American National Standard

for radiation detectors –

personnel thermoluminescence dosimetry systems – performance

ANSI N13.15-1985

american national standards institute, inc
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American National Standard

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for Radiation Detectors –

Personnel Thermoluminescence Dosimetry Systems – Performance

Secretariat
Health Physics Society

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American National Standards Institute, Inc

Foreword

(This Foreword is not part of American National Standard N13.15-1985.)

The intent of this standard is to provide guidance on performance criteria as well as on test procedures for personnel thermoluminescence dosimetry systems.

This standard was developed for American National Standards Committee N13 (Radiation Protection) by Working Group 1 2 of the Health Physics Society Standards Committee. The secretariat of N13 is held by the Health Physics Society.

Suggestions for improvement of this standard will be welcome They should be sent to the Health Physics Society, 4720 Montgomery Lane, Suite 506, Bethesda, MD 20014.

This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Radiation Protection, N13. Committee approval does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the N13 Committee had the following members:

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Individual Members
W. O. Chatfield
H. F. Henry
L. M. Scott
M. E. Wrenn

This standard was prepared under the direction of the Health Physics Society Standards Committee, which had the following members:

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J. Belhan
V. Chilson
E. Geiger
R. Griffith
R. A. Parker
W. B. Rivkin
L. M. Scott
J. F. Sommers
A. N. Tschaeche

Working Group 1.2 of the Health Physics Society, which was responsible for the development of this standard, had the following members:

G. W. Endres, Chair

W. Cool
J. Cusimano
R. Falk
E. Geiger
R. Griffith
A. Lucas

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American National Standard for Radiation Detectors –

Personnel Thermoluminescence Dosimetry Systems – Performance

1. Scope

This standard specifies performance criteria and test procedures for personnel thermoluminescence dosimetry systems. The test procedures are designed to determine the precision and accuracy of thermoluminescence dosimetry systems for beta-, gamma-, and X-radiation under conditions that may exist during occupational exposure. Standards for performance are given for each of the radiations measured separately and for mixtures

2. Introduction

Personnel thermoluminescence dosimeters are devices used to estimate radiation dose and dose equivalent This standard considers the performance of thermoluminescence dosimetry (TLD) systems in which the dosimeters are exposed to beta-, gamma-, and X-radiation. Normal conditions of temperature, time, and humidity known to affect the response of some thermoluminescence dosimeters are simulated in the test protocol. If the system is to be used in the presence of neutron radiation, the specifications for measurement of beta-, gamma-, and X-radiation still apply. This standard specifies performance testing that should be performed in addition to that specified in American National Standard for Dosimetry – Personnel Dosimetry Performance – Criteria for Testing, ANSI N13.11-1983. It complements, but does not replace, that standard.

For the purposes of this standard, all TLD irradiation levels and subsequent TLD readings shall be evaluated in terms of absorbed-dose index or dose-equivalent index as defined in ICRU-25 [1].[1] To meet this requirement, all test irradiations shall be conducted on a phanton that simulates the scattering properties of the human body. Tests conducted with thermoluminescence dosimeters yield only a quantity of light characteristic of the particular thermoluminescent (TL) materials used in the dosimeters That quantity of light can be related through calibration or other modifying factors, or both, to the index quantities described in ICRU-25. The absorbed dose shall be measured in accordance with NBS-85 [2] and NBS-87 [3] It is not the purpose of this standard to describe these methods in detail For external beta-, gamma-, or X-ray exposures, the dose-equivalent index may be assumed to be equal to the absorbed-dose index.

[1] The numbers in brackets refer to the corresponding numbers in Section 9, References.

3. Definitions

3.1 Thermoluminescence (TL). A process of releasing radiation-induced energy as light in response to heat.

3.2 Dosimeter. A radiation-sensitive element (or elements) and the holder carrying it

3.3 Thermoluminescence Dosimetry System. The detecting devices or dosimeters plus the related data-collecting and data-processing instruments and techniques required to estimate from the measurement the absorbed-dose index or dose-equivalent index for a person who wears the dosimeter.

3.4 Exposure. (1) The act or instance of exposing or (2) the condition of being or having been exposed. It is used in this standard to describe beta or neutron irradiations as well as photon irradiations.

3.5 Readout. The measurement of TL output.

3.6 Fading. The loss of the thermoluminescent signal prior to readout