

Model 43-147 Alpha/Beta Detector



Part No. 47-4092



Detector Face

Description

The Model 43-147 detector is designed for alpha-beta surveying when coupled with compatible instruments. Functionally with similar detector models is very similar but differs in the type of protective window screen and the size of the active and open window areas.

Discriminating between alpha and beta radiation simultaneously requires the counting instrument to have either separate power supplies or window/threshold controls for each channel. The Ludlum Model 2224-1 Alpha/Beta Scaler Ratemeter or Model 2360 General Purpose Data Logger instruments provide the necessary circuitry for simultaneous alpha-beta discrimination.

A Zinc Sulfide [ZnS (Ag)] scintillator is used for detecting alpha particles, and a thin plastic scintillator is employed for detecting beta radiation. The scintillation material is covered by metallized polyester to reduce light response, limiting excessive background counts. The Model 43-147 window is protected by an 88% open square-hole screen.

The photomultiplier tube (PMT) and crystal assembly may easily be removed for repair. The photomultiplier tube typically operates between 500 and 1200 volts with a recommended maximum of 1500 volts.

Specifications

INDICATED USE: alpha beta survey

SUGGESTED INSTRUMENTS: Model 2224-1, Model 2360

DETECTOR TYPE: ZnS(Ag) adhered to 0.025 cm (0.010 in.) thick plastic scintillation material

EFFICIENCY (4π): 20% of ²³⁹Pu; 13% of ⁹⁹Tc; 20% of ⁹⁰Sr/⁹⁰Y

WINDOW: 1.2 mg/cm² metallized polyester

PROTECTIVE SCREEN: removable, 0.79 mm (0.03 in.) thick, 6.5 mm (0.26 in.) square openings, 88% open

SCREEN OUTER DIMENSIONS: 225.4 x 113.7 mm (8.875 x 4.75 in.) (L x W)

WINDOW AREA:

Open: 176 cm² (27.3 in²) open

Active: 200 cm² (31.0 in²) active

NON-UNIFORMITY: less than 10%

BACKGROUND: alpha: 3 cpm or less; beta; 400 cpm or less

CROSS TALK:

alpha to beta: < 10%

beta to alpha: < 1%

PHOTOMULTIPLIER TUBE: 2.9 cm (1.12 in.) diameter

OPERATING VOLTAGE: typically 500–1200 volts

CONSTRUCTION: aluminium with beige powder coat

TEMPERATURE RANGE: -20 to 50 °C (-4 to 122 °F)

CONNECTOR: series "C", unless specified otherwise

OVERALL SIZE: 10.7 x 12.1 x 35.6 cm (4.2 x 4.76 x 14 in.) (H x W x L)

WEIGHT: 0.7 kg (1.5 lb)