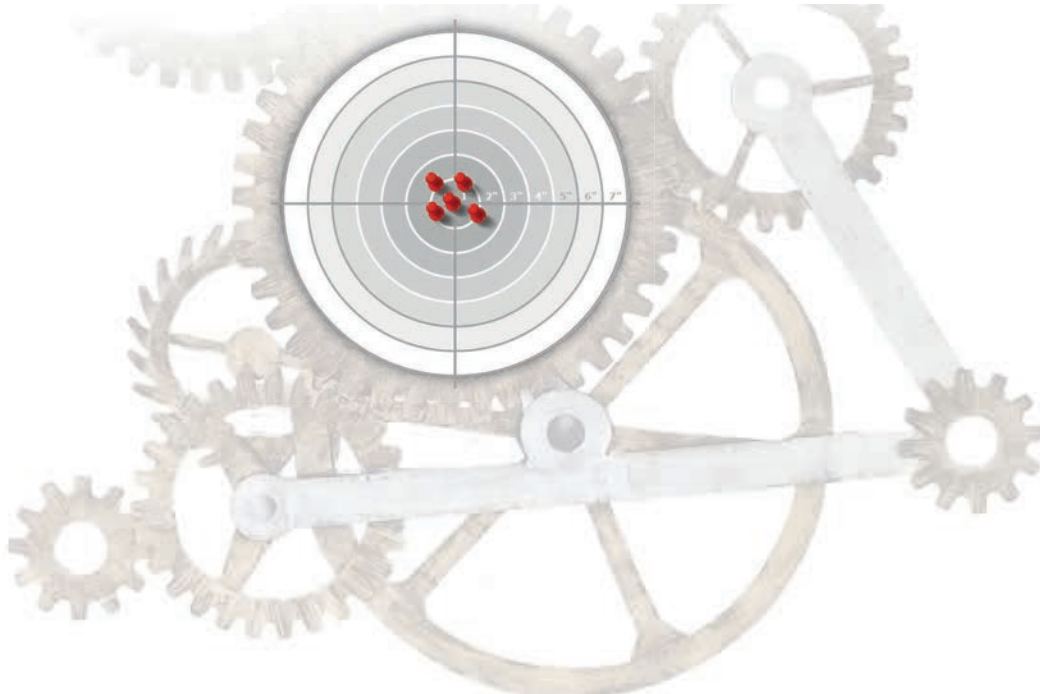




**ANSI/AARST MS-PC 2015**  
An Approved American National Standard

# Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air

Measurement Systems - Performance Criteria



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**AARST CONSORTIUM ON NATIONAL RADON STANDARDS**



## *Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air*

### **Forward**

**SCOPE:** This standard specifies minimum performance criteria and testing procedures for instruments and/or systems designed to quantify the concentration of  $^{222}\text{Rn}$  gas in air. These are consistent but general performance criteria applicable to the wide variety of radon measurement devices used for indoor measurements, primarily in residential environments or buildings not associated with the possession or handling of radioactive materials. Also included is a description of documentation necessary for demonstration of compliance with this standard. This initial edition of the standard addresses performance criteria for radiological and environmental parameters only.

This standard does not address the calibration or other quality assurance requirements for the use of the instruments and/or systems, or the measurement of other isotopes of radon such as  $^{220}\text{Rn}$  and  $^{219}\text{Rn}$  or progeny of any radon isotope. This initial edition of the standard does not address interference from isotopes of radon other than  $^{222}\text{Rn}$ , grab sampling methods, mechanical and electrical issues related to the devices, or performance criteria for laboratory equipment that might be used to analyze devices, such as a gamma-ray spectroscopy system for analyzing a charcoal canister. Sampling periods of less than 1 hour in duration are explicitly excluded from consideration in this standard. Although the performance criteria could be adopted for use in a certification program, such a program is beyond the scope of this standard.

### **Significance of Use:**

This standard seeks to address needs of measurement professionals, manufacturers, citizens, private proficiency programs, regulators and anyone concerned with conducting measurements of radon gas ( $^{222}\text{Rn}$ ). The specifications and practices in this standard can be adopted as requirements for contractual relationships or as recommendations or requirements of a state, country, private proficiency program or other jurisdiction of authority.

### **Historical Perspective:**

In the 1950s, studies confirmed increased incidence of radon-induced lung cancer for workers in underground mines. In the 1980s, studies found that exposure to radon in homes can exceed exposures found for mine workers.

In 1988, the Indoor Radon Abatement Act authorized U.S. state and federal activities to reduce citizen risk of lung cancer caused by indoor radon concentrations.

In 1999, with publication of BEIR VI<sup>2</sup>, the National Academy of Science confirmed that any exposure to radon holds a degree of risk. In 2009, the World Health Organization's *WHO Handbook on Indoor Radon* confirmed the association between indoor radon exposure and lung cancer, even at the relatively low radon concentrations found in residential buildings.

Initiated in 2010, the U.S. *Federal Radon Action Plan* highlights an *ultimate* public health goal of eliminating preventable radon-induced cancer. This plan is the result of a collaborative effort led by the U.S. Environmental Protection Agency (EPA) with the U.S. Departments of Health and Human Services (HHS), Agriculture (USDA), Defense (DOD), Energy (DOE), Housing and Urban Development (HUD), Interior (DOI), Veterans Affairs (VA) and the General Services Administration (GSA).

### **Document Purpose:**

This document responds to the need for quality instrumentation when measuring citizen exposures to radon gas.

### **Keywords:**

Radon Gas, Radon Test Devices, Radon Measurement, Radon

### **Metric Conversions**

Conversions from English-American measurement units to the International System of Units (SI) are included with literal conversion or as per conventional rules for SI conversion.

### **Consensus Process**

The consensus process developed for the AARST Consortium on National Radon Standards and as accredited to meet essential requirements for American National Standards by the American National Standards Institute (ANSI) has been applied throughout the process of approving this document.

This standard is under continuous maintenance by the AARST Consortium on National Radon Standards for which the Executive Stakeholder Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form and instructions may be obtained in electronic form at [www.radonstandards.us](http://www.radonstandards.us)

Notice of Right to Appeal: (See Bylaws for the AARST Consortium on National Radon Standards available at [www.radonstandards.us](http://www.radonstandards.us).) Section 2.1 of Operating Procedures for Appeals (Appendix B) states, "Persons or representatives who have materially affected interests and who have been or will be adversely affected by any substantive or procedural action or inaction by AARST Consortium on



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National Radon Standards committee(s), committee participant(s), or AARST have the right to appeal; (3.1) Appeals shall first be directed to the committee responsible for the action or inaction.

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## *Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air*

### **1 SCOPE**

This standard specifies minimum performance criteria and testing procedures for instruments and/or systems designed to quantify the concentration of  $^{222}\text{Rn}$  gas in air. These are consistent but general performance criteria applicable to the wide variety of radon measurement devices used for indoor measurements, primarily in residential environments or buildings not associated with the possession or handling of radioactive materials. Also included is a description of documentation necessary for demonstration of compliance with this standard. This initial edition of the standard addresses performance criteria for radiological and environmental parameters only.

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### **2 PURPOSE**

This standard provides guidance to manufacturers and/or laboratories regarding minimum performance criteria for their instruments or measurement systems with the associated tests that they should perform, or have performed by a third party, to demonstrate compliance with the standard. Such tests shall be conducted in a Standard Test Atmosphere for Radon (STAR) as defined in Section 4. Tests conducted under conditions other than the controlled conditions of a STAR are insufficient to determine whether the requirements of this standard have been met.

### **3 INTRODUCTION & OVERVIEW**

In 1992, the U.S. Environmental Protection Agency (EPA) published *Indoor Radon and Radon Decay Product Measurement Device Protocols* as guidance for devices that were to be listed in the EPA's National Radon Proficiency Program. This EPA program was privatized in 1998. Because there remained a need for consensus standards related to radon measurements in homes, schools and other buildings, radon mitigation, measurement devices, quality assurance, etc., the American Association of Radon Scientists and Technologists (AARST) created under its auspices the AARST Consortium on National Radon Standards to promulgate a series of standards to address these issues. This standard is one in that series. The primary aim of this standard is to identify minimum performance criteria for devices or systems used for measurements of radon in indoor environments for the purpose of determining whether or not the home or building should be mitigated to reduce the radon concentration below an applicable guideline concentration. However, this standard may be useful for devices or systems for measuring radon in other circumstances. Devices that are used to measure radon for the purpose of compliance with federal or State regulations related to the possession or handling of radioactive materials may require additional or more restrictive criteria than set forth in this standard.