

# HEPNAS

## High Efficiency Passive Neutron Assay System

The *HEPNAS* non-destructive assay system employs the high sensitivity passive neutron counting technique. The system provides an accurate measurement of a diverse variety of waste types.

The Add-A-Source technique is used to correct for the effect of the waste matrix. This mature technology was originally developed by scientists at the Los Alamos National Laboratory (LANL).

Isotopic data may be input from process knowledge or from an optional High Resolution Gamma Spectroscopy (HRGS) system.

The system can quantify the drum's total plutonium content, total alpha activity concentration and other nuclear parameters.



### Features

- Uses the standard Passive Neutron Coincidence Counting technique
- High efficiency chamber with internal turntable
- Suitable for assay of drums up to 400 liters (100 US Gallons) in volume
- Uses standard INCC software
- Add-A-Source matrix correction using  $^{252}\text{Cf}$  source
- Coincidence & multiplicity analysis
- Isotopic input from process knowledge or HRGS measurement (optional)
- Measurement control checks and internal data quality verification
- Customizable hard copy report
- Data output to EXCEL readable files
- Wide dynamic range: from several milligrams to 500 g Pu
- Easy drum loading and unloading
- Background radiation shielding
- Reliable high performance electronics

### Applications

- Waste management & disposal
- Decommissioning
- Criticality safety
- TRU/LLW segregation
- Safeguards & accountancy

### Benefits

- Rapid and accurate measurements
- Low detection limit allows sentencing at 100nCi/g (3700 Bq/g) alpha threshold
- Suitable for low, medium and high density waste streams including combustibles, metals & sludge
- Applicable for both homogeneous and heterogeneous waste
- Flexibility for different drum sizes
- INCC software is compatible with International Atomic Energy Agency (IAEA) standards
- Minimal operator training required
- Meets waste acceptance criteria and regulatory requirements

## Specifications

Measurement Technique:	Determination of <sup>240</sup> Pu-effective using LANL Passive Neutron Coincidence Counting (PNCC) method. Coincidence and Multiplicity modes.
Matrix Correction:	Add-A-Source with 133,000 n/s (1.1 MBq) <sup>252</sup> Cf source
Chamber Size:	Accommodates maximum 400 liter container (100 US Gallons)
Neutron Detectors:	Total 90 detectors. 4 pi arrangement – side walls, door, roof and floor.
Detector Configuration:	Double row with 5 detectors per package
Detector Diameter:	25.4 mm (1 inch)
Fill Pressure:	7.5 atmospheres <sup>3</sup> He
Assay Chamber Efficiency:	30% (Totals efficiency)
Background Shielding:	150 mm (6 inches) polyethylene
Electronics:	Advanced Multiplicity Shift Register (AMSR-150) – an IAEA approved unit
Weigh Scale:	Optional
System Control:	Local Industrial Control Panel
Measurement Control Checks:	<sup>252</sup> Cf source is used to verify system is within calibration on a routine basis
Max Package Surface Dose Rate:	200 mrem / hr (2 mSv/hr)
Max Package Weight:	454 kg (1,000 lbs)
Package Rotation	Turntable provided. Rotation option available depending on container type.
Gamma System:	Optional. Rear slit option for IAEA HRGS measurement.
Software:	INCC (developed by Los Alamos National Laboratory). Enables input of Pu isotopics. Data analysis automated by software. Off-line expert analysis capability included. Computer and system hardware diagnostics provided
Controls:	Start / stop measurement. Door and roller conveyor mechanism control.
Data Inputs:	Pu Isotopics
Data Outputs:	Printed reports and electronic data files

## Performance

Neutron Assay Time:	Precision Based. Assay continues until pre-set assay precision is attained. Configurable maximum assay times (e.g. 10 or 20 minutes).
Average Throughput:	>4.0 packages / hour
Measurement Uncertainty:	< +/- 33%
Maximum Pu Range:	500 g Pu
Applicable Matrix Types:	Organic & inorganic waste (combustibles, glass, metals, filters, sludges etc.)
Lower Limit of Detection:	< 2.5 mg Pu-240 effective (assumes non-interfering matrix)

## Contact

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