

BRITISH STANDARD

Complete spectacles

Part 2: Specification for prescription spectacles

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 17 and a back cover.

Foreword

Publishing information

This Part of BS 7394 was published by BSI and came into effect on 31 August 2007. It supersedes BS 7394-2:1994, which is withdrawn. It was prepared by Subcommittee CH/172/3, *Spectacles*, under the authority of Technical Committee CH/172, *Ophthalmic optics*.

A list of organizations represented on CH/172 can be obtained on request to its secretary.

BS 7394 was prepared to establish a means of specifying the attributes necessary for complete spectacles.

Information about this document

This Part of BS 7394 has been revised to take account of the change in name and number of various referenced standards where British Standards have been replaced by European standards, and to take account of improvements in lens technology and changes in terminology. The method for specifying surface-dyed tints is now in BS 2738-3.

BS 7394-1, relating to ready-to-wear near vision spectacles, has been withdrawn and replaced by BS EN 14139.

Product certification/inspection/testing. Users of this British Standard are advised to consider the desirability of third-party certification of product conformity with this British Standard. Appropriate conformity attestation arrangements are described in BS EN ISO/IEC 17025. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Use of this document

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

1.1 This Part of BS 7394 specifies requirements for complete spectacles incorporating a pair of prescription lenses.

1.2 This Part of BS 7394 is not applicable to the following:

- a) ready-to-wear spectacles (see **3.2** and also BS EN 14139);
- b) spectacles to be used for eye protection (these spectacles are specified in BS EN 166) or spectacles intended for use in high activity or contact sports;
- c) spectacles without optical power to be used as non-prescription sun glare eye protectors (these spectacles are specified in BS EN 1836).

1.3 This Part of BS 7394 defines several terms that may be used when dispensing or which will help in describing the numerical attributes of various lens characteristics. It also includes a lens retention test which has been developed by the Association for Consumer Research (ACRE) with the assistance of the Federation of Manufacturing Opticians (FMO), the Department of Trade and Industry and the Department of Health.

1.4 This part of BS 7394 is applicable to a product at the point of supply to the intended wearer.

NOTE Annex A contains recommendations for the mounting of lenses and on material and surface quality characteristics that are subjective and which, therefore, cannot be specified.

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.

BS 2738-1, *Spectacle lenses – Part 1: Specification for tolerances on optical properties of mounted spectacle lenses*

BS EN 166: 2002, *Personal eye protection – Specifications*

BS EN ISO 8980-3, *Ophthalmic optics – Uncut finished spectacle lenses – Part 3: Transmittance specifications and test methods*

BS EN ISO 12870:2004, *Ophthalmic optics – Spectacle frames – Requirements and test methods*

BS EN ISO 14889:2003, *Ophthalmic optics – Spectacle lenses – Fundamental requirements for uncut finished lenses*

3 Definitions

For the purposes of this Part of BS 7394, the definitions given in BS EN ISO 13666, BS 3521-1, BS 3521-2 and BS EN ISO 12870 apply, together with the following.

NOTE If the definitions in BS EN ISO 13666 differ from those quoted below, the definitions in BS EN ISO 13666 take priority.

3.1 prescription spectacles

spectacles glazed in accordance with a prescription¹⁾ written for a particular individual wearer

3.2 ready-to-wear spectacles

spectacles intended only for near vision and reading use having or incorporating a pair of single vision lenses of equal positive spherical power in which the glazing has not been carried out in direct response to a written prescription by a qualified practitioner [BS EN 14139]

NOTE The term “ready-to-wear spectacles” (also known as “ready-made spectacles”) as defined in BS EN 14139 is restricted to spectacles having or incorporating single vision lenses. The rationale for this restriction is that spectacle lenses other than single vision lenses (e.g. bifocal, multifocal, progressive power lenses) are not recommended for use in ready-to-wear spectacles due to the need of a qualified practitioner’s prescription and dispensing for such lenses.

3.3 Abbe number

mathematical expression for determining the correction for chromatic aberration of an optical [BS EN ISO 13666]

NOTE This is expressed as either:

$$v_d = \frac{n_d - 1}{n_F - n_C}$$

where:

v_d is the Abbe number for the yellow helium d-line (wavelength: 587.56 nm);

n_d is the refractive index of the yellow helium d-line (wavelength: 587.56 nm);

n_F is the refractive index of the blue Hydrogen F-line (wavelength: 486.13 nm); and

n_C is the refractive index of the red Hydrogen C-line (wavelength: 656.27 nm).

or:

$$v_e = \frac{n_e - 1}{n_{F'} - n_{C'}}$$

where:

v_e is the Abbe number for the green mercury e-line (wavelength: 546.07 nm);

n_e is the refractive index of the green mercury e-line (wavelength: 546.07 nm);

$n_{F'}$ is the refractive index of the blue cadmium F'-line (wavelength: 479.99 nm); and

$n_{C'}$ is the refractive index of the red cadmium C'-line (wavelength: 643.85 nm).

These reference wavelengths are given in BS EN ISO 7944:1998.

¹⁾ The presentation of prescriptions and prescription orders for ophthalmic lenses is specified in BS 2738-3.

3.4 refractive index [of a medium, for a monochromatic radiation of wavelength λ in vacuum, $n(\lambda)$]

ratio of the velocity of the electromagnetic waves in vacuum to the phase velocity of the waves of the monochromatic radiation in the medium [IEC 60050-845:1987, 04-101]

NOTE 1 For technical applications the refractive index is given against air instead of against vacuum.

NOTE 2 Wavelengths to be used for the characterization of optical glasses, all kinds of optical systems and instruments together with spectacle lenses are specified in BS EN ISO 7944.

3.5 luminous transmittance (LT)

τ_v

ratio of the luminous flux transmitted by the lens or filter to the incident luminous flux [BS EN ISO 13666]

NOTE The terms “light transmission factor” (LTF) and “luminous transmission factor” (LTF) are deprecated.

$$\tau_v = 100 \cdot \frac{\int_{380\text{nm}}^{780\text{nm}} \tau(\lambda) \cdot V(\lambda) \cdot S_{D65\lambda}(\lambda) \cdot d\lambda}{\int_{380\text{nm}}^{780\text{nm}} V(\lambda) \cdot S_{D65\lambda}(\lambda) \cdot d\lambda} \%$$

where:

$\tau(\lambda)$ is the spectral transmittance of the tinted spectacle lens

$V(\lambda)$ is the spectral luminous efficiency function for daylight (see BS ISO/CIE 10527)

$S_{D65\lambda}(\lambda)$ is the spectral distribution of radiation of CIE standard illuminant D 65 (see BS ISO/CIE 10526).

3.6 design reference point

point or points, stipulated by the manufacturer, on the finished surface of the lens blank or front surface of the finished lens at which the design specifications apply [BS EN ISO 13666]

NOTE Examples are the distance design reference point and the near design reference point.

3.7 distance design reference point

point, stipulated by the manufacturer, on the front surface of a finished lens or the finished surface of a lens blank at which the design specifications for the distance portion apply [BS EN ISO 13666]

3.8 near design reference point

point, stipulated by the manufacturer, on the front surface of a finished lens or the finished surface of a lens blank at which the design specifications for the near portion apply [BS EN ISO 13666]