

Previous model number: 3500

# Shielded Segmented Gamma Scanner

## G3280-220

### Introduction

The ANTECH Model G3280-220 Shielded Segmented Gamma Scanner (SSGS) is designed to measure low level radioactive waste arising from industrial, medical and nuclear power industries at very low detection levels.

Conventional segmented gamma-ray scanning provides a non-destructive method for measuring the radionuclide content of waste. It can be applied to waste in a variety of matrices and chemical forms, and is applicable to waste where the chemical form and the relationship between the nuclide and the matrix may be unknown. The method involves rotating the drum or sample while scanning a vertical segment and it provides a vertical profile of gamma-ray transmission through the drum and nuclide concentration within the drum. The measurement procedure is highly automated and requires little operator interaction.

The ANTECH G3280-220 combines the features of the conventional segmented gamma scanning with the ANTECH Shielded QED Model G3400-220 Low Level Waste Segregation and Sentencing System to allow the sentencing to free release for medium to low density matrices. The ANTECH implementation of the shielded segmented gamma scanner technique complies with Standard Test Method for non-destructive assay by segmented passive gamma-ray scanning, ASTM standard C1133.

The intensity of a characteristic gamma-ray from each nuclide of interest is measured and the intensity of the gamma-ray is corrected for count rate losses and attenuation in the sample. The relationship between the observed gamma-ray intensity and nuclide content is obtained by comparison to similarly corrected gamma-ray intensities observed during the gamma-ray measurement of known mass calibration standards.

The drum is rotated about its vertical axis and simultaneously scanned, segment by segment, along the vertical axis. This method of scanning reduces the effects of non-uniformity in density and nuclide distribution. Corrections are made for count dependent losses from pulse pile-up and analyser dead time, as these are monitored during the measurement process. Using ANTECH helical scanning Master SGS measurement and analysis software, measurements may be reduced to 10 minutes in one-pass mode.

For each linear segment of the drum the average linear attenuation coefficient is calculated by measuring the transmitted intensity of an external gamma-ray transmission source. The source is mounted directly opposite the gamma-ray detector on the far side of the drum. Both the High Purity Germanium (HPGe) detectors and the transmission source move in the vertical axis as the drum rotates.

### Features

- ANTECH MasterScan SGS analysis software complies with ASTM standard C1133
- Employs gamma-ray spectroscopy with a single HPGe detector to measure radionuclides of interest
- Optional use of X-cooler2 replaces LN
- Digital MCA based on the ORTEC DSpec Pro
- Optional load cells for drum weight and Bar-Code Reader
- Optional automatic or manual drum loading



## Benefits

- Combines conventional Segmented Gamma Scanner (SGS) and Shielded QED functionality in one instrument
- Measures 200 litre (55 gal.) drums or boxes with the same envelope
- Ultra-low MDA (~10 nCi/g)
- Suitable for both free release measurements of low density waste and assay of medium density waste
- Performs TRU/LLW sorting over wide density range
- NORM activity can be removed from assay result
- Short SGS measurement times in one-pass helical scanning mode of approximately 10 minutes
- Windows based display screens for ease of use and user friendly operation
- Automation of drum rotation and movement of detector and source
- Transmission source used to determine average gamma-ray attenuation in the drum

## Specification

<b>Overall instrument envelope (H x W x D)</b>	1850 mm x 1250 mm x 2700 mm (72.83 in x 49.12 in x 106.23 in)
<b>Germanium HPGe coax detector efficiency</b>	(typically) 30%
<b>Sample drum and can size</b>	Variable to a maximum of 200 litre
<b>Total weight</b>	7500 kg (16,535 lb)
<b>Drum loading</b>	Automatic or manual options
<b>Network connection</b>	Ethernet communication from operator computer console