



American National Standard Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security

Accredited by the American National Standards Institute

Sponsored by the
National Committee on Radiation Instrumentation, N42

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Secretariat

Institute of Electrical and Electronics Engineers, Inc.

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Abstract: Performance specifications, design criteria, and testing methods are provided for the evaluation of radiation detection instruments that are pocket-sized and carried on the body.

Keywords: alarming, design criteria, performance specifications, personal radiation detectors, pocket-sized, radiation, radiation detection, radiation instrumentation

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This introduction is not part of ANSI N42.32-2006, American National Standard Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security.

This standard is the responsibility of the Accredited American Standards Committee on Radiation Instrumentation, N42. The standard was approved by the N42 letter ballot of July–August 2006.

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American National Standard Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security

1. Overview

1.1 Scope

This standard describes design and performance criteria along with testing methods for evaluating the performance of instruments for homeland security that are pocket-sized and worn on the body for the purpose of rapid detection of radioactive materials.

These instruments are used for detection of photon-emitting, and optionally neutron-emitting, radioactive substances for the purposes of detection, interdiction, and prevention.

The performance criteria contained in this standard are meant to provide a means for verifying the capability of these instruments to reliably detect significant changes above background levels of radiation and alert the user to these changes.

This standard does not apply to instruments that are primarily intended to provide a measurement of dose equivalent, or dose equivalent rate. However, devices that comply with this standard can provide an approximate value of exposure rate.

1.2 Purpose

The purpose of this standard is to specify performance criteria and test methods used to evaluate self-reading, alarming, radiation detection instruments that are pocket-sized, worn on the body, and used to detect the presence of ionizing radiation.

2. Normative references

This standard shall be used in conjunction with the following publications. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

ANSI N42.22, American National Standard—Traceability of Radioactive Sources to the National Institute of Standards and Technology (NIST) and Associated Instrument Quality Control.¹

ANSI N42.23, American National Standard Measurement and Associated Instrumentation Quality Assurance for Radioassay Laboratories.

ANSI N42.42, American National Standard Data Format Standard for Radiation Detectors Used for Homeland Security.²

IEC 60068-1, Environmental Testing—Part 1: General and Guidance.³

IEC 60068-2-18, Environmental Testing—Part 2-18: Tests—Test R and Guidance: Water.

IEC 60068-2-75, Environmental Testing—Part 2-75: Tests—Test Eh: Hammer Tests.

IEC 60529, Degrees of Protection Provided by Enclosures (IP Code), IP53.

IEC 61000-4-1, Electromagnetic Compatibility (EMC)—Part 4-1: Testing and Measurement Techniques—Overview of IEC 61000-4 Series.

IEC 61000-4-2, Electromagnetic Compatibility (EMC)—Part 4-2: Testing and Measurement Techniques—Electrostatic Discharge Immunity Test.

IEC 61000-4-3, Electromagnetic Compatibility (EMC)—Part 4-3: Testing and Measurement Techniques—Radiated, Radio-Frequency, Electromagnetic Field Immunity Test.

ISO/IEC 4037-3, X and Gamma Reference Radiation for Calibrating Dosimeters and Doserate Meters and for Determining the Response as a Function of Photon Energy—Part 3: Calibration of Area and Personal Dosimeters and Measurement of Their Response as a Function of Energy and Angle of Incidence.⁴

3. Definitions

The following definitions apply to this standard, as well as to ANSI N42.33 [B11]⁵, ANSI N42.34 [B12], and ANSI N42.35 [B13], all of which have been developed at the request of the U.S. Department of Homeland Security (DHS) for instruments to be used by DHS and emergency responders.

3.1 A-weighted sound level: The frequency weighting of an acoustic spectrum according to a standardized frequency response curve based on the frequency response of the human ear.

¹ The ANSI N42 publications included in this clause are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08855-1331, USA (<http://standards.ieee.org/>).

² The ANSI N42.42 schema can be obtained from <http://physics.nist.gov/Divisions/Div846/Gp4/ANSIN4242/xml.html>.

³ IEC publications are available from the Sales Department of the International Electrotechnical Commission, Case Postale 131, 3, rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse (<http://www.iec.ch/>). IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

⁴ ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/ Suisse (<http://www.iso.ch/>). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

⁵ The numbers in brackets correspond to those of the bibliography in Annex A.