

Previous model number: 3200-320

G3200-340

Segmented Gamma Scanner

Introduction

The ANTECH Model G3200-340 Segmented Gamma-ray Scanner (SGS) is designed to provide a non-destructive method for measuring the radionuclide content of typically low-level and intermediate level waste (LLW and ILW) including corrections for attenuation. Segmented gamma ray scanning is applicable to waste of a variety of matrices and chemical forms. It is particularly relevant when the chemical form and the relationship between the nuclide and matrix are unknown.

The drum or sample is rotated about its vertical axis as horizontal segments are scanned in order to allow for any inconsistencies in the matrix density and to average inhomogeneity. A vertical profile of the gamma ray transmission and the nuclide concentration for the drum or sample is recorded. The spectrum for each vertical segment or the summed drum or sample spectrum can be viewed in real time on the software interface. Corrections are made for to each spectrum for count deficit losses from pulse pile-up and analyser dead time.

For each horizontal segment of the drum or sample, the average linear attenuation coefficient is calculated by measuring the transmitted intensity of the external transmission source. This is known as the transmission measurement. The transmission source is mounted on an arm directly opposite the detector. A shutter opens for the transmission scan and closes during the emission scan to shield the transmission source. In this manner the attenuation or density correction is determined on a segment-by-segment basis for the entire drum.

In a similar manner an emission scan or measurement is performed in which an emission spectrum is obtained for each vertical segment of the drum. Each segment emission spectrum is corrected for gamma ray attenuation using the transmission data described above and the radionuclide content of each segment is determined from the gamma ray spectrum peak areas associated with appropriate regions of interest in the spectrum corresponding to the desired radionuclides.

The result for the entire drum is the sum of the results for all of the scans, corrected for any scan overlap. When the transmission and emission scans are performed separately, the process is called a two pass scan. This is the case when the transmission source may interfere with the emission measurement. When a single scan is performed and both transmission and emission data is obtained the process is referred to as a one pass measurement.

The ANTECH implementation of the SGS technique complies with Standard Test Method for Non-destructive Assay by Segmented Passive Gamma-ray Scanning, ASTM standard number C1133.

Features

- Automatic or manual operation
- User selectable one pass or two pass measurement mode operation
- Multiple drum handling solutions available - manual or automatic conveyor loading/unloading
- Adjustable detector position for optimum measurement of cans and small containers and high activity drums
- Mobile operator control console, which can be local or remote from the instrument
- Direct communication of results data to a controlling data storage computer or another ANTECH assay instrument via Ethernet
- Digital MCA based on the ORTEC DSPEC or ANTECH DPA
- Optional built-in Geiger-Muller dose sensor and waste drum bar code reader



Benefits

- Specifically designed for the non-destructive assay of up to 200 litre drums and 200 litre (55 gallon) drums inside 320 litre (85 gal) overpack drums containing gamma-ray emitting nuclear waste
- Automatic gamma-ray energy calibration using a variety of transmission sources
- Employs gamma-ray spectroscopy to detect and measure nuclides of interest and to measure and correct for the average gamma-ray attenuation in vertical segments of the drum
- Detector and transmission source are connected by a transmission source arm to ensure continuous alignment
- Improved safety of transmission source holder design facilitates ease of source handling
- Collimator can be interchanged for drums or cans
- Automation of three axis of motion
- Measurement time typically between 15 and 30 minutes (increased accuracy and precision can be achieved by extending the measurement time)
- Can be easily upgraded to full Tomographic Gamma Scanner (TGS) [see ANTECH Model G3850]



Close up of the detector with the optional interchangeable collimator



Side profile showing the transmission source arm and detector

Specification

Dimensions (H x W x D)	1785 mm x 1512 mm x 1835 mm (70.28 in x 59.53 in x 72.24 in)
Drum size	200 litres with 320 litre overpack
Germanium coax detector efficiency	20% (higher efficiency as an option)
Transmission Source	¹⁵² Eu
Analysis Software	Windows XP™ or Windows 7™ operating platform ANTECH MasterScan and GammaScan menu driven analysis software for ease of use
Digital MCA	ORTEC DSPEC or ANTECH DPA
Power Supply	110 or 240 VAC, 50-60 Hz
Network Connection	Ethernet

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