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

GB 10252-2009

**Regulations for radiation protection and safety of gamma
irradiation facilities**

γ辐照装置的辐射防护与安全规范

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Foreword

All the technical contents of this standard is mandatory. This standard replaces GB 10252-1996 "radiation protection and safety standards cobalt-60 irradiation facilities." This standard compared with GB 10252-1996, the main changes are as follows:

--- By the name of the standard "cobalt-60 radiation protection and safety standards irradiation apparatus" with "radiation protection and safety gamma Irradiation Facilities specification";

--- "Scope" to add a chapter include some content, expanding the scope of application;

--- "Normative references" All has been modified;

--- Added "Terms and Definitions" chapter;

--- "Radiation and Pollution Control" made some changes;

--- Remove the original "division and workplace requirements" chapter, "non-restricted zone" a;

- Increased "radiation protection and safety," a chapter;
- Increased "environmental assessment irradiation apparatus" chapter;
- Original "radiation protection and safety management" with "Radiation Safety Management";
- Remove the original "technical requirements for radiation protection and safety" and "security analysis irradiation apparatus" two chapters;
- Original "inventory and inventory of radiation sources" to "Management of Radioactive Sources";
- The original "Radiation protection and safety testing content" and "radiation monitoring" Merge to "detect radiation safety";
- Added "retired irradiation apparatus" chapter;

1 Scope

China's mandatory national regulations for the radiation protection and safety of gamma irradiation facilities. These are the industrial plants that expose products to a cobalt-60 or caesium-137 source to sterilise medical devices, treat food, or modify polymers - and the source inside them is among the most dangerous objects in civilian industry: unshielded, it delivers a lethal dose in minutes. The whole safety case rests on never letting a person be in the cell with the source raised, and the standard is built around that single proposition. It specifies the shielding, the source hoist and its fail-safe return to the pool, the interlocks on every entrance, the search-and-secure procedure before a run, the radiation monitors and their independence from the control system, and the emergency stops inside the cell. The accidents that have happened worldwide were all defeats of these barriers by people who believed the source was down.

This standard specifies the use of gamma irradiation apparatus I class sources of radiation and pollution control division, radiation protection and radiation in the workplace Environmental evaluation of safety design, the irradiation apparatus and the radiation safety management, radiation safety testing, irradiation facilities decommissioning and emergency requirements. This standard applies to the use of the site class I gamma irradiation apparatus radioactive sources, design, construction, operation and decommissioning of radiation protection and safety.

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 3095 Ambient Air Quality Standard

GB 17568 gamma irradiation facilities design and construction specifications and use

GB 18871-2002 ionizing radiation protection and safety of radiation sources basic standards (IAEA Safety Series, NEQ) HJ/T 2.2-1993 Environmental Impact Assessment Technology Guidelines

3 Terms and Definitions

GB 17568 and established in the following terms and definitions apply to this standard.

3.1 Within the irradiation facility enclosed by a radiation-shielding material with, radiation processing and in working condition due to safety measures for personnel can not enter the interlock Space.

3.2 Penetrating power strong radiation in matter, generally refers to gamma radiation, X-radiation and neutron radiation. This standard refers specifically to shield the irradiation chamber wall table Surface water surface, the roof and a reservoir wells transmission out of gamma radiation.

3.3 Important safety control system irradiation apparatus, wherein the operation of such components are interrelated, each action parts are subject to pre-regulation Given state and (or) controlled conditions, so long as either a component of any state and (or) does not meet the pre-conditions for the provisions of irradiation can be prevented Sources from the storage device state put into use, or to have been put into use radioactive sources or are immediately returned to the storage state, or resistance Personnel from entering the irradiation device is irradiated from the irradiation chamber to make it.

3.4 The source or the use of a particular practice is possible to predict and estimate the impact on the environment carried out, including the size of the source or practice with special Of the overview of the status of the site or workplace environment analysis and environmental impact under normal, abnormal and may cause accidents or consequences Analysis.

3.5 Environmental protection department under the State Council issued on the basis of the safety review, together with its holder to comply with the specific requirements and conditions Radiation safety license.

3.6 Reached the end of life of the radionuclide or find a leak or licensees are no longer expected to use radioactive sources specified by the manufacturer.

4.1 Individual Dose Control

4.1.1 radiation workers occupational and public exposure dose limits should be in

accordance with the requirements of GB 18871-2002.

4.1.2 irradiator engineering design, operation and decommissioning, radiation protection dose constraint value is defined as.

- a) Radiation Workers' Individual annual effective dose values 5mSv;
- b) members of the public individual annual effective dose values 0.1mSv.

4.2 Radioactive pollution control

4.2.1 radioactivity concentrations in well water reservoir ^{60}Co source should be controlled 10Bq/L or less.

4.2.2 source storage wells emissions shall meet the following requirements.

- a) Monthly discharged into the sewer ^{60}Co total activity should not exceed $1 \times 10^6\text{Bq}$;
- b) ^{60}Co total activity every emissions should not exceed $1 \times 10^5\text{Bq}$, and after each discharge with no less than three times the amount of water discharged rinse;
- c) discharge only after the approval of the regulatory authorities.

4.2.3 in accordance with GB 18871-2002 Table B. 11, staff clothing, surface and workplace equipment, tools, floors and other surfaces beta Control the level of radioactive contaminants in Table 1. Table

1 Surface beta radioactive pollution level Substances Control unit becquerels per square centimeter Surface type beta radioactivity Tables, equipment, walls, floors, Control area 4 x

6.1 Shield

6.1.1 shield should be designed to ensure the irradiation chamber radiation shielding integrity and security. For weak radiation shielding parts (such as ventilation and wear Wall tunnels, etc.), compensatory measures should prevent leakage beam; irradiation chamber should be designed taking into account the thickness of the roof penetrating radiation and sky diffuse; fan channel design Fans should be crossing the external radiation dose of radiation workers to meet the requirements of 4.1.2; at the maximum design loading source volume, the outer surface of the shield dose levels It shall also meet the requirements of 4.1.2.

6.1.2 source storage wells (including auxiliary shaft) should be designed to ensure that a reservoir wells radiation shielding integrity and security. Wells and well equipment cladding It should be used in good corrosion resistance of stainless steel and ensure good sealing performance and a certain load-bearing capacity; the bottom of the pond should have penetrations (such as Pipes, plugs). Any penetrations through the wall of the pool should be below the normal water level of not less than 30cm. At the maximum design loaded source activity, well above the dose levels should meet the requirements of 4.1.2.