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Optics and photonics — Lasers and laser-related equipment — Test methods for laser beam power, energy and temporal characteristics

Optique et photonique — Lasers et équipements associés aux lasers — Méthodes d'essai de la puissance et de l'énergie des faisceaux lasers et de leurs caractéristiques temporelles

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Foreword

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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).

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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.

This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*.

This fourth edition cancels and replaces the third edition (ISO 11554:2006) which has been technically revised. The following changes were made:

a) Subclause 3.1: definition of RIN was changed in order to harmonize with ISO 11145:2016.

b) Clause 4, note 3: Expression for dB calculation was corrected.

c) Figure 3: Explanation of M was modified.

d) Subclause 7.9: Measurement of RIN was added, and former content of 7.9 was moved to 7.10.

e) Subclause 7.10: Explanation for the measurement of small signal cut-off frequency was modified.

f) Subclause 8.9: Explanation for RIN was added and former content of 8.9 was moved to 8.10.

g) Clause 9, item 8): Parameters for RIN were added, and former content of item 8) was moved to item 9).

h) Equation numbers were renumbered.

Introduction

The measurement of laser power (energy for pulsed lasers) is a common type of measurement performed by laser manufacturers and users. Power (energy) measurements are needed for laser safety classification, stability specifications, maximum laser output specifications, damage avoidance, specific application requirements, etc. This document provides guidance on performing laser power (energy) measurements as applied to stability characterization. The stability criteria are described for various temporal regions (e.g. short-term, medium term and long term) and provide methods to quantify these specifications. This document also covers pulse measurements where detector response speed can be critically important when analysing pulse shape or peak power of short pulses. To standardize reporting of power (energy) measurement results, a report template is also included.

This document is a Type B standard as stated in ISO 12100.

The provisions of this document may be supplemented or modified by a Type C standard.

Note that for machines which are covered by the scope of a Type C standard and which have been designed and built according to the provisions of that standard, the provisions of that Type C standard take precedence over the provisions of this Type B standard.