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Standard Terminology Relating to Radiation Measurements and Dosimetry[1]

This standard is issued under the fixed designation E170; 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.

INTRODUCTION

This terminology generally covers terms that apply to radiation measurements and dosimetry associated with energy deposition and radiation effects, or damage, in materials caused by interactions by high-energy radiation fields. The common radiation fields considered are X-rays, gamma rays, electrons, alpha particles, neutrons, and mixtures of these fields. This treatment is not intended to be exhaustive but reflects special and common terms used in technology and applications of interest to Committee E10, as for example, in areas of radiation effects on components of nuclear power reactors, radiation hardness testing of electronics, and radiation processing of materials.

This terminology uses recommended definitions and concepts of quantities, with units, for radiation measurements as contained in the International Commission on Radiation Units and Measurements (ICRU) Report 85a on "Fundamental Quantities and Units for Ionizing Radiation," October 2011.[2] Those terms that are defined essentially according to the terminology of ICRU Report 85a will be followed by ICRU in parentheses. It should also be noted that the units for quantities used are the latest adopted according to the International System of Units (SI) which are contained in Appendix X1 as taken from a table in ICRU Report 85a.[2] This terminology also uses recommended definitions of two JCGM documents,[3] namely "International vocabulary of metrology" (VIM, 2012, unless indicated otherwise) and "Guide to the expression of uncertainty in measurement" (GUM, 2008). Those terms that are defined essentially according to the terminology of these documents will be followed by either VIM or GUM in parentheses.

A term is boldfaced when it is defined in this standard. For some terms, text in italics is used just before the definition to limit its field of application, for example, see **activity**.

1. Referenced Documents

1.1 *ASTM Standards:*[4]

E380 Practice for Use of the International System of Units (SI) (the Modernized Metric System) (Withdrawn 1997)[5]

E722 Practice for Characterizing Neutron Fluence Spectra in Terms of an Equivalent Monoenergetic Neutron Fluence for Radiation-Hardness Testing of Electronics

E910 Test Method for Application and Analysis of Helium Accumulation Fluence Monitors for Reactor Vessel Surveillance, E706 (IIIC)

1.2 *Joint Committee for Guides in Metrology (JCGM) Reports:*[3]

JCGM 100:2008, GUM 1995 , with minor corrections, Evaluation of measurement data – Guide to the expression of uncertainty in measurement

JCGM 200:2012, VIM International vocabulary of metrology – Basic and general concepts and associated terms

[1] This terminology is under the jurisdiction of ASTM Committee E10 on Nuclear Technology and Applications and is the direct responsibility of Subcommittee E10.93 on Editorial.

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[2] ICRU Report 60 has been superseded by ICRU Report 85a on "Fundamental Quantities and Units for Ionizing Radiation," October 2011. Both of these documents are available from International Commission on Radiation Units and Measurements (ICRU), 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814.

[3] Document produced by Working Groups of the Joint Committee for Guides in Metrology (JCGM). Available free of charge at BIPM website (http://www.bipm.org).

[4] 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.

[5] The last approved version of this historical standard is referenced on www.astm.org.

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