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**Ophthalmic optics and instruments —  
Free form technology — Spectacle  
lenses and measurement**

*Optique et instruments ophtalmiques — Technologie free form —  
Verres de lunettes et mesurage*

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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 on 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 the following URL: [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*.

# Ophthalmic optics and instruments — Free form technology — Spectacle lenses and measurement

## 1 Scope

This document outlines all the steps from refraction to dispensing of spectacles, with particular attention to the benefits added by using free form technology, and provides a collection of relevant terms and descriptions.

This document does not contain the proprietary features of lens designs provided by suppliers.

## 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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

## 4 Technical introduction

### 4.1 Preliminaries

**4.1.1** There are various ways of spelling the term “free form”. This document uses two separate words.

**4.1.2** There are various terms explaining spectacle lens optical power design which are commonly used such as “optical function”, “optical characteristics”, “optical properties”, or “design property”. For purpose of simplicity, this document uses the word “characteristics”. The phrase “optical properties” is used simply to describe the optical results of the geometry of the lens, but not an intended design or characteristic.

**4.1.3** A typical flowchart including refraction, dispensing and manufacturing is shown in [Figure A.1](#) (see [Annex A](#)).

**4.1.4** A glossary of terms and their descriptions is provided in [Annex C](#).

### 4.2 What is free form?

In ophthalmic optics, the term “free form surfacing” refers to a spectacle lens surfacing process that is capable of producing continuous, smooth, non-symmetrical lens surfaces that lack point, axial or plane symmetry and are described by three-dimensional coordinates created by mathematical formulation. This design and surfacing process enables optimization of the lens performance.

Conventional lens surfacing technology which smooths and polishes using hard lap tools can produce only simple spherical or toroidal lens surfaces.