

## Model 42-31H 9-Inch Moderated Neutron Detector

Part Number: 47-3583

### Features

- Portable Neutron Detector
- Rugged Bracket for Mounting Measurement Instrument
- Cadmium-Loaded Polyethylene Sphere Responds Similarly to a Larger 10-Inch REM-Responding Sphere



Shown with Model 12  
General Purpose Ratemeter

### Introduction

The Ludlum Model 42-31H Neutron Detector is designed to detect thermal and fast neutrons (0.025 eV to approximately 12 MeV). Neutrons are detected indirectly through nuclear reactions which result in energetically charged particles such as alpha which are often found associated with intense fields of gamma rays. Therefore it is important to choose a method of neutron detection with the ability to discriminate against those gamma rays in the detection and measurement processes.

The Model 42-31H is intended for use with portable counting instruments, and is fitted with a top bracket for convenient mounting. The instrument consists of a cadmium-loaded polyethylene sphere surrounding the  $^3\text{He}$  detector. A study demonstrates that the 9-inch cadmium-loaded sphere has a response similar to that of a 10-inch diameter rem-responding sphere.

**NOTE ON CABLES:** Ludlum offers different cables for this detector depending on the length requested. ("X" in the part number is the cable length in feet.)

CABLE LENGTH	PART NUMBER
7.6 - 15.2 m (25 - 50 ft.)	8303-889-X
> 15.2 m (50 ft.)	4396-905-X

### Specifications

**INDICATED USE:** neutron detection; area monitoring

**DETECTOR:** 2 atm  $^3\text{He}$  tube LND 25185 or equivalent

**MODERATOR:** 22.9 cm (9 in.) diameter cadmium-loaded polyethylene sphere

**COMPATIBLE INSTRUMENTS:** typically used with portable counting instruments capable of achieving -2 mV input sensitivity

**SENSITIVITY:** 10,000 cpm/mSv/h (100 cpm/mrem/hr) ( $^{241}\text{AmBe}$  fast neutrons)

**GAMMA REJECTION:** 10 cpm or less through 100 mSv/hr (10 R/hr) ( $^{137}\text{Cs}$ )

**DETECTION RANGE:** thermal to approximately 12 MeV

**ENERGY RESPONSE:** thermal to 12 MeV follows the radiation protection guide curve for neutron dose

**INPUT SENSITIVITY:** -2 mV

**OPERATING VOLTAGE:** typically 1200 volts

**CONNECTOR:** Series "C" (others available)

**CONSTRUCTION:** Brackets: drawn-and-cast aluminum with a beige powder-coat; Ball: polyethylene

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

**SIZE (H x W x D):** 26 x 22.9 x 22.9 cm (10.3 x 9 x 9 in.), including brackets

**WEIGHT:** 6.6 kg (14.5 lb)