



Designation: 51539 – 23^{ε1}

Standard Guidance for Use of Radiation-Sensitive Indicators¹

This standard is issued under the fixed designation 51539; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Footnote 1 and references to ISO/ASTM standards were editorially updated in November 2024.

1. Scope

1.1 This document covers procedures for using radiation-sensitive indicators (referred to hereafter as *indicators*) in radiation processing. These indicators may be labels, papers, inks or packaging materials which undergo a visual change when exposed to ionizing radiation (**1-5**).²

1.2 The purpose for using indicators is to determine visually whether or not a product has been irradiated, rather than to measure different dose levels.

1.3 Indicators are not dosimeters and should not be used as a substitute for proper dosimetry. Information about dosimetry systems for radiation processing is provided in other ASTM documents (see ASTM Guide 51261).

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced documents

2.1 ASTM Standards:³

E170 Terminology Relating to Radiation Measurements and Dosimetry

¹ This document is under the jurisdiction of ASTM Committee E61 on Radiation Processing and is the direct responsibility of Subcommittee E61.04 on Specialty Application. Originally developed as a joint ASTM/ISO standard in conjunction with ISO/TC 85/WG 3.

Current edition approved Jan. 12, 2023. Published May 2023. Originally approved in 1993. Last previous edition approved in 2013 as ISO/ASTM 51539:2013(E). DOI:10.1520/51539-23E01.

² The boldface numbers in parentheses refer to the bibliography at the end of this document.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E3083 Terminology Relating to Radiation Processing: Dosimetry and Applications

51261 Practice for Calibration of Routine Dosimetry Systems for Radiation Processing

51608 Practice for Dosimetry in an X-ray (Bremsstrahlung) Facility for Radiation Processing at Energies between 50 keV and 7.5 MeV

51649 Practice for Dosimetry in an Electron Beam Facility for Radiation Processing at Energies between 300 keV and 25 MeV

51702 Practice for Dosimetry in a Gamma Facility for Radiation Processing

51939 Practice for Blood Irradiation Dosimetry

51940 Guide for Dosimetry for Sterile Insect Release Programs

2.2 *International Commission on Radiation Units and Measurements (ICRU) Reports:*⁴

ICRU Report 85 Fundamental Quantities and Units for Ionizing Radiation

3. Terminology

3.1 Definitions:

3.1.1 *dosimetry system*—interrelated elements used for determining absorbed dose, consisting of dosimeters, measurement instruments and their associated reference standards, and procedures for the system's use.

3.1.2 *indicator*—see *radiation-sensitive indicator*.

3.1.3 *process load*—volume of material with a specified product loading configuration irradiated as a single entity.

3.1.4 *radiation-sensitive indicator*—material such as coated or impregnated adhesive-backed substrate, ink, coating or other materials which may be affixed to or printed on the process loads, and which undergoes a visual change when exposed to ionizing radiation.

3.1.4.1 *Discussion*—This visual change may be as observed with the unaided eye or with an eye aid such as an optical filter.

3.1.4.2 *Discussion*—In the past, radiation-sensitive indicators have been referred to by different names (**1-5**) including

⁴ Available from the International Commission on Radiation Units and Measurements, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814, USA.