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

GB 15849-1995

Replacing GB/T 15849-1995

**Leakage test methods for sealed sources
(English Translation)**

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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 for standardization documents" Drafting.

This document replaces GB/T 15849-1995 "Leakage test method for sealed radioactive sources".

In addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) Added the definitions of "leachable" and "non-leachable" (see 3.9 and 3.10);

- b) Added factors to be considered when designing an effective leak detection program for a specific type of sealed source (see Chapter 4);
- c) Added the inspection method training requirements for inspectors (see Chapter 4);
- d) Added the requirement that measurement uncertainty should be considered when judging non-binary test results (see Chapter 4);
- e) The detection thresholds and acceptance limits of different test methods have been changed (see Table 1, Table 1 of the 1995 edition);
- f) Added liquid components suitable for immersion testing (see 5.1.1, 5.1.2, 5.1.4);
- g) Added the need to consider the correction caused by wiping efficiency (see 5.3);
- h) Added the note that the bubble test assumes that the bubbles are observed under ideal conditions (see 6.3);
- i) Added precautions regarding spontaneous heat source bubble inspection (see 6.3.1).

This document is modified to adopt ISO 9978:2020 "Leakage test method for sealed sources for radiation protection".

This document has the following structural adjustments compared to ISO 9978:2020.

- Chapter 3 adjusts the order of terms;
- Chapter 4 is supplemented with numbers, 4.1~4.13 correspond to Chapter 4 in ISO 9978:2020;
- Chapter 5 adds 5.3.1, of which 5.3.2~5.3.4 correspond to 5.3.1~5.3.3 in ISO 9978:2020;
- Chapter 6 adds 6.1 and 6.3.1, of which 6.2~6.4 correspond to 6.1~6.3 in ISO 9978:2020, and 6.3.2~6.3.6 correspond to it should comply with 6.2.1~6.2.5 of ISO 9978:2020.

The technical differences between this document and ISO 9978:2020 and their reasons are as follows.

- Changed the definitions of "leachable" and "non-leachable" (see 3.9 and 3.10) to improve the operability of the determination;
- To adapt to the language environment of my country, some contents are adjusted to notes (see 4.9).

The following editorial changes were made to this document.

- In order to coordinate with the existing standards, the name of the standard is changed to "Leakage test method for sealed radioactive sources";
- Replaced ISO 2919 with the informative reference GB 4075;
- Replaced ISO 9712 with the informative reference GB/T 9445.

1 Scope

This document specifies different leak detection methods and selection requirements for sealed radioactive sources, and establishes a complete set of methods using radioactive and non-radioactive A comprehensive test procedure for radiometric methods.

This document applies to the following situations.

- a) Leakage test when classifying the test source according to GB 4075;
- b) Production quality control inspection of various sealed sources;
- c) Periodic inspection of sealed radioactive sources at prescribed time intervals during their effective use period.

This document does not provide for special circumstances requiring special inspections.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 40335-2021 Non-destructive testing - Leak test - Tracer gas method (ISO 20485:2017, MOD) Note. There is no technical difference between the referenced content of GB/T 40335-2021 and the referenced content of ISO 20485:2017.

3 Terms and definitions

The following terms and definitions apply to this document.

Capsule

A protective shell that prevents the leakage of radioactive materials.

sealed radioactive source sealedsource Radioactive material sealed in a shell or tightly combined with a certain material. Under the designed conditions of use and normal wear and tear, this the enclosure or material is sufficient to maintain the seal of the sealed source.

Note: Hereinafter referred to as "sealed source".

dummysealedsource

A replica of a sealed source whose shell structure and materials are exactly the same as the sealed source it represents, but the radioactive material contained in it is replaced by a

non-radioactive substance with physical and chemical properties as similar as possible.

A replica of a sealed source whose shell structure and materials are exactly the same as the sealed source it represents, but the radioactive material contained in it is replaced by a tracer amount of radioactive material having physical and chemical properties as similar as possible.

Note: The tracer amount of radioactive material can be dissolved in a solvent that does not corrode the shell and the maximum activity is compatible with the sealed chamber.