



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 13163.2-2021

**Radiation protection instrumentation - Radon and radon decay
product measuring instruments - Part 2: Specific requirements
for ^{222}Rn and ^{220}Rn measuring instruments**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is the second part of GB/T 13163 "Radiation protection instrument radon and radon daughter measuring instrument". GB/T 13163 has been released

The following parts.

---Part 1. General principles;

---Part 2. Special requirements for ^{222}Rn and ^{220}Rn measuring instruments;

---Part 3. Special requirements for radon daughter measuring instruments;

---Part 4. Reference atmosphere production equipment containing radon isotopes and their daughters (radon environmental test system).

This document replaces GB/T 13163.2-2005 Radon and Radon Progeny Measuring Instruments for Radiation Protection Part 2. Special Requirements for Radon Measuring Instruments

Compared with GB/T 13163.2-2005, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

---Added the terms and definitions of rated range, error, relative error, inherent error, response (of radiation measuring device), and cross-interference

(See 3.2, 3.3, 3.4, 3.5, 3.6, 3.8);

--- Deleted the terms and definitions of relative inherent errors (see 3.2 in the.2005 edition);

---Change "general characteristics" to "overall design considerations", and change the corresponding technical content (see Chapter 4, Chapter 4 of the.2005 edition);

---Added measurement design considerations and operation and maintenance design considerations (see 4.1, 4.2);

--- Deleted the measurement range and the lowest detectable volume activity (see 4.1 and 4.2 in the.2005 edition);

---Changed the expression and technical content of "reference source", changed "reference source" to "reference radon" and adjusted it to 6.4 (see 6.4,.2005

Version 4.3);

---Deleted test sources and test items (see Chapter 7 and Chapter 8 of the.2005 edition);

---Added the cross-interference of other radon isotopes, the linearity of the indicated value, the statistical fluctuation of the instrument, the response time, the signal accumulation (see 7.2, 7, 3, 7.4, 7.5, 7.6);

---Added requirements and tests for air circuit performance (see Chapter 8);

--- Deleted statistical fluctuations, warm-up time, response time (see 11.1, 11.4, 11.5 in the.2005 edition).

This document is equivalent to IEC 61577-2:2014 ``Radiation Protection Instruments Radon and Radon Progeny Measuring Instruments Part 2.222Rn and 220Rn

Special requirements for measuring instruments.

This document has made the following minimal editorial changes.

---Deleted 3.1~3.7, 3.9 and 3.10 term source IEC 60050-394:2007 (withdrawn internationally).

Introduction

Radon is a kind of radioactive trace gas, which is composed of natural radionuclides ^{238}U , ^{235}U and ^{232}Th in the earth's crust.

And ^{224}Ra decay. The isotopes of radon (^{222}Rn , ^{219}Rn , and ^{220}Rn) decay through three decay chains, and finally terminate in the stable homology of lead.

Bit. The isotope of radon ^{220}Rn is usually called thoron gas. In this document, the term thoron gas is not used, and radon is used to represent the nuclide ^{220}Rn .

And ^{222}Rn , indicate the specific nuclide by marking the chemical symbol and mass.

Under normal circumstances, due to the very short half-life of ^{219}Rn , its activity is comparable to that of the radon daughters compared with the activities of the other two radon decay chains.

The activity of (RnDP) can be completely ignored. Therefore, the measurement of ^{219}Rn and its radon progeny is not considered in this document.

Note. RnDP is the abbreviation for radon decay products, sometimes expressed as radon daughters. The radon decay product or its abbreviation RnDP refers to the radon decay that this document focuses on.

All short-lived daughters. For a specific daughter isotope, add a mass number to the upper left corner of its chemical symbol to indicate it. Symbol RnDP plus lower right corner

The reference numerals (222, 220) refer to all daughters of the corresponding radon isotope. RnDP222 refers to ^{218}Po , ^{214}Pb , ^{214}Bi , ^{214}Po of ^{222}Rn , and RnDP220 refers to ^{220}Rn .

The daughter body ^{216}Po , ^{212}Pb , ^{212}Bi , ^{212}Po , ^{208}Tl .

GB/T 13163 consists of four parts.

---Part 1. General principles. The purpose is to specify the terms and units used for radon and radon progeny (RnDP) measurement, as well as for radon and radon progeny (RnDP) measurements.

Radon Environmental Test System (STAR) for testing and calibration of RnDP measuring equipment.

---Part 2. Special requirements for ^{222}Rn and ^{220}Rn measuring instruments. The purpose is to test ^{222}Rn and ^{220}Rn measuring instruments.

---Part 3. Special requirements for radon daughter measuring instruments. The purpose is to test RnDP222 and RnDP220 measuring instruments.

---Part 4. Reference atmosphere production equipment containing radon isotopes and their daughters (radon environmental test system). Purpose is for STAR

Structure and test application.

Radon and Radon Progeny Measuring Instrument