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

GB 12951-2009

Replacing GB 12951-1996

**Americium-241 alpha sources for ionization smoke fire
detectors**

(English Translation)

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Foreword

All the technical contents of this standard is mandatory.

This standard replaces GB 12951-1996 "ion smoke detectors use americium 241alpha sources of technical conditions." this standard compared with GB 12951-1996 main changes are as follows.

--- The standard GB 12951-1996 3.4 increase source mount and the source base is described;

--- On the "safety rating" re-do description;

--- 5.4 parts has been adjusted;

--- Modify the contents of the inspection certificate.

Appendix A of this standard is an informative annex.

The standard proposed by China National Nuclear Corporation.

This standard by the National Standardization Technical Committee of nuclear energy.

This standard was drafted. four in the fourth nuclear power plant - Limited.

1 Scope

This standard specifies the ionization smoke detector technical requirements for radioactive americium 241alpha (hereinafter referred to as "Am alpha source"), test methods, Inspection rules, marking and inspection certificate, packing, transportation and storage.

This standard applies to all kinds of ion smoke detectors use americium 241alpha sources.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 2828.1-2003 Sampling procedures for inspection - Part 1. by acceptance quality limit (AQL) retrieval batch test sample plan GB 4075-2009 Sealed radioactive sources - General requirements and classification GB/T 6378 percent nonconforming sampling inspection procedures and charts (for continuous batch of checks) GB 11806 Regulations for the Safe Transport of Radioactive Substances Leakage test methods GB 15849 sealed radioactive sources EJ/T 535 ion smoke detectors -241alpha americium source environment test

3.1 Structure

Am alpha source should be part of americium 241alpha source sheet, the source holder and the like. alpha-chip source and the source holder should fit properly without being loose.

3.2.1 Radionuclide and impurities

Nuclide. americium 241 (241Am); gamma impurity content of not more than 1%.

3.2.2 Overburden material

Cover material should be gold-palladium alloy or other equivalent material.

3.2.3 Source scaffold

Source scaffold should be used 1Cr18Ni9Ti, 0Cr18Ni10Ti or other equivalent material.

3.3 Safety rating

Am alpha source safety performance level should not be less than GB 4075-2009/C32222.

Appearance 3.4 Am alpha source Americium alpha Yuan yuan sheet surface should be smooth, no cracks, no discoloration, no pinholes, no scratches and the like. Surface source mount and the source of the base should be smooth, no glitches.

3.5 Am alpha source activity

Am alpha source of radioactivity should be limited to 370kBq. Total uncertainty Am alpha source activity test value shall not exceed $\pm 10\%$.

alpha alpha spectrum 3.6 americium source for alpha particles alpha americium peak energy source in 3.0MeV ~ 4.0MeV range of its spectrum of alpha particles should be less than half width 1.2MeV; alpha of 4.0MeV above americium source that alpha particle energy spectrum FWHM should not exceed 0.8MeV.

Surface emissivity 3.7 alpha particle dispersion Dispersion alpha particle surface emissivity Am alpha source shall not exceed the nominal value $\pm 20\%$.

3.8 Surface Contamination

Am alpha source of surface contamination should not exceed 200Bq.

3.9 Environmental Testing

Environmental testing results Am alpha source should meet EJ/T 535 requirements.

3.10 Term

Under normal conditions of use americium source alpha period of 5 years.

Test Method 4

4.1 safety rating tests carried out according to the provisions of GB 4075.

4.2 appearance test by visual inspection.

4.3 Am alpha source activity, alpha particle energy, alpha particle surface emissivity spectrum test shall use the methods provided in Appendix A or other eligible the method of

testing requirements were.

4.4 Am alpha source alpha particle surface emissivity test may be used to test the value of the uncertainty of alpha counts less than 10% of the measuring device to be tested.

4.5 level surface contamination and leakage tests carried out according to the provisions of GB 15849.

4.6 Environmental Testing conducted by EJ/T 535 requirements.

5.1 Overview

Product inspection is divided into type test and factory inspection. Am alpha source of performance tests made at the time of type testing and factory inspection, see Appendix A.

5.2 Type inspection

The standard 3.1 to 3.9 for the type inspection items. Wherein. 3.2,3.3,3.5,3.6,3.7 is always checked.

When the following conditions occur, you should type inspection.

- a) the development of new products;
- b) products in the design, specification, technology and materials have significant changes;
- c) the production of varieties not often when production again;
- d) mass production of bulk products, sampling should be carried out regularly.

Type inspection items include.

- a) safety performance rank test;

Index Test b) Am alpha source activity, alpha and alpha particle spectrum particle surface emission rate;

- c) the level of surface contamination and leakage test;
- d) Environmental testing.

5.3 Factory inspection

Factory inspection items include.

- a) visual inspection;
- b) alpha particle spectra;
- c) alpha particle surface emissivity index testing;
- d) surface contamination;