

Optics and photonics - Reference wavelengths (ISO 7944:2024)

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ICS 17.180.01

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EUROPEAN STANDARD

EN ISO 7944

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English Version

## Optics and photonics - Reference wavelengths (ISO 7944:2024)

Optique et photonique - Longueurs d'onde de référence (ISO 7944:2024)

Optik und Photonik - Bezugswellenlängen (ISO 7944:2024)

This European Standard was approved by CEN on 1 December 2024.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## European foreword

This document (EN ISO 7944:2024) has been prepared by Technical Committee ISO/TC 172 "Optics and photonics" in collaboration with Technical Committee CEN/TC 170 "Ophthalmic optics" the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 7944:1998.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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## Endorsement notice

The text of ISO 7944:2024 has been approved by CEN as EN ISO 7944:2024 without any modification.

# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Reference wavelengths, principal dispersions and Abbe numbers</b> .....	<b>1</b>
4.1 General.....	1
4.2 Mercury e-line 546,075 nm.....	1
4.3 Helium d-line 587,562 nm.....	2
4.4 Wavelength tables.....	2
<b>Bibliography</b> .....	<b>4</b>

## 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 document 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)).

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This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 170, *Ophthalmic optics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 7944:1998). It also incorporates the Technical Corrigendum ISO 7944:1998/Cor 1:2009, which has been technically revised.

The main changes are as follows:

- updated to the current format and drafting rules;
- clarification through rewording in [4.1](#) and deletion of Note;
- addition of wavelengths to [Tables 1, 2](#) and [3](#), alignment of precision of the stated wavelengths with the sources and explanation of the source.

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).

# Optics and photonics — Reference wavelengths

## 1 Scope

This document specifies reference wavelengths to be used for the characterization of optical materials, optical systems and instruments, and ophthalmic lenses. It defines the associated principal refractive indices and principal dispersions, as well as the Abbe numbers with regard to these reference wavelengths and principal dispersions.

## 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 terminology databases for use in standardization at the following addresses:

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

## 4 Reference wavelengths, principal dispersions and Abbe numbers<sup>1)</sup>

### 4.1 General

For ophthalmic lenses and many non-ophthalmic optical applications, the reference wavelengths are the mercury e-line 546,07 nm (see 4.2) and the helium d-line 587,56 nm (see 4.3).

For other non-ophthalmic optical applications, the appropriate reference wavelength shall be specified. Any reference wavelength is allowed (see Tables 1, 2, 3 as well as other wavelengths).

If nothing is specified, the mercury e-line shall be the reference wavelength.

### 4.2 Mercury e-line 546,075 nm

The associated principal refractive index  $n_e$  is the refractive index at the green mercury e-line and the associated principal dispersion is given by Formula (1):

$$n_{F'} - n_{C'} \tag{1}$$

where

$n_{F'}$  is the refractive index at the blue cadmium F'-line;

$n_{C'}$  is the refractive index at the red cadmium C'-line.

1) ISO 9802 gives the terms and definitions for principal dispersion and Abbe number.