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ANSI/ANS-6.1.1-1991 (W2001)

American Nuclear Society

neutron and gamma-ray fluence-to-dose factors

an American National Standard

WITHDRAWN

August 23, 2001
ANSI/ANS-6.1.1-1991

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published by the
American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60526 USA

ANSI/ANS-6.1.1-1991 (W2001)

Table 6

Polynomial Coefficients in the Analytic Fit of $h_E(E)$ for Neutrons*

Neutron Energy Bounds	Coefficients				
	C_0	C_1	C_2	C_3	C_4
AP Exposure[a]					
$E \leq 0.01$ MeV	3.430895E+00[b]	7.725710E-01	9.834081E-02	4.903466E-03	8.149667E-05
$E > 0.01$ MeV	4.952167E+00	6.644235E-01	-1.017445E-01	-1.496004E-03	3.636748E-03
PA Exposure					
$E \leq 0.2$ MeV	3.687778E+00	1.240448E+00	1.888331E-01	1.164621E-02	2.516630E-04
$0.2 < E \leq 1$ MeV	3.965468E+00	1.012777E+00	3.608077E-01	-5.689570E-02	-2.047265E-01
$E > 1$ MeV	3.965468E+00	1.078553E+00	3.607919E-01	-4.288176E-01	9.411842E-02
LAT Exposure					
$E \leq 0.01$ MeV	8.677172E-01	2.290812E-01	2.457221E-02	7.646448E-04	0.0
$E > 0.01$ MeV	3.577644E+00	1.005248E+00	~~-4.227422E+00~~ -4.227422E-02	-2.054736E-02	4.461858E-04
ROT Exposure					
$E \leq 0.01$ MeV	2.436148E+00	6.502219E-01	8.819417E-02	4.752092E-03	8.782611E-05
$E > 0.01$ MeV	4.216783E+00	8.470534E-01	-6.771566E-02	-1.213208E-02	1.829400E-03

*Polynomial coefficients in analytic fit: $h_E(E = 10^{-12} \times \exp(C_0 + C_1X + C_2X^2 + C_3X^3 + C_4X^4)$ Sv-cm^2, E = energy (MeV), and X = ln(E).
[a]If the orientation of the receptor with respect to the radiation field is unknown, AP exposure geometry should be used.
[b]Read as 3.430895×10^{00}.

ANSI/ANS-6.1.1-1991

American National Standard for Neutron and Gamma-Ray Fluence-to-Dose Factors

Secretariat
American Nuclear Society

Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-6.1.1

Published by the
American Nuclear Society
555 North Kensington Avenue
LaGrange Park, Illinois 60525 USA

Approved August 26, 1991
by the
American National Standards Institute, Inc.

American National Standard

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Published by

American Nuclear Society
555 North Kensington Avenue, La Grange Park, Illinois 60525 USA

Printed in the United States of America

Foreword

(This Foreword is not a part of American National Standard for Neutron and Gamma-Ray Fluence-to-Dose Factors, ANSI/ANS-6.1.1-1991, but is included for information purposes only.)

In 1977, the American Nuclear Society (ANS) published American National Standard Neutron and Gamma-Ray Flux-to-Dose-Rate Factors (ANSI/ANS-6.1.1-1977), which provided the means for computing dose equivalent values pertinent to radiation protection from externally incident neutron and gamma-ray flux values calculated in the process of shield analysis and design. That standard, unchanged and in effect for 12 years, has been revised as recommended by Working Group ANS-6.1.1. The revision process has awaited the availability of internationally accepted data to replace those originally recommended by the National Council on Radiation Protection and Measurement (NCRP) and incorporated in the previous standard. Such data, conforming to definitions propounded by the International Commission on Radiological Protection (ICRP) and the International Committee on Radiation Units and Measurements (ICRU), have since become available and have been considered as replacements for the previous standard.

This standard provides guidelines for computing the biologically relevant dosimetric quantity in neutron and gamma-ray radiation fields pertinent to shield design. The data presented in this standard relate fluence to a quantity that is considered to be proportional to biological damage in human tissue and that is used as the basis for limiting the radiation exposure to keep the risk of occurrence of stochastic, somatic effects to the individual to within acceptable levels. That quantity is the effective dose equivalent received by an individual over a specified time interval. Tables are presented containing factors relating fluence to effective dose equivalent for monoenergetic gamma rays and neutrons, and procedures are specified for representing the tabulated data in analytical form and for computing the effective dose equivalent due to gamma rays and neutron fields having broad spectral distributions.

The membership of Working Group ANS-6.1.1 is as follows:

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Consensus Committee N17, Research Reactors, Reactor Physics, Radiation Shielding, and Computational Methods, had the following membership at the time it reviewed and approved this standard:

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