

STN	Optika a fotonika Lasery a laserové zariadenia Skúšobné metódy spektrálnych charakteristík laserov (ISO 13695: 2024)	STN EN ISO 13695 19 2020
------------	---	--

Optics and photonics - Lasers and laser-related equipment - Test methods for the spectral characteristics of lasers (ISO 13695:2024)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/25

Obsahuje: EN ISO 13695:2024, ISO 13695:2024

Oznámením tejto normy sa ruší
STN EN ISO 13695 (19 2020) z novembra 2004

140074

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2025
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii
v znení neskorších predpisov.

EUROPEAN STANDARD

EN ISO 13695

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2024

ICS 31.260

Supersedes EN ISO 13695:2004

English Version

Optics and photonics - Lasers and laser-related equipment
- Test methods for the spectral characteristics of lasers
(ISO 13695:2024)

Optique et photonique - Lasers et équipement associé
aux lasers - Méthodes d'essai des caractéristiques
spectrales des lasers (ISO 13695:2024)

Optik und Photonik - Laser und Laseranlagen -
Prüfverfahren für die spektralen Kenngrößen von
Lasern (ISO 13695:2024)

This European Standard was approved by CEN on 30 November 2024.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN ISO 13695:2024 (E)

Contents	Page
European foreword.....	3

European foreword

This document (EN ISO 13695:2024) has been prepared by Technical Committee ISO/TC 172 "Optics and photonics" in collaboration with Technical Committee CEN/TC 123 "Lasers and photonics" 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 13695:2004.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 13695:2024 has been approved by CEN as EN ISO 13695:2024 without any modification.



International Standard

ISO 13695

Optics and photonics — Lasers and laser-related equipment — Test methods for the spectral characteristics of lasers

*Optique et photonique — Lasers et équipement associé aux lasers
— Méthodes d'essai des caractéristiques spectrales des lasers*

**Second edition
2024-11**

ISO 13695:2024(en)**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

ISO 13695:2024(en)**Contents**

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	7
5 Traceability	8
6 Measurement of wavelength and bandwidth	9
6.1 General.....	9
6.1.1 Preparations.....	9
6.1.2 Common laser types.....	9
6.2 Types of measurements.....	9
6.2.1 General.....	9
6.2.2 Low accuracy measurements.....	10
6.2.3 Medium accuracy measurements.....	10
6.2.4 High accuracy measurements.....	10
6.3 Equipment selection.....	10
6.4 Measurements in air.....	11
6.5 Measurements at low resolution.....	12
6.5.1 Principle.....	12
6.5.2 Measurement procedure.....	12
6.5.3 Analysis.....	13
6.6 Measurement at higher resolution.....	13
6.6.1 General.....	13
6.6.2 Preliminary test.....	13
6.6.3 Measurement with a grating spectrometer.....	14
6.6.4 Measurement with an interferometer.....	14
6.6.5 Measurement with photoelectric mixing methods.....	15
6.6.6 Analysis for medium accuracy $U_\lambda/\lambda = U_\nu/\nu$ in the range 10^{-5} to 10^{-4}	16
6.6.7 Analysis for high accuracy $U_\lambda/\lambda = U_\nu/\nu < 10^{-5}$	16
7 Measurement of wavelength stability	17
7.1 Dependence of the wavelength on operating conditions.....	17
7.2 Wavelength stability of a single frequency laser.....	17
8 Test report	17
Annex A (informative) Refractive index of air	20
Annex B (informative) Criteria for the choice of a grating monochromator and its accessories — Calibration	21
Annex C (informative) Criteria for the choice of a Fabry-Perot interferometer	24
Bibliography	25

ISO 13695:2024(en)

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO [had/had not] received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

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.

This document was prepared by Technical Committee ISO/TC 172, *Optics and Photonics*, Subcommittee SC 9, *Laser and electro-optical systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 123, *Lasers and photonics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 13595:2004) of which it constitutes a minor revision.

The main changes are as follows:

- editorial changes related to the new format;
- the symbol for side-mode suppression ratio was adapted from *SMS* to R_{SMS} ;
- *lg* was changed to \log_{10} in [3.15](#);
- the title of the SC 9 was updated;
- intensity was adapted to irradiance;
- in the Bibliography Reference 2 was updated and replaced by References 2 and 3.

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.

ISO 13695:2024(en)**Introduction**

The spectral characteristics of a laser, such as its peak wavelength or spectral linewidth, are important for potential applications. Examples are the specific application requirements of interferometry and lithography. This document gives definitions of key parameters describing the spectral characteristics of a laser, and provides guidance on performing measurements to determine these parameters for common laser types.

The acceptable level of uncertainty in the measurement of wavelength will vary according to the intended application. Therefore, equipment selection and measurement and evaluation procedures are outlined for three accuracy classes. To standardize reporting of spectral characteristics measurement results, a report example is also included.

Optics and photonics — Lasers and laser-related equipment — Test methods for the spectral characteristics of lasers

1 Scope

This document specifies methods by which the spectral characteristics such as wavelength, bandwidth, spectral distribution and wavelength stability of a laser beam can be measured. This document is applicable to both continuous wave (cw) and pulsed laser beams. The dependence of the spectral characteristics of a laser on its operating conditions may also be important.

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.

ISO 11145, *Optics and photonics — Lasers and laser-related equipment — Vocabulary and symbols*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

IEC 60747-5-1, *Discrete semiconductor devices and integrated circuits — Part 5-1: Optoelectronic devices — General*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN