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Standard Guide for Application of ASTM Evaluated Cross Section Data File¹

This standard is issued under the fixed designation E1018; 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—The title of this guide and the Referenced Documents were updated in May 2017.

1. Scope

1.1 This guide covers the establishment and use of an ASTM evaluated nuclear data cross section and uncertainty file for analysis of single or multiple sensor measurements in neutron fields related to light water reactor LWR-Pressure Vessel Surveillance (PVS). These fields include in- and ex-vessel surveillance positions in operating power reactors, benchmark fields, and reactor test regions.

1.2 Requirements for establishment of ASTM-approved cross section files address data format, evaluation requirements, validation in benchmark fields, evaluation of error estimates (covariance file), and documentation. A further requirement for components of the ASTM-approved cross section file is their internal consistency when combined with sensor measurements and used to determine a neutron spectrum.

1.3 Specifications for use include energy region of applicability, data processing requirements, and application of uncertainties.

1.4 This guide is directly related to and should be used primarily in conjunction with Guides E482 and E944, and Practices E560, E185, and E693.

1.5 The ASTM cross section and uncertainty file represents a generally available data set for use in sensor set analysis. However, the availability of this data set does not preclude the use of other validated data, either proprietary or nonproprietary. When alternate cross section files are used that deviate from the requirements laid out in this standard, the deviations should be noted to the customer of the dosimetry application.

1.6 *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.*

1.7 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:²

- E170 Terminology Relating to Radiation Measurements and Dosimetry
- 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
- E560 Practice for Extrapolating Reactor Vessel Surveillance Dosimetry Results, E 706(IC) (Withdrawn 2009)³
- E693 Practice for Characterizing Neutron Exposures in Iron and Low Alloy Steels in Terms of Displacements Per Atom
- E844 Guide for Sensor Set Design and Irradiation for Reactor Surveillance
- E853 Practice for Analysis and Interpretation of Light-Water Reactor Surveillance Results
- E854 Test Method for Application and Analysis of Solid State Track Recorder (SSTR) Monitors for Reactor Surveillance
- E910 Test Method for Application and Analysis of Helium Accumulation Fluence Monitors for Reactor Vessel Surveillance
- E944 Guide for Application of Neutron Spectrum Adjustment Methods in Reactor Surveillance
- E1005 Test Method for Application and Analysis of Radiometric Monitors for Reactor Vessel Surveillance
- E2005 Guide for Benchmark Testing of Reactor Dosimetry in Standard and Reference Neutron Fields

¹ This guide 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 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.

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