

Reuter Stokes Helium-3 filled proportional counter

RS-P4-1614-204

Thermal neutron counting, spectroscopy and nuclear materials assay

A smart design

This Helium-3 filled proportional counter has a 5.08 cm diameter design for safeguards applications. It combines the performance characteristics required by both safeguards and spectroscopy applications: high sensitivity, moderate operating voltage and excellent spectral resolution. Other sensitive lengths are available on request.

For spectroscopy applications the detector design uses the diameter, cathode and anode relationship, internal field shaping and gas additives to minimize wall effects and optimize the spectral resolution over a wide energy range.

Precision performance

Helium-3 purification techniques and manufacturing process control were developed to ensure precise matching of operating characteristics among large batches of counters. This permits parallel operation of large numbers of detectors without need for separate power supplies or gain matching.

Customizable solutions

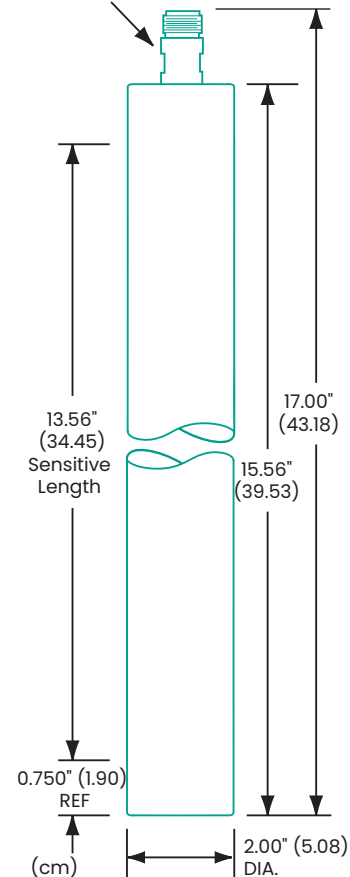
Gas mixtures can be tailored for a customer's applications and for optimization of combined parameters including operating voltage, pulse risetime, pulse jitter time, gas gain, spectral resolution, neutron sensitivity and gamma ray sensitivity.

Product configurations

The detector has a sensitive length of 34.45 cm and an outer diameter of 5.08 cm. Sensitivity is approximately 100 cps/nv for thermal neutrons when filled with standard pressure of three atmospheres of Helium-3 gas. Plateau slope <2% per 100 volts over a minimum of 200 volts range.



HN jack
mates with any
series HN plug such
as MIL UG-59A/U



Sample specifications

This proportional counter is a sample of one of over 10,000 neutron counter designs we have manufactured. Please contact us if your application requires modification of the specifications given here.

Specifications

Mechanical

- Maximum diameter: 5.16 cm
- Maximum overall length: 43.5 cm
- Connector type: HN female
- Net weight (maximum): 0.45 kg

Material

- Outer shell: 304 Stainless Steel
- Connector: Brass, silver plated
- Insulation:
 - Detector: Alumina ceramic
 - Connector: Teflon
- Neutron sensitive material: Helium-3
- Fill pressure: 3 atmospheres

Capacitance

- 8 pf

Resistance @ 25°C

- 10^{12} ohms (minimum)

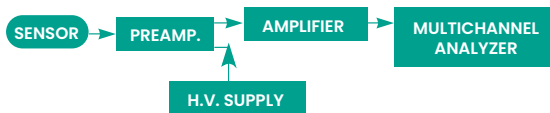
Maximum ratings

- Voltage: 3500 V
- Temperature: 100°C

Typical operating characteristics

- Thermal neutron sensitivity (unperturbed): 100 cps/nv
- Thermal neutron flux range: to 10^3
- Voltage range: See plateau curve
- Resolution (FWHM): See spectrum
- Output pulse characteristics (average)
 - Charge output: 1×10^{-13} coulombs @ 1100 V

Typical spectroscopy arrangement



Typical counting arrangement



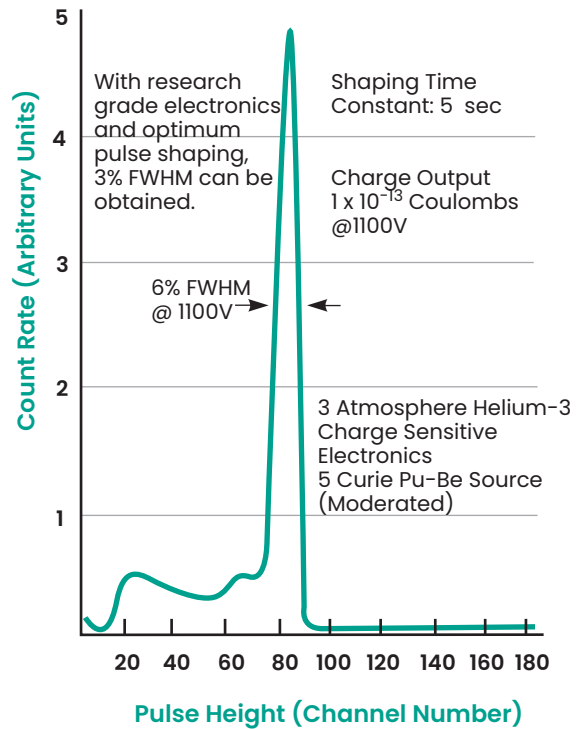
8499 Darrow Road
Twinsburg, OH 44087 USA

+1 330-425-3755
rsweb@bhge.com
industrial.ai

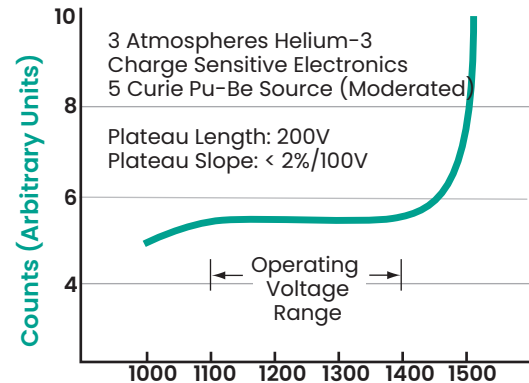
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Typical differential pulse height spectrum



Typical plateau curve



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