

Hopewell Designs, Inc.

# Model BX3-BR Gamma Irradiator

The Model BX3-BR Gamma Irradiator produces a beam of gamma radiation of varying strengths for irradiating biological specimens inside a fully shielded enclosure. The large exposure chamber and variable distance to the radiation source offers the most flexibility for research and irradiation projects.



## EXPOSURE CHAMBER

A shielded enclosure provides an exposure chamber for irradiating biological specimens to predefined exposure rates. The chamber is 805mm wide x 440mm deep x 650mm tall. A positioning track provides variable distances from the source that range from 500mm to 900mm. The track also allows vertical adjustment. A 200mm diameter turntable rotates the test material at 10 RPM. Two vent/cable holes, curved to prevent radiation shine, allow fresh air and/or cables to enter the chamber. A front door provides full access to the chamber.

## SOURCES

A range of Cesium-137 source strengths is available to provide different exposure rates.

Cs-137 Source Size	Exposure Rate @ Center of Chamber
2200 Ci	11 to 35 cGy/min
1200 Ci	6 to 19 cGy/min
450 Ci	2 to 7 cGy/min

The sources are doubly encapsulated, hermetically sealed, special form sources. The source capsule is fabricated of stainless steel. A tungsten rod holds the source and is raised to the side of the exposure chamber during exposure. When it is lowered to the storage position by pneumatic cylinder, exposure rates in the exposure chamber are minimized. Dose uniformity is +/- 10%.

## SHIELDING

The irradiator consists of 2 shields, one for storing the radiation source, and the second for housing the exposure chamber. The exposure chamber door is stepped to eliminate radiation shine. Lead provides sufficient shielding to limit radiation level to  $\leq 5 \mu\text{Sv/hr}$  (0.5 mR/h) at 30cm from the surface of the shield. All lead is totally encased in steel.

## SAFETY INTERLOCK SYSTEM

The safety interlock system assures the source cannot be exposed if all interlocks are not satisfied. During an exposure the door is locked closed. Status lights show the exposure status at all times. An emergency off button when pressed will terminate an exposure and stop all motion of the positioning track. If power or air is lost the system reverts to a safe condition.

## MODEL BX3-BR GAMMA IRRADIATOR

### CONTROL SYSTEM

The control panel has a timer, an expose and return switch, and a keyed power switch. The operator interface is an LCD display and keypad with function keys. Time is entered via keypad. Preset and elapsed time are displayed. The turntable can be turned on or off. The positioning track can be moved horizontally and vertically.

When the expose button is pressed, and all interlock circuits are satisfied, the source is raised to the exposed position via pneumatic cylinder and the turntable begins to rotate. A position sensor confirms source position. When the timer expires or the return button is pressed, the source returns to the storage position and the turntable stops rotating.

### OPTIONAL COMPUTER CONTROL

A computer control system is available to automate many features of the BX3-BR. Exposure rate is calculated for turntable position. The positioning track automatically moves to position when a distance is entered. One-button setup allows pre-defined exposure protocols to be quickly configured. Calibration of the radiation fields is automated to simplify the irradiator calibration.

### SPECIFICATIONS

#### Physical Size:

820mm wide x 590mm deep x 2000mm tall  
(72 in. x 23 in. x 79 in.)

#### Test Chamber Size:

805mm x 440mm x 650mm tall  
(32 in. x 17 in. x 24 in.)

**Weight:** 3,190 kg (7,000 lbs)

**Floor Loading:** 3,140 kg/m<sup>2</sup> (640 Lbs/SqFt)

**Available Cs-137 Source Sizes:** 450, 1200, 2200 Ci

**Distance:** Source to center of turntable: Adjustable from 500mm to 900mm

Vertical height of turntable can be adjusted from beam centerline to -225mm

**Dose Rates (cGy/min):** from 11 to 35 for 2,200 Ci  
from 6 to 19 for 1,200 Ci  
from 2 to 7 for 450 Ci

### ACCESSORIES

**Attenuator Set:** A set of three attenuators (X2, X4, X10) can be used singly or in combination to provide attenuation up to X800.

**Jigs and Fixtures:** Fixtures are available for a variety of sample holders such as cell cultures and flasks. Cages for small animals are also available.

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