol — “Not suitable for driving and road use”

14.4 Additional information to be available from the manufacturer

The following information shall be available from the manufacturer or supplier on request:

- a) an explanation of the marking and of the trademarks that are not universally recognized or foreseen by the users of this document;
- b) the position of the reference point when this is different from the one defined in this document;
- c) the country of origin (Made in);
- d) the nominal value of the luminous transmittance;
- e) the transmittance requirements applicable to this product ([Table 1](#));
- f) the polarization efficiency in the case of polarizing lenses;
- g) the base material of lenses and frame.

15 Selection of test samples

15.1 General

The minimum level of conformity testing requires that 3 samples shall be selected at random. These specimens shall be selected by the manufacturer or its representative and shall be identified as listed in [Table 7](#) or [Table 8](#) and shall be conditioned as described in [15.2](#) before testing.

NOTE When conformity to this document is claimed, the manufacturer or its representative has the responsibility to ensure that conformity of the product to this document is valid during the lifetime of manufacture and not only at its first launch on the market.

15.2 Preparation and conditioning of test samples

Before starting the tests, the test samples shall be conditioned for 4^{+2}_{-0} h at an ambient temperature of (23 ± 5) °C, in the as-received condition from the manufacturer or supplier, without prior realignment, adjustment or lubrication but after cleaning in accordance with [4.3](#).

The testing schedule in [Table 7](#) shall be applied to type testing of complete eye protectors. The testing schedule in [Table 8](#) shall be applied to type testing of replacement or interchangeable lenses provided for and fitted to the appropriate eye protector frame.

Table 7 — Testing schedule for complete eye protectors

Requirements	According to Subclause/Clause	Eye protector number				
		1	2	3	4-5	6
Construction	4.2	+				
Lens material and surface quality	4.4	+				
Physiological compatibility	4.1	+				
Sit and fit	4.6	+				
Transmittance categories	5.2	+ ^a		+ ^b		
General transmittance requirements	5.4	+ ^a		+ ^b		
Special transmittance requirements	5.5	+ ^a		+ ^b		
Anti-reflective coated lenses or reduced reflection coated lenses (optional requirement)	5.6.4 or 5.6.5	0				
Scattered light	Clause 6	+ ^a		+ ^b		
Refractive power	Clause 7	+ ^a				
Mechanical strength	Clause 8		+			
Resistance to solar ultraviolet radiation	Clause 9			+		
Resistance to ignition	Clause 10		+			
Field of view	Clause 11	+				
Minimum area to be protected	Clause 12	+				
Resistance to fogging (optional requirement)	13.1					0
Resistance to abrasion (optional requirement)	13.2				0 ^a	
Explanation of the symbols: + Testing to be carried out on the indicated specimen; 0 Optional testing; Empty field No testing specified. ^a One lens from the left and one lens from the right eye or, in the case of a one-piece lens covering both eyes, the zones in front of the left and right eyes. ^b These measurements provide the values before exposure to solar radiation.						