


ANSI N13.3-1969 (R 1981) ◀

# American National Standard

## *Dosimetry for Criticality Accidents*

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ANSI N13.3-1969 (R 1981)

 **ANSI** American National Standards Institute  
11 West 42nd Street  
New York, New York  
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**ANSI  
N13.3-1969**

**American National Standard  
Dosimetry for  
Criticality Accidents**

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# American National Standard

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# Foreword

(This Foreword is not a part of American National Standard Dosimetry for Criticality Accidents, N13.3-1969.)

The need and usefulness of criticality accident dosimetry have been demonstrated by the cases of serious radiation exposure from criticality accidents which have occurred during the processing and handling of fissionable materials. This standard provides criteria for obtaining criticality accident dosimetry information useful in planning the handling of seriously exposed persons.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

The Standards Committee on Radiation Protection, N13, which reviewed and approved this standard, had the following personnel at the time of approval:

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# American National Standard Dosimetry for Criticality Accidents

## 1. Introduction

Guidance to the prevention of criticality accidents in the handling, storing, processing, and transporting of fissionable materials is presented in American National Standard Nuclear Criticality Safety Standard for Operations with Fissionable Materials Outside Reactors, N16.1-1969, Revision of N6.1-1964. In most operations with fissionable materials the risk of inadvertent criticality is very low; however, this risk cannot be eliminated. It is important to provide a means of measuring the radiation dose of persons who may have been seriously exposed in such an accident.

## 2. Scope

This standard is applicable to operations with fissionable materials in which accidental criticality may occur and cause the exposure of personnel to acute, external, and penetrating radiation doses exceeding the maximum doses recommended for normal practice [1, 2].<sup>1</sup> The dosimetry systems covered by this standard are those capable of providing dose information down to about 10 rad.

The standard provides criteria for a system capable of measuring the doses received by personnel involved in a criticality accident. Systems using physical detectors, biological samples, or combinations may conform to this standard. The dose information is intended to:

- (1) Assist the management of exposed individuals.
- (2) Provide a basis for correlating man's radiation dose to his biological response.

<sup>1</sup>Numbers in brackets refer to corresponding numbers in Section 8, References to the Text.

- (3) Contribute to the maintenance of integrated exposure records [1].

This standard specifies dosimetric capability and performance in rads. The quality factor for the conversion of absorbed dose from neutrons (rad) to dose equivalent (rem) for criticality accident is assumed to be between one and two [2, 3].

Adherence to this standard does not provide criticality accident planning, except in the area of criticality accident dosimetry. Administrative actions considered to be management prerogatives, or the medical use of dosimetry data, are beyond the scope of this standard. Details of criticality accident evacuation alarms, emergency plans, design and description of specific instrumentation, personnel screening and accountability following an accident, personnel decontamination, and post-accident diagnostics are also not within the scope of this standard; however, these important planning areas are identified to aid management in accomplishing overall accident planning.

## 3. Definitions

In this standard the following definitions shall apply:

**absorbed dose.** The energy imparted to matter in a volume element by ionizing radiation divided by the mass of irradiated material in that volume element. The special unit of absorbed dose is the rad [4].

**dose equivalent.** The product of absorbed dose, quality factor, absorbed dose distribution factor, and other modifying factors necessary to express on a common scale, for all ionizing radiations, the irradiation incurred by exposed persons. The special unit of dose