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Neutron Slab Counter

High Accuracy Neutron Measurements on a Robust Engineered Deployment Platform

PSC's Neutron Slab Counter is an extremely versatile assay system with a huge range of applications for the measurement of nuclear materials.

The system achieves a high neutron detection efficiency using an array of Helium-3 proportional counters embedded in a polyethylene moderator and shield.

Designed for safe operations, rapid deployment and portability (based on PSC's TechniCART™ high performance platform) the slab counter provides a quick & easy method to classify special nuclear materials and transuranic waste. The instrument is well suited for the measurement of drums, crates, process vessels and many other in-situ applications.

The software provides several analysis options to the operator (based on Total Neutron Counting) including "Go /No Go" determination of plutonium content e.g. for sorting waste retrieved from interim storage and burial grounds. Detection limits as low as 0.5g Pu can be routinely achieved with a single slab unit in a 20 minute count time.



Features

- Rapid set-up and deployment; fast counting
- Based on TechniCART™ mobile rugged platform
- High performance solid rubber wheels
- Setup and re-location over multiple terrains
- Accurate / stable positioning of slab counter
- Aluminum cladding: easy to clean / decontaminate
- Advanced high performance digital electronics
- High neutron counting efficiency
- Background shielding enables low detection limits
- Cosmic neutron suppression
- Rugged laptop computer
- Configurable easy-to-use software
- Remote operation mode

Applications

- "Go / No Go" determination
- Pu and U waste
- TRU / LLW Screening
- In-situ Measurements / Portable NDA
- Safeguards Verification
- Criticality Control
- Hold-up measurements

Benefits

- Multiple counters can be connected in series for large item measurements.
- Monte Carlo calibration option available (expands range of use for diverse container / matrix types).
- Suitable for indoors and outdoors operation in a wide range of environmental conditions.

Standard Specifications

Counting Technique:	Total Neutron Counting (option of Coincidence Counting with multiple slabs)
Detectors:	Helium-3 (4 atmosphere)
Software:	Neutron count rate, LLDs, GO / NO GO status, Pu mass estimator mode
Count Time:	Configurable (typically < 20 minutes)
Calibration Method:	Cf-252 source and /or MCNP modeling
Efficiency:	>1.5 % (Cf-252 at 30cm) : Debris / concrete / solvents waste >2.0% (Cf-252 at 30cm) : Non-combustible items
Shielding:	Polyethylene shield on sides and back of slab (option for cadmium shielding)
Limit of Detection:	< 0.5 g Pu for 200L drums (20 minute count with single slab unit)
Objects counted:	Drums, crates, B25 boxes, in-situ objects (vessels, gloveboxes etc.)
Computer:	Rugged Laptop: operates up to 50 ft (15m) from slab counter
Multi-slab option:	Allows up to 4 slab counters connected in series with single assay station.
Electronics:	PDT radiation hardened compact neutron pulse monitoring modules

Additional Options

- **Multiple Slab Option:**
Several units can be supplied that operate independently or in series.
- **Moderator thickness:**
For assorted debris waste with diverse low Z content (e.g. combustibles, solvents, concrete) the system is configured "under-moderated" for best all-round performance. If use is restricted to non-combustible items, a thicker moderator can be provided for optimum efficiency.
- **Calibration Source:**
Cf-252 source available with jig for standardization measurements.
- **HPGe Detector:**
Allows for measurement of Pu isotopics and other radionuclides of concern. HPGe can be deployed on PSC TechniCART™ rugged platform.



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