Cavendish Nuclear's DrumScan® SGS Plus

DrumScan® SGS Plus

The DrumScan® SGS Plus is a High Resolution segmented gamma scanner that reliably, accurately and cost-effectively assays contaminated waste in drums, boxes, bags or filters. It provides a record of the radionuclide inventory for final storage or further processing. The system is highly configurable, easy to use and is suitable for both homogeneous and heterogeneous wastes.

The Cavendish Nuclear DrumScan® SGS Plus provides a measurement of the radionuclide inventory of a wide range of waste items contaminated with fission products, activation products, plutonium or uranium. Where uranium is discovered, the system can determine the uranium enrichment.

Typical applications for the DrumScan® SGS Plus include:

- Nuclear Power Stations
- Reprocessing Plants
- Fuel Fabrication Facilities
- Waste Storage Facilities
- LLW Disposal Sites
- Non-nuclear facilities such as medical, pharmaceutical and research institutions

Measurement and Analysis Techniques

The DrumScan® SGS Plus comprises four separate modules: a detector lift, turntable (with optional integrated conveyor system), a transmission source lift and an operator interface.

The system is capable of accommodating 100litre to 500litre sized drums.

Unique to the DrumScan® SGS Plus operation is a continuous, vertical scan of the drum by the detector and transmission source which move up and down the height of the drum as it is rotated. This combination of vertical scanning and drum rotation produces a helical scan of the waste.

Helical scanning results in superior accuracy over conventional segmented gamma scanners (SGS) due to:

- the uniform gamma detection efficiency over the whole drum
- the gamma transmission source scanning the entire drum

In addition to the gamma transmission source measurements, the drum is also weighed during the measurement.

Non-uniformity in the waste matrix is accounted for by dividing the measurement into a number of horizontal segments, providing tie gamma ray energy spectrum relating to each segment.

The use of internationally recognised analysis codes along with additional algorithms developed by Cavendish Nuclear allows the calculation of isotopic composition and radionuclide activity of the waste materials.

Patented world leading matrix attenuation correction techniques, including “Intelligent Combination” algorithms, minimise assay error for both low and high density wastes.

The DrumScan® SGS Plus reliably, accurately and cost-effectively assays contaminated waste in drums, boxes, bags or filters providing a record of the radionuclide inventory. The system is equally applicable for wastes ranging from paper and plastics to concrete, rubble and scrap metal, allowing all to be accurately measured without the need for any calibration changes by the operator.

On completion of the measurement, the spectral data are analysed and all results presented to the user via a Microsoft Windows driven operator interface. The operator interface can be located in excess of 100 metres (330 feet) from the measurement system if necessary.

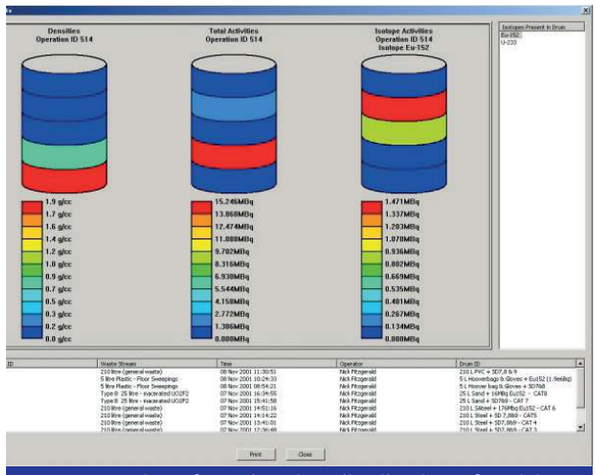
Results Reporting

The activities and specific activities of all directly measured and inferred radionuclides are reported along with the total alpha activity (Bq), total specific alpha activity, (Bq/g) total beta activity (Bq) and total specific beta activity (Bq/g).

The DrumScan® SGS Plus provides a full colour graphical display of the vertical distribution of the waste density, activity of all directly measured radionuclides (displayed individually) and the total activity of the drum (including inferred radionuclides).

This unique display allows the operator to visualise the important waste characteristics for the drum.

The DrumScan® SGS Plus can automatically generate the approved waste declaration form containing the total combined radionuclide inventory for LLW consignments to the Low Level Waste Repository.



Operator interface showing distribution of activity within the drum segments

Specifications	
Measurement system size/ mass	Detector lift module: 1200mm(l) x 1000mm(w) x 2210mm(H) 650kg Turntable module: 900mm(l) x 900mm(w) x 550mm(h), 230kg Transmission source module: 900mm(l) x 900mm(w) x 2150mm(h), 555kg
Drum Size	100 to 500 litres (25 to 130 US gallons)
Drum Mass	10 to 1000kg (22 to 2200lbs)
Detector	Liquid nitrogen cooled, coaxial HPGe detector with 30litre dewar (electrically cooled option available)
Transmission source	370MBq (10mCi) ^{152}Eu source. Other options available.
Performance	
Minimum detectable activity	200 litre drum weighing 120kg / 30 minutes measurement 0.08Bq/g ^{60}Co (10kBq) 0.1Bq/g ^{137}Cs (12kBq)
Count Time	10 to 120 minutes, optimised for application
Accuracy	Better than +/- 15% geometrical uncertainty
Energy Resolution	<1.9keV at 1332keV
Energy Range	50keV to 2.5MeV
Operating Temperature	0°C to 40°C
Operating Humidity Range	5% to 80% RH (non condensing) at 40°C

Key Features

- Drum dose rate measurement for selected positions close to drum
- Attenuating filters to meet needs of LLW and ILW handling
- Detectable activity range to > 12GBq ^{60}Co and > 30GBq ^{137}Cs
- Customised results reporting
- Barcode reader for automatic input of waste identification code
- Graphical user interface showing distribution of activity
- Integrated roller conveyor option for fully automated drum handling and drum queuing
- Electrically cooled HPGe detector option available

For more information please contact
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