

Personal eye protection — Optical test methods

The European Standard EN 167:1995 has the status of a
British Standard

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PSM/2, Eye protection, upon which the following bodies were represented:

- Association of Consulting Scientists
- British College of Optometrists
- British Foundry Association
- British Glass Manufacturers' Confederation
- British Plastics Federation
- British Steel plc
- Department of Trade and Industry (National Physical Laboratory)
- Electricity Association
- Engineering Equipment and Materials Users' Association
- Federation of Manufacturing Opticians
- Flat Glass Manufacturers' Association
- Health and Safety Executive
- Industrial Safety (Protective Equipment) Manufacturers' Association
- Institution of Gas Engineers
- Institution of Mechanical Engineers
- Institution of Occupational Safety and Health
- Light Metal Founders' Association
- Manufacturing Science Finance
- Ministry of Defence
- National Radiological Protection Board
- Safety Equipment Distributors' Association
- Steel Casting Research and Trade Association
- Trades Union Congress
- Zinc Alloy Die Casters' Association

This British Standard, having been prepared under the direction of the Personal Safety Equipment Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 December 1995

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National foreword

This British Standard has been prepared under the direction of the Personal Equipment Standards Policy Committee and is the English language version of EN 167 *Personal eye-protection — Optical test methods*, published by the European Committee for Standardization (CEN). EN 167 was produced as a result of international discussions in which the United Kingdom took an active part. It is based on ISO 4854:1981 *Personal eye-protectors — Optical test methods*.

The scope of this standard includes matters which are given in appendices C and D of BS 2092:1987. It does not include matters which are given in either the specification clauses of BS 2092:1987 or appendices A, B and E to N inclusive of BS 2092:1987. The specification clauses of BS 2092:1987, together with the schedule of tests given in appendix E of BS 2092:1987, are replaced by those given in BS EN 166. The non-optical test methods given in appendices A, B and F to N of BS 2092:1987 are replaced by those given in BS EN 168.

This British Standard, together with BS EN 166:1995 and BS EN 168:1995, replaces BS 2092:1987, which will be withdrawn when BS EN 166 is published.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 16 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Safety, accident prevention, eyes, eye-glasses, oculars, optical tests, inspection, specifications, measurement

English version

Personal eye-protection — Optical test methods

Protection individuelle de l'oeil — Méthodes
d'essais optiques

Persönlicher Augenschutz — Optische
Prüfverfahren

This European Standard was approved by CEN on 1994-05-30. 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 Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 85, Eye-protective equipment, of which the secretariat 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 November 1995, and conflicting national standards shall be withdrawn at the latest by November 1995.

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 EC Directive(s).

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

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1 Scope

This European Standard specifies optical test methods for eye-protectors, the requirements for which are contained in other ENs. Alternative methods may be used if shown to be equivalent. Non-optical test methods are given in EN 168. A definition of terms is given in EN 165.

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.

EN 165:1995, *Personal eye-protection — Vocabulary*.

EN 166:1995, *Personal eye-protection — Specifications*.

EN 168:1995, *Personal eye-protection — Non-optical test methods*.

3 Test for spherical, astigmatic and prismatic refractive powers

NOTE The reference methods for assessment of refractive power are contained in 3.1 and 3.2. If during measurement using the telescope a doubling or other aberration of the image is observed then the ocular may either be classified as a defective, or subjected to further examination using the method described in annex A.

3.1 Testing unmounted oculars covering one eye

3.1.1 Apparatus

3.1.1.1 Telescope

A telescope with an aperture of nominally 20 mm and a magnification between 10 and 30, fitted with an adjustable eyepiece incorporating a reticular.

3.1.1.2 Illuminated target

A target, consisting of a black plate incorporating the cut-out pattern shown in Figure 1, behind which is located a light source of adjustable luminance with a condenser, if necessary, to focus the magnified image of the light source on the telescope objective.

The large annulus of the target has an outer diameter of $(23,0 \pm 0,1)$ mm with an annular aperture of $(0,6 \pm 0,1)$ mm. The small annulus has an inner diameter of $(11,0 \pm 0,1)$ mm with an annular aperture of $(0,6 \pm 0,1)$ mm. The central aperture has a diameter of $(0,6 \pm 0,1)$ mm. The bars are nominally 20 mm long and 2 mm wide with a nominal 2 mm separation.

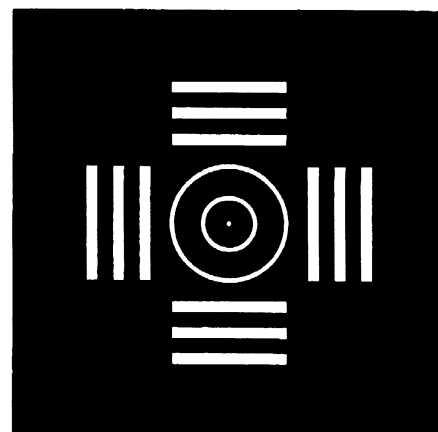


Figure 1 — Telescope target
(dimensions are given in 3.1.1.2)

3.1.1.3 Filter

A filter with its maximum transmittance in the green part of the spectrum may be used to reduce chromatic aberrations.

3.1.1.4 Calibration lenses

Lenses with positive and negative spherical refractive powers of $0,06 \text{ m}^{-1}$, $0,12 \text{ m}^{-1}$ and $0,25 \text{ m}^{-1}$ (tolerance $\pm 0,01 \text{ m}^{-1}$).

3.1.2 Arrangement and calibration of apparatus

The telescope and illuminated target are placed on the same optical axis $(4,60 \pm 0,02)$ m apart.

The observer focuses the reticule and the target and aligns the telescope to obtain a clear image of the pattern. This setting is regarded as the zero point of the focusing scale of the telescope.

The focusing adjustment of the telescope is calibrated with the calibration lenses (3.1.1.4) so that a power of $0,01 \text{ m}^{-1}$ may be measured. Any other equivalent calibration method may be used.

3.1.3 Procedure

The ocular is positioned normal to the telescope axis. Measurements are taken at the points specified in 7.1.2.1.1 of EN 166:1995.