

Health Physics Society



An American National Standard

Safe Design and Use of Self- Contained Wet Source Storage Gamma Irradiators (Category III)

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American National Standard –

**Safe Design and Use of Self-Contained Wet Source
Storage Gamma Irradiators (Category III)**

Approved March 2001
American National Standards Institute, Inc.

Preface

(This preface is not a part of American National Standard N43.15, Safe Design and Use of Self-Contained Wet Source Storage Gamma Irradiators (Category III)).

The 1950's and 1960's can be characterized as the research era for radionuclide applications. Based on this research, a number of commercial gamma irradiators started operation in the early 1960's. Gamma irradiators are used for a variety of purposes in research, industry, and other fields. Typical uses are:

1. Sterilization or microbial reduction in medical and pharmaceutical supplies.
2. Microbial reduction and disinfestation of food products.
3. Radiation effects studies.
4. Chemical and polymer synthesis and modifications.
5. Insect eradication through sterile male release programs.

The number and types of irradiators supporting these and other applications are continually growing. Source requirements for any particular irradiator may vary from a few curies to several million curies. Irradiator designs can be many and varied to suit individual needs; therefore, it is essential to establish basic criteria to ensure a high standard of radiation safety in the design and use of irradiators, but in a way which does not unnecessarily restrict the logical use and growth of radionuclide applications.

This standard sets forth basic safety standards which are recommended in irradiator design and use. Its use by Regulatory Authorities, relative to the review of radionuclide applications, is encouraged. In the event of a conflict between this standard and federal or state regulation, the regulation shall take precedence.

Because of the variety of designs, four general categories of irradiators have been established to facilitate preparation of standards. A separate standard establishes the criteria to be used in the design, fabrication, installation, use, and maintenance for each irradiator category.

The categories are as follows:

Category I - Self-contained, dry source storage irradiators. American National Standard N43.7.

An irradiator in which the sealed source is completely contained in a dry container constructed of solid materials, the sealed source is shielded at all times, and human access to the sealed source and the volume undergoing irradiation is not physically possible in its designed configuration.

Category II - Panoramic, dry source storage irradiator. American National Standard N43.10.

A controlled human access irradiator in which the sealed source is contained in a dry container constructed of solid materials, and the sealed source is fully shielded when not in use; the sealed source is exposed within a radiation volume that is maintained inaccessible during use by an entry control system.

Category III - Self-contained, wet source storage irradiator. American National Standard N43.15.

An irradiator in which the sealed source is contained in a storage pool (usually containing water), the sealed source is shielded at all times, and human access to the sealed source and the volume undergoing irradiation is physically restricted in its designed configuration and proper mode of use.

Category IV - Panoramic, wet source storage irradiator. American National Standard N43.10.

A controlled human access irradiator in which the sealed source is contained in a storage pool (usually containing water), and the sealed source is fully shielded when not in use; the sealed source is exposed within a radiation volume that is maintained inaccessible during use by an entry control system.

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