



Standard Practice for Use of a LiF Photo-Fluorescent Film Dosimetry System¹

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1. Scope

1.1 This practice covers the handling, testing, and procedure for using a lithium fluoride (LiF)-based photo-fluorescent film dosimetry system to measure absorbed dose (relative to water) in materials irradiated by photons or electrons. Other alkali halides that may also exhibit photofluorescence (for example, NaCl, NaF, and KCl) are not covered in this practice. Although various alkali halides have been used for dosimetry for years utilizing thermoluminescence, the use of photoluminescence is relatively new.

1.2 This practice applies to photo-fluorescent film dosimeters (referred hereafter as photo-fluorescent dosimeters) that can be used within part or all of the following ranges:

- 1.2.1 Absorbed dose range of 5×10^{-2} to 3×10^2 kGy **(1-3)**.²
- 1.2.2 Absorbed dose rate range of 0.3 to 2×10^4 Gy/s **(2-5)**.
- 1.2.3 Radiation energy range for photons of 0.05 to 10 MeV **(2)**.
- 1.2.4 Radiation energy range for electrons of 0.1 to 10 MeV **(2)**.
- 1.2.5 Radiation temperature range of -20 to +60°C **(6,7)**.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

- 2.1 *ASTM Standards*:³

¹ This practice is under the jurisdiction of ASTM Committee E61 on Radiation Processing and is the direct responsibility of Subcommittee E61.02 on Dosimetry Systems.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

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

E170 Terminology Relating to Radiation Measurements and Dosimetry

E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

E925 Practice for Monitoring the Calibration of Ultraviolet-Visible Spectrophotometers whose Spectral Bandwidth does not Exceed 2 nm

2.2 *ISO/ASTM Standards*:

51204 Practice for Dosimetry in Gamma Irradiation Facilities for Food Processing

51261 Guide for Selection and Calibration of Dosimetry Systems for Radiation Processing

51431 Practice for Dosimetry in Electron and Bremsstrahlung Irradiation Facilities for Food Processing

51608 Practice for Dosimetry in an X-ray (Bremsstrahlung) Facility for Radiation Processing

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 Irradiation Facility for Radiation Processing

51707 Guide for Estimating Uncertainties in Dosimetry for Radiation Processing

51818 Practice for Dosimetry in an Electron Beam Facility for Radiation Processing at Energies between 80 keV and 300 keV

51956 Practice for Thermoluminescence-Dosimetry (TLD) Systems for Radiation Processing

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

ICRU Report 14 Radiation Dosimetry: X-rays and Gamma rays with Maximum Photon Energies Between 0.6 and 50 MeV

ICRU Report 17 Radiation Dosimetry: X-rays Generated at Potentials of 5 to 150 kV

ICRU Report 34 The Dosimetry of Pulsed Radiation

ICRU Report 35 Radiation Dosimetry: Electron Beams with Energies Between 1 and 50 MeV

ICRU Report 60 Fundamental Quantities and Units for Ionizing Radiation

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