



Standard Practice for Analysis and Interpretation of Physics Dosimetry Results from Test Reactor Experiments¹

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1. Scope

1.1 This practice covers the methodology summarized in **Annex A1** to be used in the analysis and interpretation of physics-dosimetry results from test reactors.

1.2 This practice relies on, and ties together, the application of several supporting ASTM standard practices, guides, and methods.

1.3 Support subject areas that are discussed include reactor physics calculations, dosimeter selection and analysis, exposure units, and neutron spectrum adjustment methods.

1.4 This practice is directed towards the development and application of physics-dosimetry-metallurgical data obtained from test reactor irradiation experiments that are performed in support of the operation, licensing, and regulation of LWR nuclear power plants. It specifically addresses the physics-dosimetry aspects of the problem. Procedures related to the analysis, interpretation, and application of both test and power reactor physics-dosimetry-metallurgy results are addressed in Practices **E185**, **E853**, and **E1035**, Guides **E900**, **E2005**, **E2006** and Test Method **E646**.

1.5 *This standard may involve hazardous materials, operations, and equipment. 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:²

- E185** Practice for Design of Surveillance Programs for Light-Water Moderated Nuclear Power Reactor Vessels
- E482** Guide for Application of Neutron Transport Methods for Reactor Vessel Surveillance, E706 (IID)

- E646** Test Method for Tensile Strain-Hardening Exponents (n -Values) of Metallic Sheet Materials
- E693** Practice for Characterizing Neutron Exposures in Iron and Low Alloy Steels in Terms of Displacements Per Atom (DPA), E 706(ID)
- E706** Master Matrix for Light-Water Reactor Pressure Vessel Surveillance Standards, E 706(0) (Withdrawn 2011)³
- E844** Guide for Sensor Set Design and Irradiation for Reactor Surveillance, E 706 (IIC)
- E853** Practice for Analysis and Interpretation of Light-Water Reactor Surveillance Results, E706(IA)
- E854** Test Method for Application and Analysis of Solid State Track Recorder (SSTR) Monitors for Reactor Surveillance, E706(IIIB)
- E900** Guide for Predicting Radiation-Induced Transition Temperature Shift in Reactor Vessel Materials, E706 (IIF)
- E910** Test Method for Application and Analysis of Helium Accumulation Fluence Monitors for Reactor Vessel Surveillance, E706 (IIIC)
- E944** Guide for Application of Neutron Spectrum Adjustment Methods in Reactor Surveillance, E 706 (IIA)
- E1005** Test Method for Application and Analysis of Radiometric Monitors for Reactor Vessel Surveillance, E 706 (IIIA)
- E1018** Guide for Application of ASTM Evaluated Cross Section Data File, Matrix E706 (IIB)
- E1035** Practice for Determining Neutron Exposures for Nuclear Reactor Vessel Support Structures
- E2005** Guide for Benchmark Testing of Reactor Dosimetry in Standard and Reference Neutron Fields
- E2006** Guide for Benchmark Testing of Light Water Reactor Calculations

2.2 Nuclear Regulatory Documents:

- Code of Federal Regulations, “*Fracture Toughness Requirements*,” Chapter 10, Part 50, Appendix G⁴
- Code of Federal Regulations, “*Reactor Vessel Materials Surveillance Program Requirements*,” Chapter 10, Part 50, Appendix H⁴

¹ This practice is under the jurisdiction of ASTM Committee **E10** on Nuclear Technology and Applications and is the direct responsibility of Subcommittee **E10.05** on Nuclear Radiation Metrology.

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² The reference in parentheses refers to Section 5 as well as to Figs. 1 and 2 of Matrix **E706**.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.