INTERNATIONAL STANDARD

ISO 18527-1

First edition
2021-03

Eye and face protection for sports use —

Part 1: Requirements for downhill skiing and snowboarding goggles

Protection des yeux et du visage à usage sportif —

Partie 1: Exigences relatives aux lunettes de ski alpin et de surf des neiges

Reference number
ISO 18527-1:2021(E)

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

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 the following URL: 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 in the ISO 18527 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

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 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.

Eye and face protection for sports use —

Part 1:
Requirements for downhill skiing and snowboarding goggles

1 Scope

This document applies to all goggles with plano lenses, intended for eye protection against hazards including ultraviolet and visible solar radiation, rain, snow and wind, during downhill skiing, snowboarding and other similar activities.

This document applies to downhill skiing and snowboarding goggles fitted with an insert to carry prescription lenses.

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

Information on the selection and use of downhill skiing and snowboarding goggles is given in Annex A.

This document does not apply to

a) eye protectors for protection when operating or travelling on a motorized vehicle,

b) eye protectors for protection against optical radiation from artificial sources, such as those used in solaria,

c) eye protectors for direct observation of the sun, and

d) eye protectors intended for sports with unrelated hazards and risks.

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 goggles

4.1 Physiological compatibility

Goggles 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 goggles 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 goggles such that, when the goggles are 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 goggles that may, during intended use, come into contact with the wearer shall be free from projections, sharp edges or other features likely to cause discomfort or injury to the wearer.

Any part of the goggles 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 goggles 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 goggles 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 goggles, 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)

Goggles shall sit in the intended position during normal use and shall adapt to the contours of the face. The headband shall be designed to be flexible or adjustable and sit securely on the back of the head or a helmet. The 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, lenses for downhill skiing and snowboarding 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. There are only three descriptive groups for use by consumers as shown in Table 7. 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 transmittance values falling in categories 0 to 3 and ±30 % relative to the stated value for transmittance values falling in tint category 4.

When describing the transmittance properties of a lens with changeable tint, e.g. photochromic, two categories for the luminous transmittance values are generally used. These two values correspond to the highest and lowest transmittance states of the lens. Lenses or filters with temperature sensitive transmittance shall also be tested at (+5 ± 2) °C. If the performance at (+5 ± 2) °C results in a category change, then this category shall also be attributed.

In the case of a gradient-tinted lens, the mean luminous transmittance $\tau_{v,D65}$ at the reference points shall be used to characterize the luminous transmittance and the tint category.

For a gradient-tinted lens, the overlap in luminous transmittance allowed between categories shall be double that for uniformly tinted lenses.

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, τ_{SUVA}, solar UV-B, τ_{SUVB}, 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 downhill skiing and snowboarding lenses

Tint category	Wavelength range from 280 nm to 400 nm			Visible spectral range	Optional infrared spectral range
	Maximum solar UV-B transmittance τ_{SUVB} 280 nm ≤ λ ≤ 315 nm (%)	Maximum solar UV-A transmittance $\tau_{SUVA,380}$ 315 nm ≤ λ ≤ 380 nm (%)	Maximum mean 380 nm to 400 nm spectral transmittance $\tau_{m380-400}$ 380 nm ≤ λ ≤ 400 nm (%)	Luminous transmittance $\tau_{v,D65}$ 380 nm ≤ λ ≤ 780 nm (%)	Maximum solar IR transmittance τ_{SIR} 780 nm ≤ λ ≤ 2 000 nm (%)
S0	$0{,}03\ \tau_{v,D65}$	$0{,}30\ \tau_{v,D65}$	$0{,}75\ \tau_{v,D65}$	$\tau_{v,D65} > 80$	$\tau_{v,D65}$
S1				$43 < \tau_{v,D65} \leq 80$	$\tau_{v,D65}$
S2			$0{,}5\ \tau_{v,D65}$	$18 < \tau_{v,D65} \leq 43$	$\tau_{v,D65}$
S3		$0{,}15\ \tau_{v,D65}$		$8 < \tau_{v,D65} \leq 18$	$\tau_{v,D65}$
S4			0,5 % absolute or $0{,}15\ \tau_{v,D65}$ whichever is greater	$3 < \tau_{v,D65} \leq 8$	$\tau_{v,D65}$
NOTE Some national requirements can stipulate a different requirement for the long wavelength limit of UV-A.					

5.4 General transmittance requirements

5.4.1 Uniformity of luminous transmittance and transmittance matching

5.4.1.1 Uniformly tinted lenses

Lenses that are intended to be uniformly tinted shall appear to be visually uniform within circles $30^{+0,5}_{-0}$ 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 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).

5.4.1.2 Linear gradient-tinted lenses

In the case of mounted linear gradient-tinted lenses, when inspected against a white background in accordance with ISO 18526-3:2020, 6.6, the luminous transmittances shall appear constant in the horizontal direction and having equal transmittance at the reference points. Where there is visible rotation of the gradient or visibly mismatched transmittances at the reference points, when measured in accordance with ISO 18526-2:2020, 7.5, the difference in the luminous transmittances at the reference points and between pairs of points on the lens at $15^{+0,5}_{-0}$ mm to the left, to the right, above and below the reference points shall not exceed 15 % (relative to the higher value in each direction).

5.4.1.3 Radial gradient-tinted lenses

When measured in accordance with ISO 18526-2:2020, 7.5, the difference in the luminous transmittances at the reference points and between pairs of points on the lens $15^{+0,5}_{-0}$ mm to the left, to the right, above and below the reference points shall not exceed 15 % (relative to the higher value).

5.4.1.4 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.

5.4.2 Ultraviolet transmittance of the frame or housing

When tested in accordance with ISO 18526-2:2020, Clause 6, non-lens areas of goggles shall provide at least the same level of protection against ultraviolet radiation, for the area to be protected according Clause 12, as given by a lens of any tint category declared usable with the goggles by the manufacturer or supplier.

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 (5 ± 2) °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 ≥1,25.

5.5.2 Polarizing lenses

5.5.2.1 Plane of transmission

If the lenses in the goggles 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 ±5°. When the goggles are 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 ≥78 % for tint categories 2, 3, 4 and ≥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

5.5.3.1 General

Uniformity of transmission is subject to the requirements of 5.4.1.2 and 5.4.1.3.

5.5.3.2 Determination of the tint category

The tint category of gradient-tinted lenses shall be determined by the luminous transmittance at the reference point.

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 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 the UV-B shall be as given in Table 1 as appropriate. In cases where it is claimed that a lens provides a certain percentage UV absorption or UV transmittance that is better than the requirement in Table 1, 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* % UV absorption, the solar UV transmittance of the lens, $\tau_{SUV,380}$, 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* % UV transmittance, the solar UV transmittance of the lens, $\tau_{SUV,380}$, 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 % UV-A absorption, the solar UV-A transmittance of the lens, $\tau_{SUVA\,380}$, 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 % UV-A transmittance, the solar UV-A transmittance of the lens, $\tau_{SUVA,380}$, 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 % 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 having 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, 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.

5.6.6 Enhanced infrared absorption

When tested in accordance with ISO 18526-2:2020, 10.4, lenses for which enhanced infrared absorption is claimed shall meet the requirements as given in column 6 of Table 1.

6 Scattered light

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

7 Refractive power

7.1 General

The complete goggles 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.

7.2, 7.3 and 7.4 apply to plano lenses. If a goggle is fitted with a prescription insert, this should be removed before testing.

7.2 Spherical and cylindrical power

The spherical power and cylindrical power at the left and right 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. $(F_1 + F_2)/2$ dioptres (D)	Absolute difference between the focal powers (F_1, F_2) in the two principal meridians. $\lvert F_1 - F_2 \rvert$ dioptres (D)	The maximum difference between the measured spherical powers of the right and left lenses (F_R, F_L) $\lvert F_R - F_L \rvert$ dioptres (D)
±0,12	≤0,12	≤0,18

7.3 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.

7.4 Prism imbalance

The complete goggles 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 dioptres (Δ)	Base in prism dioptres (Δ)	 prism dioptres (Δ)
1,00	0,25	0,25

7.5 Goggles with inserts to carry prescription lenses

Prescription lenses in the insert shall conform to the refractive power, prism imbalance and positioning requirements of ISO 21987.

8 Mechanical testing

8.1 Temperature range

The conditioning temperature before testing to 8.2 shall be (−10 ± 2) °C.

NOTE Some national requirements can stipulate a basic requirement of temperature below −10 °C.

8.2 Mechanical strength level 2

8.2.1 Complete goggles

The drop ball test for complete goggles (steel ball: nominal diameter of 22 mm; minimum mass of 43 g; dropping from $1{,}27^{+0{,}03}_{-0{,}00}$ m) according to ISO 18526-3:2020, 7.3.1, shall be carried out after conditioning

at the appropriate temperature according to 8.1. If a performance at lower temperatures is claimed, see 14.1.

8.2.2 Goggles with inserts to carry prescription lenses

Goggles with an insert intended to carry prescription lenses shall be tested when (2,0 ± 0,1) mm thick afocal uncoated hard resin lenses (allyl diglycol carbonate) are fitted in the prescription insert. The requirements of 8.2.3 shall also apply to the prescription lenses and insert frame.

8.2.3 Failure criteria after impact

When tested according to ISO 18526-3:2020, 7.3.1, 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:

a) cracking through the entire thickness into two or more pieces;

b) the goggles separates into two or more pieces;

c) the lens has become dislodged from its normal position;

d) material becomes detached from the surface opposite to that impacted;

e) the ball passes through the goggles; or

f) an indication that there has been contact of the ball or the goggles with the eye of the headform.

For multiple glazed goggles, the criteria for failure shall apply to the lens element nearer the eye.

This requirement also applies to the lens portions of complete goggles 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:

a) the change in the luminous transmittance relative to the initial value shall not be greater than the values shown in Table 4;

b) 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;

c) the value of wide angle scatter shall not exceed 3 %;

d) any applicable UV and/or IR requirements shall continue to be satisfied;

e) all claimed transmittance requirements shall continue to be met, if applicable.

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

Tint category	Relative change in luminous transmittance[a] %
S0	±3
S1	±5
S2	±8
S3	±10
S4	±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 goggles, lenses and frames (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 Protection against water and snow

The goggles shall be designed so that no snow or water can penetrate the goggles.

The result shall be considered to be satisfactory if no liquid enters the inside of the goggles during the test according to ISO 18526-3:2020, 6.12, when spraying from the front, in the horizontal and in the direction that is perpendicular to the line joining the corneal vertices.

12 Field of view

When tested in accordance with ISO 18526-3:2020, 6.2 and measured at the centre of the corneal apex of the headform, goggles, 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 direction	Dimensions degrees (°)
Temporal	60
Nasal	30
Superior	30
Inferior	30

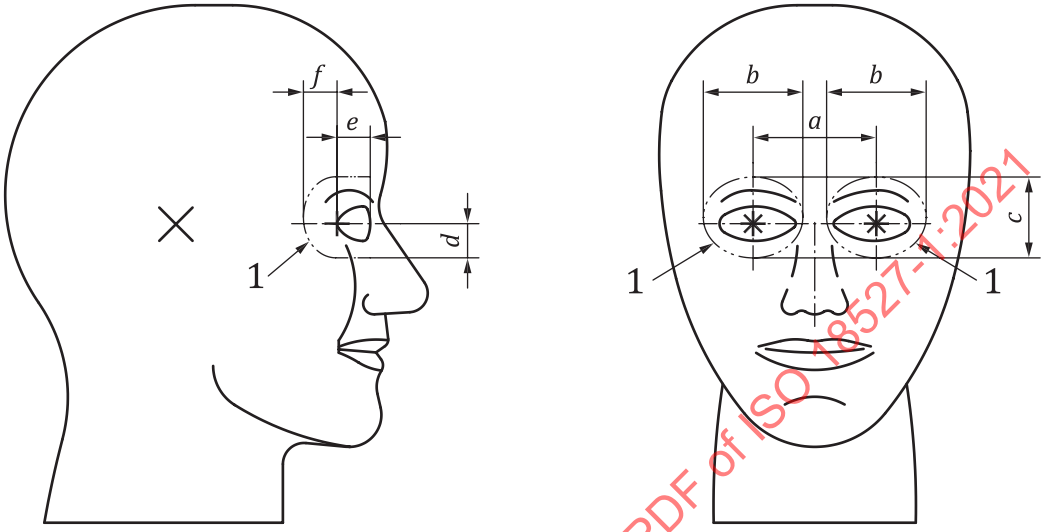
13 Minimum area to be protected

13.1 Assessment of frontal protection

When tested according to ISO 18526-3:2020, 6.3, the goggles shall cover two ellipses projected on to the appropriate headform(s) (see 4.5), as defined in Table 6 and Figure 1. These ellipses have a horizontal dimension of *b* and a vertical dimension *c*, 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.

13.2 Assessment of lateral protection

When tested from each side according to ISO 18526-3:2020, 6.4, the goggles shall cover the area projected on to the appropriate headform(s) (see 4.5), as defined in Table 6 and Figure 1. This area is bounded by a semicircle of radius *f* centred on the lateral canthus, which is a distance *e* behind the corneal apex, and the horizontal lines through the top and bottom of the semicircle.



Key

1 areas to be protected

✳ corneal apices and pupil centres

+ lateral canthus

× the point where the top of the ear meets the head

a - *f* 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 1

Tolerance on dimensions ±0,5 mm

Dimensions	Headform dimension mm				
	1-C6	**1-C12**	**1-S**	**1-M**	**1-L**
a[a]	54	58	60	64	68
b	29	32	36	40	42
c	21	22	25	28	29
d	10	11	12	14	15
e	7	8	9	12	13
f	10	10	10	10	10
			2-S	**2-M**	**2-L**
a[a]			63	64	70
b			33	35	40
c			23	24	28
d			12	12	14
e			7	8	9
f			10	10	10

[a] Dimension *a* is the same as dimension *D* in ISO 18526-4:2020, Tables 2 and 3.

NOTE There are no dimensions available for headforms 2-C6 and 2-C12.

14 Optional requirements

14.1 Extended low temperature range

If claims of mechanical strength performance at temperatures lower than −10 °C are made, the conditioning temperature before testing to 8.2 shall be the claimed temperature ±2 °C and testing shall be carried out according to 8.2.

14.2 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 ≤0,5 s shall not constitute a failure.

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

14.3 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 goggles.

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.

15 Marking and information to be supplied by the manufacturer

15.1 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 goggles are assembled. The marking shall not encroach into the minimum field of view.

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

15.2 Mandatory markings on goggles

The frame shall be marked with:

a) the manufacturer’s identifying mark or manufacturer's trade mark;

b) the number of this document, i.e. ISO 18527-1.

The lenses shall be marked with:

a) manufacturer’s identifying mark or manufacturer's trade mark;

b) lens tint category or, in the case of photochromic lenses, tint categories.

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

15.3 Information to be supplied with goggles by the manufacturer

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

This information shall include:

a) an identification as goggles for downhill skiing and snowboarding (S);

b) an identification of the model;

c) the identifying mark or trade mark and the address of the manufacturer or supplier;

d) the applicable headforms(s) and size(s) according to ISO 18526-4;

e) the minimum temperature of use (–10 °C see 8.1) or lower, if claimed, see 14.1;

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) preferably on the frame or on the lens;

h) the description of the claimed tint category in form of a symbol and/or verbal description as given in Table 7;

NOTE The wording in Table 7 under "Usage" and related to UV may be replaced with a numerical claim according to 5.6.3.

i) the number of this document, i.e. ISO 18527-1:2021;

j) the instructions for care and cleaning; warning(s) about cleaning or other products that might damage the goggles; list of damaging products not suitable for cleaning;

NOTE In some regions and countries this information can be mandatory.

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) "Not for protection against mechanical hazards such as impact." This may be omitted if the goggles meet the Impact Level C requirements of ISO 16321-1.

5) 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

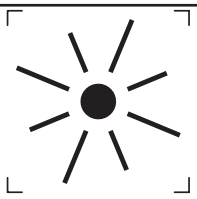
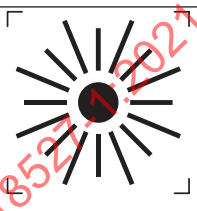
b) ISO 7000-2952 Version B

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

Table 7 — Description of tint categories and assigned symbols

Tint category	Description	Usage	Symbol
S0	Light tint goggles	Very limited reduction of sunglare Some UV protection	 IEC 60417-5955:2003-11
S1		Limited reduction of sunglare Some UV protection	 ISO 7000-2948
NOTE Either the wording and/or the graphical symbols can be used.			

Table 7 *(continued)*

Tint category	Description	Usage	Symbol
S2	General purpose goggles	Good protection against sunglare Good UV protection	 ISO 7000-2949
S3		High protection against sunglare Good UV protection	 ISO 7000-2950
S4	Very dark special purpose goggles	Very high protection against extreme sun radiation over snowfields and on high mountains Good UV protection	 ISO 7000-2951
NOTE Either the wording and/or the graphical symbols can be used.			

15.4 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.

16 Selection of test samples

16.1 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 8 or Table 9 and shall be conditioned as described in 16.2 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.

16.2 Preparation and conditioning of test samples

Before starting the tests, the test samples shall be conditioned for 4^{+2}_{-0} h at the temperature specified for the test, 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 8 shall be applied to type testing of complete goggles. The testing schedule in Table 9 shall be applied to type testing of replacement or interchangeable lenses provided for and fitted to the appropriate goggles for testing.

Table 8 — Testing schedule for complete goggles

Requirements	According to Subclause/ Clause	Sample 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	O					
Scattered light	Clause 6	+[a]		+[b]			
Refractive power	Clause 7	+[a]					
Mechanical testing	Clause 8		+				
Resistance to solar ultraviolet radiation	Clause 9			+			
Resistance to ignition	Clause 10		+				
Protection against water and snow	Clause 11	+					
Field of view	Clause 12	+					
Minimum area to be protected	Clause 13	+					
Extended low temperature range (optional requirement)	14.1				O		
Resistance to fogging (optional requirement)	14.2					O	
Resistance to abrasion (optional requirement)	14.3						O

Explanation of the symbols:

\+ Testing to be carried out on the indicated specimen;

O Optional testing;

Empty field No testing specified.

[a] One lens from the left and one lens from the right 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.

Table 9 — Testing schedule for unmounted lenses used as replacement or alternative lenses

Requirements	According to Sub-clause/Clause	Lens pair number				
		1	2	3	4	5
Construction	4.2	+				
Lens material and surface quality	4.4	+				
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	O				
Scattered light	Clause 6	+[a]		+[b]		
Refractive power	Clause 7	+[a]				
Mechanical testing	Clause 8		+			
Resistance to solar ultraviolet radiation	Clause 9			+		
Resistance to ignition	Clause 10		+			
Protection against water and snow	Clause 11	+				
Resistance to fogging (optional requirement)	14.2					O
Resistance to abrasion (optional requirement)	14.3				O[a]	

Explanation of the symbols:

\+ Testing to be carried out on the indicated specimen;

O 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.