BRITISH STANDARD

BS EN
174:2001

Personal eye-protection — Ski goggles for downhill skiing

The European Standard EN 174:2001 has the status of a British Standard

ICS 13.340.20; 97.220.20

National foreword

This British Standard is the official English language version of EN 174:2001. It supersedes BS EN 174:1997 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee PH/2, Eye protection, to Subcommittee PH/2/1, Sunglasses, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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This British Standard, having been prepared under the direction of the Health and Environment Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 June 2001

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 174

April 2001

ICS 13.340.20

Supersedes EN 174:1996

English version

Personal eye-protection - Ski goggles for downhill skiing

Protection individuelle de l'oeil - Masques pour le ski alpin

Persönlicher Augenschutz - Skibrillen für alpinen Skilauf

This European Standard was approved by CEN on 19 February 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 174:2001 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 85, "personal eye-protection" the secretariat of which is held by AFNOR.

This European Standard replaces EN 174:1996.

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 October 2001, and conflicting national standards shall be withdrawn at the latest by October 2001.

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(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard is applicable to ski goggles which are used for eye-protection during downhill skiing and other downhill activities, like snowboard.

For snow mobile use EN 13178 applies.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 165, *Personal eye-protection – Vocabulary.*

EN 167:2001[1)], *Personal eye-protection - Optical test methods.*

EN 168:2001[1)], *Personal eye-protection - Non-optical test methods.*

EN 1836:1997, *Personal eye-protection - Sunglasses and sunglare filters for general use.*

EN 13178, *Personal eye-protection - Eye protectors for snow mobile users*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions of EN 165 and of EN 1836:1997 apply.

4 Requirements for design and manufacture

4.1 General requirements

Ski goggles shall be free from sharp edges or other defects which are likely to cause discomfort or injury during intended use. This is checked by visual inspection.

4.2 Materials

No parts of the ski goggle which are in contact with the wearer shall be made of materials that are known to cause irritation, allergic or toxic reaction in a normal state of health amongst a significant proportion of users.
This is checked by the inspection of the information supplied by the manufacturer.

NOTE Rare or idiosyncratic reaction to any material may occur and may indicate the need for the individual to avoid particular types of material. Adverse skin reaction may be due to other causes, e.g. excessive contact pressure.

4.3 Sit and fit

Ski goggles shall sit reliably when used as intended and adapted to the contours of the face. The surfaces in contact with the face shall be made of soft flexible material. The head strap shall be designed to be flexible or adjustable and sit securely on the back of the head or the helmet. The head strap assembly shall withstand any stress which occurs during proper use without tearing or being permanently deformed. This is checked by visual inspection.

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1) To be published.

4.4 Ventilation

Design measures shall ensure that the inside of the ski goggles is well ventilated during skiing.
This is checked by visual inspection.

NOTE The necessary rate of air exchange and the design of the ventilation openings depend heavily on the weather, style of skiing and the individual conditions (e.g. sweating), which means that generally applicable requirements cannot be stipulated.

5 Other requirements

5.1 Optical requirements

5.1.1 Field of vision

The size of the field of vision is defined in conjunction with the head-form as given in clause 17 of EN 168:2001.

Ski goggles shall exhibit a minimum field of vision defined by the two ellipses in Figure 1 when placed and centered at a distance of 25 mm from the surface of the eyes of the head-form. The horizontal axis shall be parallel to and 0,7 mm below the height of the line connecting the centres of the two eyes. The plane of the ellipses shall be parallel to the back flat portion of the head-form.

The horizontal length of the ellipses shall be of 32 mm, the vertical width of the ellipses shall be of 25 mm. The centre distance of the two ellipses shall be $d = c + 20$ mm, where c is the pupillary distance. The pupillary distance is 64 mm, if not specified differently by the manufacturer.

The test shall be carried out in accordance with 6.2.

Dimensions in millimetres

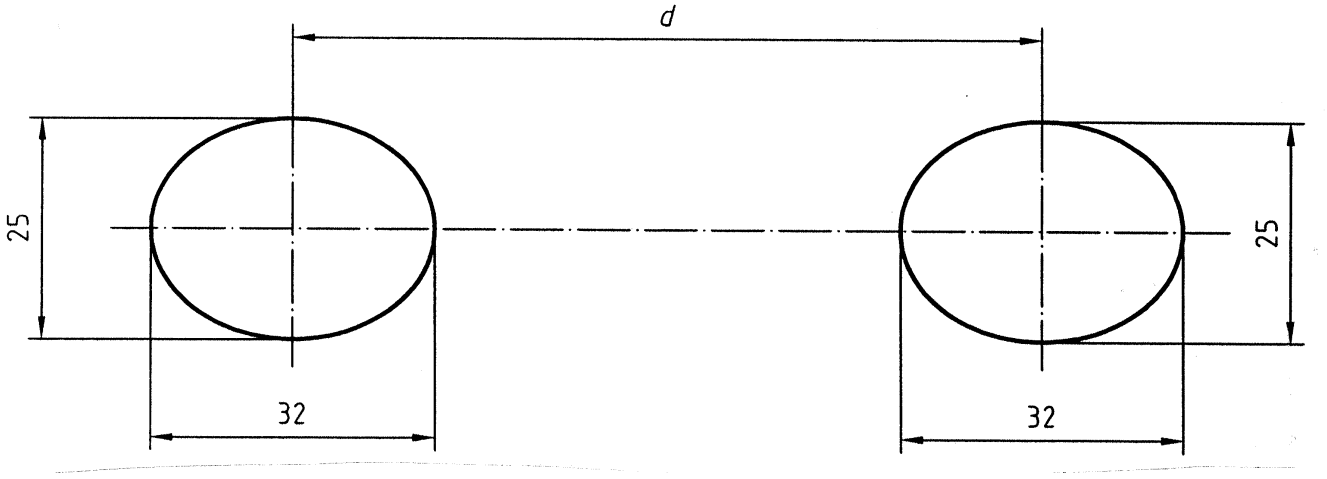


Figure 1 - Definition of the field of vision

5.1.2 Lens requirements

The lens requirements are summarised in Tables 1 and 2.

Table 1 - Requirements for lenses used in ski goggles for downhill skiing

Optical power	In accordance with 4.2 of EN 1836:1997
Transmittance	In accordance with Table 2 and 6.1 of EN 1836:1997
Variations in luminous transmittance	In accordance with 4.1.2.1 of EN 1836:1997
Maximum reduced luminance coefficient	Diffusion of light class 1 1,0 $\frac{cd/m^2}{lx}$ in accordance with 6.3 Diffusion of light class 2 2,0 $\frac{cd/m^2}{lx}$ in accordance with 6.3
Quality of material and surface	In accordance with 4.4 of EN 1836:1997
Resistance to ultraviolet radiation	a) Maximum relative change in the luminous transmittance in accordance with 6.4 ± 5 % for filters of category S0 ± 10 % for filters of category S1 ± 20 % for filters of all other categories b) Maximum reduced luminance coefficient in accordance with 6.4 Diffusion of light class 1 1, 0 $\frac{cd/m^2}{lx}$ Diffusion of light class 2 2, 0 $\frac{cd/m^2}{lx}$

Table 2 - Permissible transmittance of lenses for downhill skiing

Filter category	Requirements					Optional specifications
	Ultraviolet spectral range			Visible spectral range		Enhanced infrared absorption
	Maximum value of spectral transmittance $\tau(\lambda)$		Maximum value of solar UVA transmittance τ_{SUVA}	Range of luminous transmittance τ_V		Maximum value of solar infrared transmittance τ_{SIR}
	280 nm to 315 nm	over 315 nm to 350 nm	315 nm to 380 nm	from over %	to %	%
S 0	0,03. τ_V	0,3. τ_V	0,3. τ_V	80,0	100	τ_V
S 1				43,0	80,0	
S 2				18,0	43,0	
S 3		0,15. τ_V	0,15. τ_V	8,00	18,0	
S 4				3,00	8,00	

If special transmittance properties are claimed, EN 1836:1997 applies.

5.2 Mechanical strength

The ski goggle shall withstand the impact of a steel ball when tested in accordance with 6.5.

On so testing, the following defects shall not occur :

a) ocular fracture :

An ocular shall be considered to have fractured if it cracks through its entire thickness into two or more pieces, or if the ball passes through the ocular ;

b) ocular deformation :

An ocular shall be considered to have been deformed if a mark appears on the white paper on the opposite side to that struck by the ball ;

c) ocular housing or frame fracture :

An ocular housing shall be considered to have failed if it separates into two or more pieces, or if it is no longer capable of holding an ocular in position, or if an unbroken ocular becomes detached from the frame, or if the ball passes through the housing or frame.

5.3 Protection against water and snow

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

The result shall be considered to be satisfactory if no liquid enters the inside of the ski goggle during the test in accordance with clause 12 of EN 168:2001 when spraying from the front only in directions perpendicular to the flat portion at the back of the head-form.

5.4 Resistance to ignition

Ski goggles shall be tested in accordance with the method specified in clause 7 of EN 168:2001 and shall be considered to be satisfactory if no part of the ski goggle ignites or continues to glow after removal of the steel rod.

5.5 Suitability for cleaning and care

All parts of the ski goggle shall be capable or withstanding, without visible change, cleaning in accordance with manufacturer’s recommended methods.

5.6 Optional specifications

5.6.1 Resistance to surface damage by fine particles

If oculars are claimed to be resistant to surface damage by fine particles they shall have a reduced luminance coefficient of :

$\leq 5,0 \frac{cd/m^2}{lx}$ in surface damage by fine particles class 1

$\leq 10,0 \frac{cd/m^2}{lx}$ in surface damage by fine particles class 2

following the test specified in clause 15 of EN 168:2001.

5.6.2 Resistance to fogging of oculars

If oculars are claimed to be resistant to fogging they shall remain free from fogging for a minimum of 30 s when tested in accordance with clause 16 of EN 168:2001.

NOTE Resistance to fogging in use is a function of the antifog properties of the ocular and the design of the ski goggle.

5.6.3 Enhanced infrared absorption of oculars

If oculars are claimed to have enhanced infrared absorption, they shall comply with the requirements of the last column of Table 2.

6 Testing

This clause contains recommended test methods. Any method shown to be equivalent may be used instead.

6.1 General remarks

The testing schedule in Table 3 shall be applied to type testing of complete ski goggles. The sequence of testing 1 to 10 may be changed. At least 9 samples are required for testing. If additionally testing for optional requirements has to be done, more than 13 samples may be necessary.

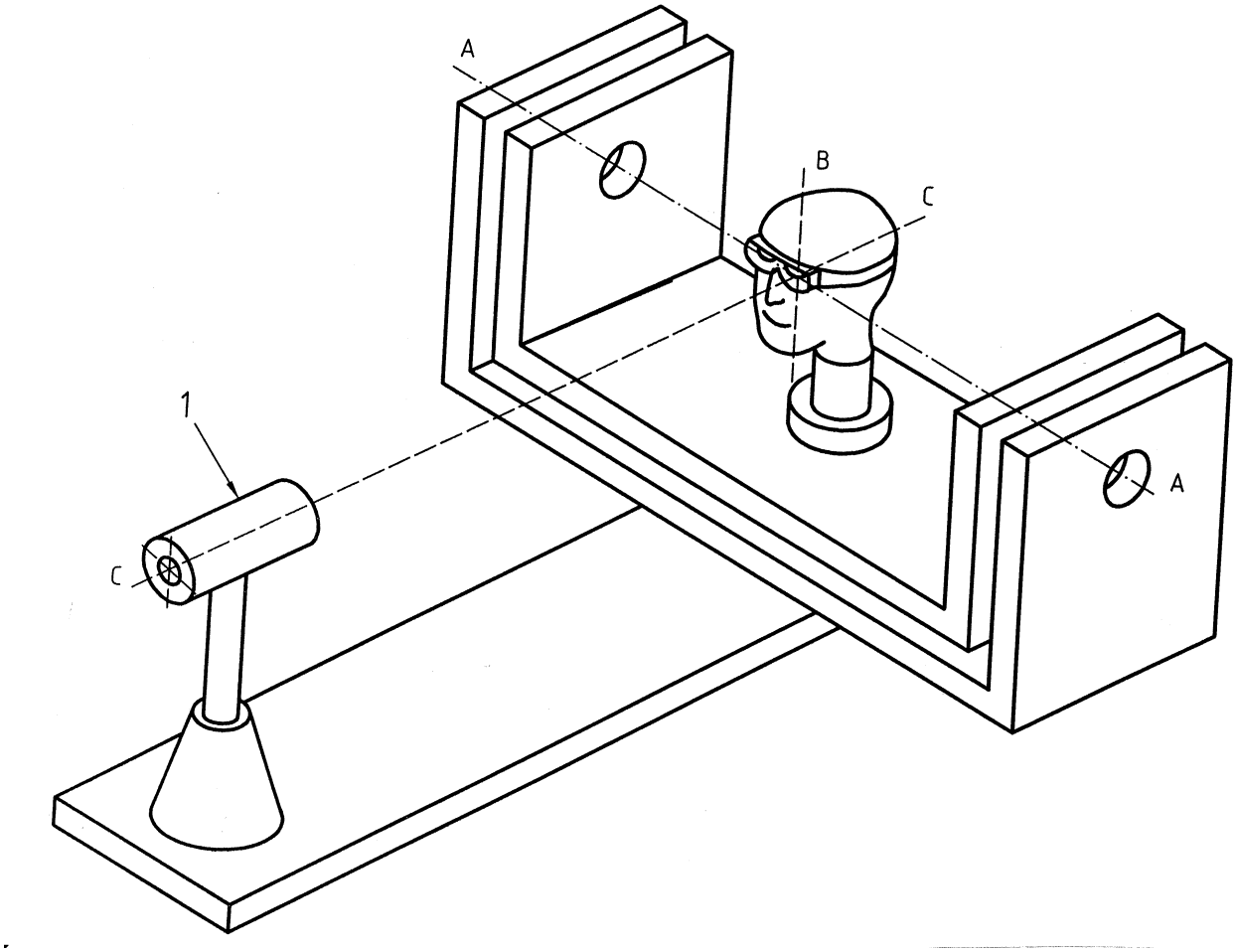
Table 3 - Testing schedule for complete ski goggles

Order of testing	Requirement	According to clause	Ski goggle number				
			1-3	4-6	7-9	10-11	12-13
1	General requirements	4.1	+				
2	Quality of material and surface	4.2 ; 5.1.2	+				
3	Field of vision	5.1.1	+				
4	Ventilation	4.4	+				
5	Sit and fit	4.3	+				
6	Scattered light	5.1.2	+ 1)				
7	Transmittance, uniformity of luminous transmittance	5.1.2	+ 1)				
8	Enhanced infrared absorption	5.6.3	+ 1)				
9	Refractive power	5.1.2	+ 1)				
10	Prismatic difference	5.1.2	+				
11	UV stability	5.1.2	+ 2)				
12	Mechanical strength	5.2		+			
13	Resistance to ignition	5.4		+			
14	Protection against water and snow	5.3			+		
15	Suitability for cleaning and care	5.5			+		
16	Resistance to surface damage by fine particles	5.6.1				+ 2)	
17	Resistance to fogging	5.6.2					+ 2)

Explanation of the symbols : + Testing to be carried out on the indicated specimen
Empty field No testing specified
1) Three filters from the left and three filters from the right eye
2) Two filters from the left and two filters from the right eye

6.2 Field of vision

The size of the field of vision shall be measured with a perimeter in conjunction with the medium size head-form as defined in clause 17 of EN 168:2001. The size of the field of vision of ski goggles for children shall be measured with a perimeter in conjunction with the small size head-form of EN 168:2001. The ski goggle shall be mounted as shown in Figure 2 so that the two axes of rotation A and B and the optical axis C intersect in the front surface of one eye at the interpupillary distance. Radiation is provided by a laser beam with $(1 \pm 0{,}5)$ mm diameter of along axis C.



Key

1 Laser

Figure 2 - Test assembly for the measurement of the field of vision

In (250 ± 5) mm distance from the surface of the eyes of the test head a transparent screen is placed centered to the middle of the eyes. On this screen the two ellipses shown in Figure 3 are drawn. The horizontal length of the ellipses shall be of 320 mm, the vertical width of the ellipses shall be of 250 mm. The centre distance of the two ellipses shall be $d' = c + (200 \pm 1)$ mm, where c is the pupillary distance. The pupillary distance is 64 mm, if not specified differently by the manufacturer. The horizontal axis shall be parallel to and 7 mm below the height of the line connecting the centres of the two eyes. The plane of the ellipses shall be parallel to the back flat portion of the head-form.

The arrangement is rotated around axis A and the axis B so that the circumference of the ellipse is hit by the laser beam. Such a beam shall not be shielded by the frame of the ski goggle. The test shall be done for both eyes.

Dimensions in millimetres

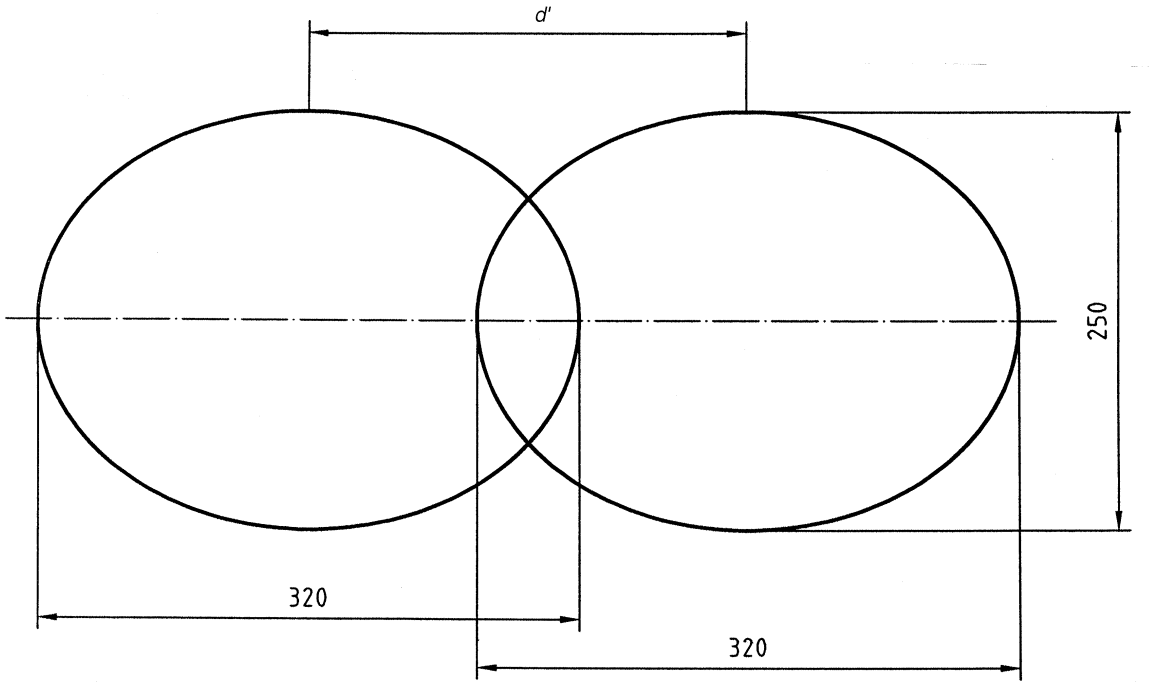


Figure 3 - Test ellipses for the measurement of the field of vision

6.3 Reduced luminance coefficient

The reduced luminance coefficient shall be measured in accordance with one of the reference methods specified in clause 4 of EN 167:2001.

NOTE When measuring double lenses, care should be taken to ensure that no reflections penetrate the ring opening in the case of a wedge-shaped arrangement of these lenses. In cases of doubt the two lenses are measured individually and the measured values added together.

6.4 Resistance to ultraviolet radiation

Oculars shall be subjected to the test for resistance to ultraviolet radiation in accordance with the method specified in 6.6 of EN 1836:1997.

At the end of the test, oculars shall meet the following requirements :

a) the relative change of luminous transmittance shall not be greater than the values specified in Table 1 ;

b) the values for the maximum reduced luminance coefficient shall not exceed the values shown in Table 1.

6.5 Mechanical strength

6.5.1 Apparatus

6.5.1.1 **Head-form**, as defined in clause 17 of EN 168:2001.

6.5.1.2 **A freezer** capable of maintaining a temperature of –10 °C.

6.5.1.3 **A device** enabling a steel ball of 22 mm nominal diameter and 43 g minimum mass to be projected at a specified point on the ski goggle at a speed of 5,1 m/s (see 3.2 of EN 168:2001).

6.5.2 Procedure

The ski goggle to be tested shall be placed on the head-form in the position corresponding to normal use.

A sheet of carbon paper on top of a sheet of white paper is inserted between the ski goggle and the head-form. The head-form and ski goggle assembly are positioned in the test apparatus.

The ball is projected at the points of impact defined in Figure 4.

If the ski goggle is equipped with a one piece lens, the test shall be conducted at all three impact points. The impact points shall be at the vertical middle of the lens as determined at every impact point. If the ski goggle is equipped with two separate lenses, the test shall be conducted at the lens impact points only. *c* is the pupillary distance. The pupillary distance is 64 mm, if not specified differently by the manufacturer.

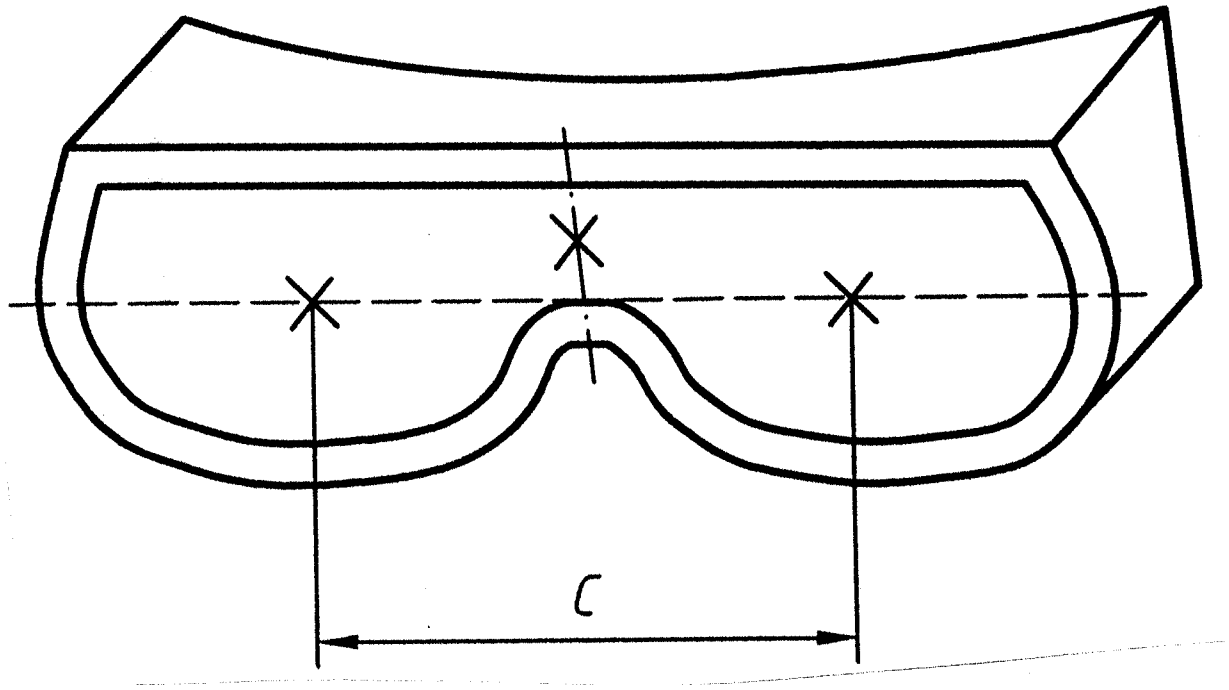


Figure 4 - Illustration of the impact points

The ski goggle shall be conditioned at a temperature of (- 10 $^{0}_{-3}$) °C for at least 1 h.

Each impact shall be applied on a new ski goggle within 30 s of the removal of the ski goggle from the freezer.

The test shall be conducted at an ambient temperature of (23 $\pm$ 5) °C.

Subsequently, a visual inspection is performed to determine whether the frame or lens exhibit any damage specified in 5.2.

7 Information supplied by the manufacturers

The following minimum information shall be supplied by the manufacturer or supplier in the national language(s) of the country of sale, in the form of a marking on the ski goggles, an affixed label or packaging, or any combination thereof:

a) number and date of this standard ;

b) filter categories ;

c) antifogging (if applicable) ;

d) name and address of the manufacturer or supplier ;

e) instructions for storage, use and maintenance ;

f) specific instructions for cleaning and disinfection ;

g) details of the field of use, protection capabilities and performance characteristics ;

h) details of suitable accessories and spare parts and instructions for fitting ;

i) "do not use ski goggles in road and when driving";

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

a) optical class;

b) a transmittance curve of a filter lens.

Annex A
(informative)
Uncertainty of measurement and results interpretation

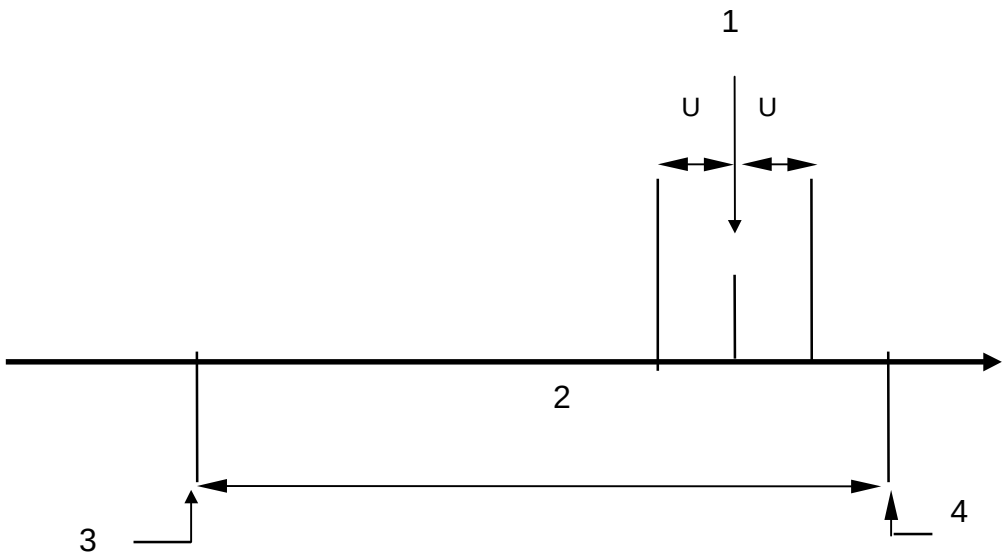
A.1 Test report and uncertainty of measurement

For each of the required measurements performed in accordance with this standard, a corresponding estimate of the uncertainty of measurement shall be evaluated.

This estimate of uncertainty shall be applied and stated when reporting test results, in order to enable the user of the test report to assess the reliability of the data.

The following protocol with regard to uncertainty of measurement shall be applied to test results :

If the limit value for the particular test given in the standard, falls outside of the range of values calculated from the test data plus/minus the uncertainty U of measurement, then the result shall be deemed to be a straightforward pass or fail (Figures A.1 and A.2).



Key

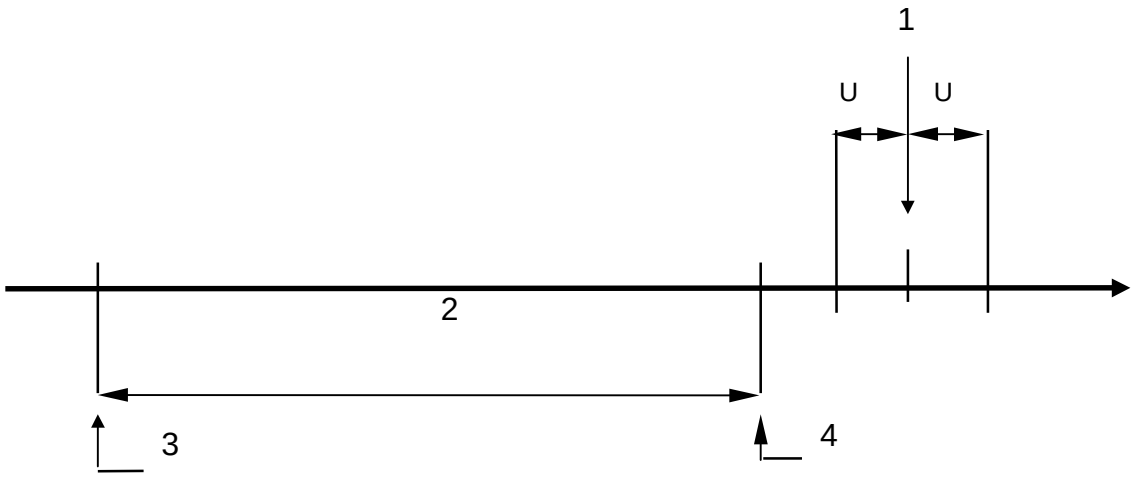
1 Result of a measurement

2 Specification zone

3 Lower specification limit (LSL)

4 Upper specification Limit (USL)

Figure A.1 — Result pass



Key

1 Result of a measurement

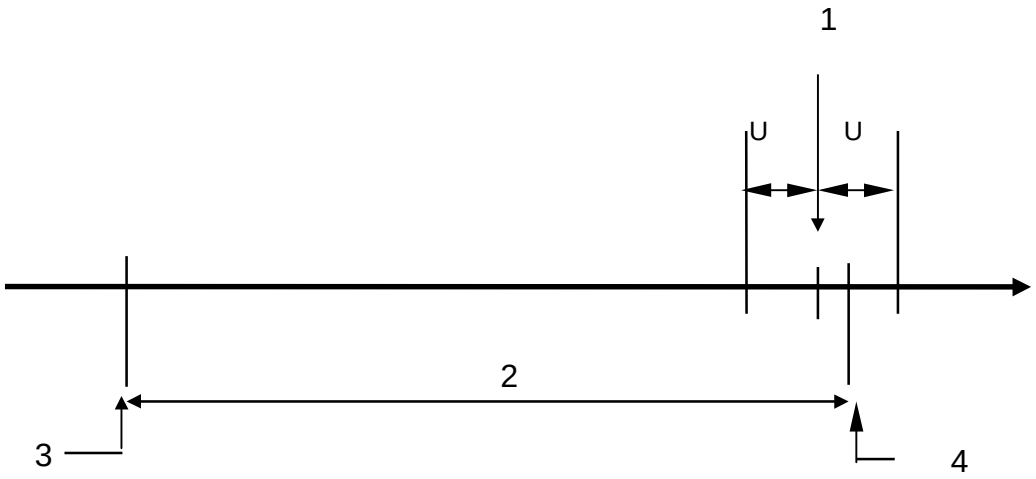
2 Specification zone

3 Lower specification limit (LSL)

4 Upper specification Limit (USL)

Figure A.2 — Result fail

If the limit value for the particular test given in the standard, falls within the range of values calculated from the test data plus/minus the uncertainty U of measurement, then the assessment of passor fail shall be determined on the basis of safety, that is considering the safest conditions for the user of the PPE (Figure A.3).



Key

1 Result of a measurement

2 Specification zone

3 Lower specification limit (LSL)

4 Upper specification Limit (USL)

Figure A.3 — Result fail

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU directives.

This European Standard 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 89/686/EEC.

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

The following clauses of this standard are likely to support requirements of Directive 89/686/EEC, Annex II.

Compliance with the clauses of this standard provides one with means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

Table ZA.1

EU-Directive 89/686/EEC, Annex II		Clauses/subclauses of this standard
1.1.1	Ergonomics	5.1.1, 5.1.2, 4.3, 4.4
1.1.2.1	Highest level of protection possible	5.1.2 (Table 2)
1.1.2.2	Classes of protection appropriate to different levels of risk	5.1.2 (Table 2)
1.2.1.1	Suitable constituent materials	4.2
1.2.1.2	Satisfactory surface condition of all PPE parts in contact with the user	4.1
1.2.1.3	Maximum permissible user impediment	5.1.1, 5.1.2
1.3.1	Adaptation of PPE to user morphology	4.3
1.3.2	Lightness and design strength	5.2
1.4	Information supplied by the manufacturer	Clause 7
2.1	PPE incorporating adjustments systems	4.3
2.2	PPE 'enclosing' the parts of the body to be protected	4.4
2.3	PPE for the face, eyes and respiratory tracts	5.1.1, 5.1.2, 4.4, 5.6.2
2.4	PPE subject to ageing	Clause 7
2.9	PPE incorporating components which can be adjusted or removed by the user	4.3, clause 7
2.14	"Multi-risk" PPE	5.2, 5.1.2
3.1.1	Impact caused by failing or projecting objects and collision of parts of the body with an obstacle	5.2
3.3	Protection against physical injury (abrasion, perforation, cuts, bites)	5.2
3.9.1	Non-ionizing radiation	5.1.2 (Table 2), clause 7

Bibliography

[1] EN 166:2001, Personal eye-protection – Specifications.

[2] EN 172:1994, Personal eye-protection - Sunglare filters for industrial use.

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