

X80 - X-Ray Beam Irradiator

Overview

The Model X80 X-Ray irradiator is a complete system for irradiating personnel dosimetry badges and radiation detection instruments with x-ray radiation. The major subsystems of the x-ray system are: the dosimetry grade x-ray system; the shielded enclosure; the beam shutter and collimator; the filter assembly; the system control panel and status indicators; and the required controls and signal cables.

Advantages

- The best system available for x-ray calibrations.
- System configurable energy ranges.
- Very easy to use filter and aperture wheels.
- Easily reconfigurable for dozens of filter combinations.

Dosimetry Grade X-Ray System

The x-ray system includes the user interface controller, the high voltage generators, the x-ray tube, the cooling system, a safety interlock system, and all cables and indicators required for operation. The components are high quality and designed for long life, excellent repeatability, low ripple, and accuracy of $\pm 1\%$.

Shielded Enclosure

The x-ray tube is housed in a shielded enclosure that limits exposure rates to less than 5 mR/hr at the surface of the cabinet with x-ray at full power. A high-speed shutter is used to provide accurate dose delivery. A collimated opening, in conjunction with the aperture wheel produces a uniform horizontal radiation beam at 100 cm to 150 cm beam height, depending on the selected system and customer requirements.

Filter and Aperture Wheels

The filter/aperture assembly is designed to modify the spectral characteristics of the x-ray beam to meet the various beam codes required for calibrating instruments. The assembly consists of two motorized aluminum disks, one which holds the filter material, the other holds the collimators. The filter wheel has 10 locations for mounting beam code material. The filter wheels can be easily changed, letting the operator perform many different beam code tests with short setup time.



Model X80 X-Ray Irradiator with Filter/Aperture Assembly

The aperture wheel has seven positions and contains six lead disks with 1 to 6 cm diameter apertures. These can be used to collimate the beam to the proper size for the items being irradiated.

All the positions for each wheel are selectable with the control panel when the automated assembly is used.

Half Value Kit

The half-value layer kit is available in a fully automated model, or with manual filter placement. Both options can include the half-value filter material for the desired beam codes, a lead shield to reduce air scatter, and a collimated opening that can be adjusted for the ion chamber diameter being used for the process.

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 radiation 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. The electronic controller (E) will allow the operator to select the filter and aperture positions, and the automated half value wheel positions. It also controls timing and the exposure of the x-rays through the opening and closing of the shutter. The computer control system (A) offers complete control of the irradiator including exposure rate calculation, x-ray system control, filter aperture wheel controls, has one button set up of irradiator, control of the instrument tables, and automated half value analysis.

Ancillary Equipment and Options

- Video monitors for instrument inspection and room security are available.
- Jigs and fixtures are available for a variety of detectors.
- Dosimetry phantoms
- Radiation area monitors to ensure the system is safe prior to entering the vault.



Model X80 X-ray Beam Irradiator with Model T20 Linear Positioning System

Standard Models	
Model	Description
X80-320kV	30 to 320 kV, 4200 Watt, 3 mm Be Window, Tungsten Target
X80-225kV	20 to 225 kV, 3200 Watt, 1 mm Be Window, Tungsten Target
X80-160kV	10 to 160 kV, 3200 Watt, 1 mm Be Window, Tungsten Target
X80-100kV-M	10 to 100 kV, 1500 Watt, 0.63 mm Be Window, Molybdenum Target
X80-100kV-R	10 to 100 kV, 1500 Watt, 0.76 mm Be Window, Rhodium Target