LUDLUM MEASUREMENTS, INC.

Model 42-30H
Neutron Detector

Part Number: 47-3582

Introduction

The Ludlum Model 42-30H Neutron Detector is typically employed with area monitors such as Models 375, 177-50, and 177-61. It is designed to detect thermal and fast neutrons (0.025 eV to approximately 12 MeV) indirectly by using nuclear reactions which result in energetically charged particles such as protons and tritons. Because intense fields of gamma rays are often found with neutrons, it is important to choose a method of neutron detection that is able to discriminate against those gamma rays in the detection process.

A common reaction for the conversion of slow neutrons into directly detectable particles is:

$$n + {}^{3}He \rightarrow {}^{3}H + {}^{1}H + 0.764\ MeV$$

The Ludlum Model 42-30H uses this reaction in the form of helium-3 (^{3}He), which fills the gas proportional tube of the detector. To detect neutrons with energies above the thermal region, the detector is placed inside the moderator. The detector can be removed from the moderator for the detection of thermal neutrons.

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 m (25 ft.)	40-1004-X
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

DESCRIPTION: wall mount proportional neutron detector

SUGGESTED INSTRUMENTS: Models 375, 177-50, and 177-61

DETECTOR: 2 atm ^{3}H tube LND 251152 or equivalent

MODERATOR: 25.4 cm (10.0 in.) diameter polyethylene sphere

DETECTION RANGE: thermal to approximately 12 MeV

ENERGY RESPONSE: approximately follows the radiation protection guide curve for neutron dose

SENSITIVITY (AmBe): typically 20,000 cpm/mSv/h (200 cpm/mrem/hr)

GAMMA REJECTION: 10 cpm or less through 0.1 Sv/h (10 R/hr)

OPERATING VOLTAGE: typically 1200 V

THRESHOLD: -2 mV

CONNECTOR: type "C" (others available)

TEMPERATURE RANGE: -20 to 50 °C (-4 to 122 °F), may be certified to operate from -40 to 65 °C (-40 to 150 °F)

CONSTRUCTION: polyethylene moderator with aluminum housing and mounting bracket

SIZE (H x W x L): 38.1 x 25.4 x 26.2 cm (15.0 x 10.0 x 10.3 in.), including bracket

WEIGHT: 8.8 kg (19.5 lb)

Ludlum Measurements, Inc. P.O. Box 810, Sweetwater, Texas 79556
Web: ludlums.com **Tel**: 800-622-0828 / 325-235-5494 **Fax**: 325-235-4672 **Email**: sales@ludlums.com
Note: specifications subject to change without notification. We are not responsible for errors or omissions.