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Eye and face protection - Sunglasses and related eyewear

Part 1: Sunglasses for general use

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National foreword

This British Standard is the UK implementation of EN ISO 12312-1:2013+A1:2015. It is identical to ISO 12312-1:2013, incorporating amendment 1:2015. It supersedes BS EN ISO 12312-1:2013, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

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A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Eye and face protection - Sunglasses and related eyewear - Part 1: Sunglasses for general use (ISO 12312-1:2013)

Protection des yeux et du visage - Lunettes de soleil et
articles de lunetterie associés - Partie 1: Lunettes de soleil
pour usage général (ISO 12312-1:2013)

Augen- und Gesichtsschutz - Sonnenbrillen und ähnlicher
Augenschutz - Teil 1: Sonnenbrillen für den allgemeinen
Gebrauch (ISO 12312-1:2013)

This European Standard was approved by CEN on 30 June 2013.

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Foreword

This document (EN ISO 12312-1:2013) has been prepared by Technical Committee ISO/TC 94 “Personal safety - Protective clothing and equipment” in collaboration with Technical Committee CEN/TC 85 “Eye protective equipment” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2014, and conflicting national standards shall be withdrawn at the latest by February 2014.

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This document supersedes EN 1836:2005+A1:2007.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 12312-1:2013 has been approved by CEN as EN ISO 12312-1:2013 without any modification.

Foreword amendment to A1

This document (EN ISO 12312-1:2013/A1:2015) has been prepared by Technical Committee ISO/TC 94 "Personal safety - Protective clothing and equipment" in collaboration with Technical Committee CEN/TC 85 "Eye protective equipment" the secretariat of which is held by AFNOR.

This Amendment to the European Standard EN ISO 12312-1:2013 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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Endorsement notice

The text of ISO 12312-1:2013/Amd 1:2015 has been approved by CEN as EN ISO 12312-1:2013/A1:2015 without any modification.

Annex ZA (informative)

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

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

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this International Standard and Directive 89/686/EEC

Clause(s)/sub-clause(s) of this International Standard	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/Notes
11	1.1.2.1. Highest level of protection possible	
5.1, 5.2, 5.3.1, 5.3.4	1.1.2.2. Classes of protection appropriate to different levels of risk	
9	1.2.1. Absence of risks and other 'inherent' nuisance factors	Ignitability of materials
4.3	1.2.1.1. Suitable constituent materials	This standard doesn't address essential requirement 1.2.1.1 with regard to the specific case of nickel release by metal parts of spectacle frames in contact with the skin. Suitable requirements and test methods for this parameter can be found in EN ISO 12870:2012, clause 4.2.3. The requirement in that clause (i.e. 0,5 µg/cm ² /week) is the requirement set forth by Directive 94/27/EEC.
4.1	1.2.1.2. Satisfactory surface condition of all PPE parts in contact with the user	
4.2, 5.3.2, 5.3.3, 5.3.5.2.8	1.2.1.3. Maximum permissible user impediment	
11.1	1.3.1. Adaptation of PPE to user morphology	
7.1, 7.2, 8	1.3.2. Lightness and design strength	
12	1.4. Information supplied by the manufacturer	
6, 11	2.3. PPE for the face, eyes and	

Clause(s)/sub-clause(s) of this International Standard	Essential Requirements (ERs) of Directive 89/686/EEC	Qualifying remarks/Notes
	respiratory tracts	
12	2.12. PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety	
7.3, 7.6	3.1.1. Impact caused by falling or projecting objects and collision of parts of the body with an obstacle.	
5.1, 5.2, 5.3.1, 5.3.2, 5.3.4, 12	3.9.1. Non-ionizing radiation	

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

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Eye and face protection — Sunglasses and related eyewear —

Part 1: Sunglasses for general use

1 Scope

This part of ISO 12312 is applicable to all afocal (plano power) sunglasses and clip-ons for general use, including road use and driving, intended for protection against solar radiation.

Information on the use of sunglass filters is given in [Annex A](#). Requirements for unmounted filters used as replacement or alternative filters are given in [Annex B](#).

A1 This part of ISO 12312 is not applicable to related eyewear, such as:

- a) eyewear for protection against radiation from artificial light sources, such as those used in solaria;
- b) eye protectors intended for specific sports (e.g. ski goggles or other types);
- c) sunglasses that have been medically prescribed for attenuating solar radiation;
- d) products intended for direct observation of the sun, such as for viewing a partial or annular solar eclipse;
- e) products intended for occupational eye protection. **A1**

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 12311:2013, *Personal protective equipment — Test methods for sunglasses and related equipment*

3 Terms and definitions

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

3.1

related eyewear

eyewear intended for protection in the same wavelength range as solar radiation but not necessarily originated by natural sunlight

4 Construction and materials

4.1 Construction

When tested in accordance with ISO 12311:2013, Clause 6, areas of the sunglass, including the frame and the edges of the filters, if in a rimless or semi-rimless style, that might, during intended use, come into contact with the wearer, shall be smooth and without sharp projections.

4.2 Filter material and surface quality

When tested in accordance with ISO 12311:2013, 6.2, except in a marginal area 5 mm wide, sunglass filters shall have no material or machining defects within an area of 30 mm diameter around the reference point that might impair vision, e.g. bubbles, scratches, inclusions, dull spots, pitting, mould marks, notches, reinforced areas, specks, beads, water specks, pocking, gas inclusions, splintering, cracks, polishing defects or undulations.

4.3 Physiological compatibility

Sunglasses 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 and safety of the wearer. The risks posed by substances leaking from the device that may come into prolonged contact with the skin shall be reduced by the manufacturer to below any regulatory limit. Special attention shall be given to substances which are allergenic, carcinogenic, mutagenic or toxic to reproduction.

NOTE 1 Reactions may be generated by excessive pressure due to a poor fit on the face, chemical irritation or allergy. Rare or idiosyncratic reactions may occur to any material and may indicate the need for the individual to avoid particular types of frames.

NOTE 2 Specific national regulations with regard to restriction of certain chemical substances should be observed, e.g. on nickel release by metal parts in prolonged contact with the skin. See ISO 12870, 4.2.3, for test methods and requirements on this parameter.

5 Transmittance

5.1 Test methods

Transmittance values shall be determined in accordance with ISO 12311:2013, Clause 7.

5.2 Transmittance and filter categories

Depending upon their luminous transmittance at their reference point, sunglass filters for general use shall be attributed to one of five filter categories. ~~A1) Text deleted A1)~~

The range of the luminous transmittance of these five categories is given by the values in [Table 1](#). An overlap of the transmittance values shall be not more than $\pm 2\%$ (absolute) between the categories 0, 1, 2 and 3. There is no overlap in transmittance values between categories 3 and 4.

The maximum deviation for declared luminous transmittance value shall be $\pm 3\%$ absolute for the transmittance values falling in categories 0 to 3 and $\pm 30\%$ relative to the stated value for the transmittance values falling in category 4.

When describing the transmittance properties of photochromic filters, two categories for transmittance values are generally used. These two values correspond to the faded state and to the darkened state of the filter.

In the case of gradient filters, the transmittance value at the reference point shall be used to characterize the luminous transmittance and the category of the filter.

For gradient filters, the overlap in luminous transmittance allowed between categories shall be double that for uniformly tinted filters.

[Table 1](#) also specifies the UV requirements for sunglass filters for general use and, when the filters are claimed by the manufacturer to protect against IR radiation, the IR requirements.

Table 1 — Transmittance for sunglass filters for general use

Consumer label	Technical label	Requirements			
Descriptive label	Filter category	Ultraviolet spectral range		Visible spectral range	Enhanced infrared absorption ^a
		Maximum value of solar UV-B transmittance τ_{SUVB} 280 nm to 315 nm	Maximum value of solar UV-A transmittance τ_{SUVA} 315 nm to 380 nm	Range of luminous transmittance τ_{V} 380 nm to 780 nm	Maximum value of solar IR transmittance τ_{SIR} 780 nm to 2 000 nm
Light tint sunglasses	0	0,05 τ_{V}	τ_{V}	$\tau_{\text{V}} > 80 \%$	τ_{V}
	1	0,05 τ_{V}	τ_{V}	$43 \% < \tau_{\text{V}} \leq 80 \%$	τ_{V}
General purpose sunglasses	2	1,0 % absolute or 0,05 τ_{V} , whichever is greater	0,5 τ_{V}	$18 \% < \tau_{\text{V}} \leq 43 \%$	τ_{V}
	3	1,0 % absolute	0,5 τ_{V}	$8 \% < \tau_{\text{V}} \leq 18 \%$	τ_{V}
Very dark special purpose sunglasses	4	1,0 % absolute	1,0 % absolute or 0,25 τ_{V} , whichever is greater	$3 \% < \tau_{\text{V}} \leq 8 \%$	τ_{V}
NOTE The upper limit of UV-A at 380 nm coincides with that taken in ophthalmic optics and in ISO 20473, <i>Optics and photonics — Spectral bands</i> . ^a Only applicable to sunglass filters recommended by the manufacturer as a protection against infrared radiation.					

5.3 General transmittance requirements

5.3.1 Uniformity of luminous transmittance

The relative difference in the luminous transmittance value between any two points of the filter within a circle 40 mm in diameter around the reference point or to the edge of the filter less the marginal zone 5 mm wide, whichever is less, shall not be greater than 10 % (relative to the higher value), except for category 4 where it shall not be greater than 20 %.

The geometric or boxed centre takes the place of the reference point if this is not known.

In the case of mounted gradient filters, this requirement shall be limited to sections parallel to the line connecting the two reference points.

For mounted filters, the relative difference between the luminous transmittance value of the filters at the reference point for the right and left eyes shall not exceed 15 % (relative to the lighter filter).

Changes of luminous transmittance that are caused by thickness variations due to the design of the filter are permitted. For verification, the test method in ISO 12311:2013, Annex L shall be used.

A1 5.3.2 Requirements for road use and driving

5.3.2.1 General

Filters suitable for road use and driving shall be of categories 0, 1, 2 or 3 and shall additionally meet the following two requirements. **A1**