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## Optics and Photonics — Bulk absorption optical filters

*Optique et photonique — Filtres optiques à absorption de masse*



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Published in Switzerland

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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)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 3, *Optical materials and components*.

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).

## Introduction

The optical properties of a bulk absorption filter are characterized by spectrophotometric values. These values relate to the energy transported by electromagnetic waves (radiant or luminous) and they vary as a function of wavelength. Additional influences can be caused by scattering.

NOTE 1 The functional spectral dependency is generally indicated by including the wavelength,  $\lambda$ , in parentheses as part of the symbol.

NOTE 2 The wavelength,  $\lambda$ , can be replaced by the wavenumber,  $\sigma$ , or the photon energy,  $h\nu$ ,  $h$  = Planck constant;  $\nu$  = frequency. The units recommended are the nanometre (nm) or the micrometre ( $\mu\text{m}$ ) for the wavelength, the reciprocal centimetre ( $\text{cm}^{-1}$ ) for the wavenumber and the electron volt (eV) for the photon energy. Bulk absorption filters are defined according to their function, i.e. according to the nature of the principal modification of the spectral transmission (see [Table 1](#)).



# Optics and Photonics — Bulk absorption optical filters

## 1 Scope

This document specifies filter functions of uncoated bulk absorption filters for optical applications excluding ophthalmic optics (spectacles) and gives a standard form for their specification. Additionally, basic definitions and a description of the specification concerning optical bulk absorption filters are given.

This document specifies the optical properties of the filters and the test and measurement methods whenever necessary.

This document does not specify any material properties (internal quality, homogeneity, etc.) and it does not apply to any production method.

This document applies to both the raw material (filter glass, filter plastics, etc.) and the polished component.

NOTE 1 Colorimetric parameters for the description of the filter function are specified in e.g. ISO 11664-1 and ISO 11664-2.

NOTE 2 For filters where the spectral transmission characteristics are achieved by the application of optical coatings, see ISO 9211 series.

NOTE 3 In the case of high power applications, further optical effects may occur.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 9211-1, *Optics and photonics — Optical coatings — Part 1: Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9211-1 and the following terms and definitions apply.

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/>.

### 3.1 Boundary conditions

#### 3.1.1

##### **optical surface**

optically effective surface, into which the radiation enters the bulk absorption filter or from which it leaves

Note 1 to entry: In general, bulk absorption filters are made as plane parallel plates and have two optical surfaces which are opposite to each other.