

N40 - Neutron / Gamma Low Scatter Irradiator

Overview

The Model N40 Low Scatter Irradiator provides a 360° radiation field for calibrating radiation detection instruments and irradiating personnel dosimetry. This irradiator is available with up to 7 radioactive sources in a wide range of isotopes and activities. Isotopes that can be used in this system include AmBe, PuBe, Cf-252, Cs-137, and Co-60. With the proper facility design this irradiator provides low scatter content in the radiation fields and allows for precise research, calibration, and analysis of detector energy dependencies. The system comes complete with source shield, instrument positioning system, safety interlocks, and controller.

Advantages

- Can be used with many sources and isotopes.
- Sources can be replaced as they decay below acceptable activities.
- Provides the purest energy spectrum with low scatter effects.
- Can be customized to specific applications.

Source Shield

The shield consists of a combination of gamma and neutron shielding. Two types of shields are available: below ground and above ground. When the shield is located below ground, it consists of a 12 inch diameter pipe that is 6 feet long with the carousel located in the bottom of the shield. The above ground shield consists of a steel box filled with a combination of borated water-extended polyester (WEP) and concrete. Additional gamma shielding may be used depending on the application. The maximum overall size of the above ground shield is 6 x 6 x 4 feet. Radiation levels around the shield are less than 5 mR/h at 12 inches from the surface of the irradiator.

Radioactive Sources

- All the sources are doubly encapsulated, hermetically sealed, special form sources.
- Standard source sizes are:
 - Up to 100 Ci of Cs-137
 - Up to 60 Ci of Co-60
 - Up to 20 Ci of AmBe
 - Up to 1.2 Ci of Cf-252

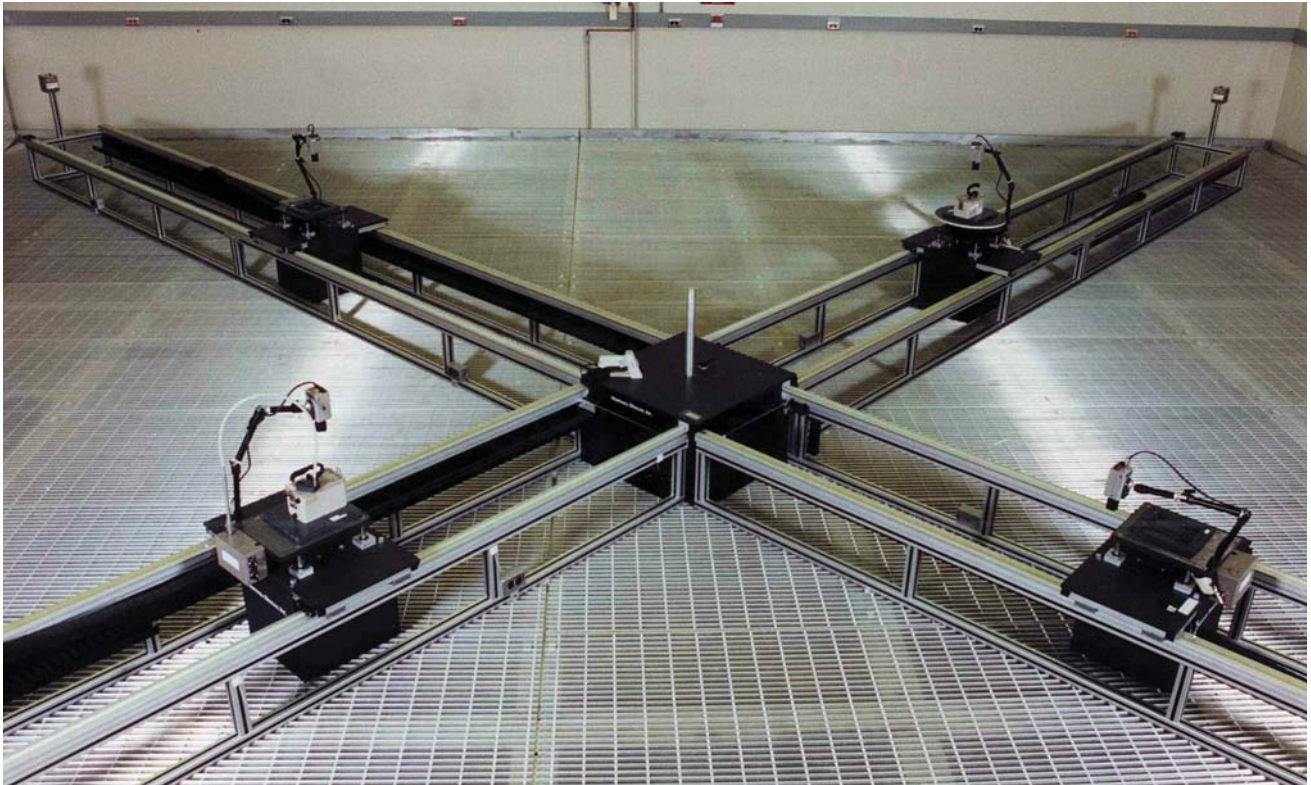
The sources are installed into an aluminum holder called a rabbit. These rabbits are loaded into the irradiator into a rotating carousel for the 7C and 2S models. The carousel rotates to align the selected source with the transport tube. The source is moved from the storage position to the expose position by compressed air and held in place by a suction cup or mechanical latch. Position of the rabbit is closely monitored with photo eye sensors and vacuum sensors to ensure the source is in the desired location.

Safety System

The irradiator system incorporates many safety features to create a fail-safe system. Safety constraints have been applied to all components that involve source exposure. The safety interlock system must be fully satisfied before an exposure can occur and will immediately halt any exposure in process if they are broken. Status panels show radiation conditions at a glance. The entire system has been designed to meet or exceed guidelines and regulations found in ANSI Standards N43.3 and NCRP 88.

Control Panel Options (-E, -A)

The operator control has two versions: electronic, and computer based. All models can use the computer based controller but the N40-1 and N40-2D can use the electronic controller. The electronic controller (E) will allow the operator to select the source and move the source to the expose position with pushbutton controls. This control option allows the user to run indefinitely, or set the system to run a predefined time. The controller will shield the source when the preset timer expires. The computer control system (A) offers complete control of the irradiator including source selection, exposure rate calculation, decay corrections, one button set up of irradiator, control of the instrument tables, and automated irradiator calibration.



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Ancillary Equipment and Options

- Multiple Linear Positioning Tracks
- Moderation Sphere
- Dosimetry Phantoms
- Video monitors for instrument inspection and room security are available.
- Up to 7 sources are available to provide a full range of exposure rates.
- Last person out safety systems are used on irradiators with high exposure rates and are optional on other systems.
- Jigs and fixtures are available for a variety of detectors.

Standard Models			
Model	Description	Weight	Max Activities
N40-1	Above Grade Single Source	800 lbs	20 Ci AmBe 1.2 Ci Cf-252
N40-2D	Above Grade Dual Source	900 lbs	100 Ci Cs-137 60 Ci Co-60
N40-2S	Above or Below Grade Dual Source	1800 lbs	
N40-7C	Above or Below Grade 7 Sources	1200 lbs	