



**BSI Standards Publication**

## **Ophthalmic optics — Review of the test methods used to assess scratch and abrasion resistance of spectacle lenses**

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## National foreword

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

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## **Ophthalmic optics — Review of the test methods used to assess scratch and abrasion resistance of spectacle lenses**

*Optique ophtalmique — Revue des méthodes de test utilisées pour évaluer la résistance à la rayure et à l'abrasion des verres ophtalmiques*



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## 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](http://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](http://www.iso.org/patents)).

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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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 7, *Ophthalmic optics and instruments*.

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](http://www.iso.org/members.html).

# Ophthalmic optics — Review of the test methods used to assess scratch and abrasion resistance of spectacle lenses

## 1 Scope

This document describes the most commonly used test methods considered in standardization work relating to scratch and abrasion resistance of plastic spectacle lenses along with their technical capacities and limitations. It includes the ISO test method for assessment of claims for basic abrasion resistance in ISO 8980-5.

This document is intended to be of benefit to any future interest in ISO standardization on scratch and abrasion resistance of spectacle lenses.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

No terms and definitions are listed in this document.

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 Background

As the spectacle lens market shifted from glass toward plastic in the 1970s, the demand for improved abrasion resistant coatings for plastic lenses resulted in the need to assess and compare the performance of the new coatings in the market.

A number of very different abrasion test methods were developed over the years which employ a variety of ways to abrade the lens. Each method uses a unique scratch or abrasion mechanism which affects how the lens is assessed for its ability to resist damage.

In addition, different methods of assessment of test lens surface damage are used by these test methods.

Together, the different mechanisms of abrading and the different assessment methods often result in dramatically different ranking and rating of the performances of lens surfaces that do not reflect marketplace performance and the experience of wearers in real life conditions.

Considerable national and ISO standardization activity was directed to find one single test method that would reliably predict wearer experience or market performance. After much work, it was realized this goal could not be achieved and that work was abandoned.

In its place an ISO standard (ISO 8980-5) was successfully developed with a methodology capable of determining whether a lens surface claimed to be abrasion resistant could achieve a basic performance level. This test method follows the only known approach avoiding the possibility of using the standard test to rank products in the market.

Further work followed the successful publishing of ISO 8980-5, this time with the aim of creating a standard for “enhanced abrasion resistance” at a higher level than “basic level”.