

The UDASS

The Universal Drum Assay and Segregation System (UDASS) is an advanced drum measurement system which can operate as a Tomographic Gamma Scan (TGS) in transmission mode, as a Wide-Range Segmented Gamma Scan (WR-SGS) or in a Dynamic Open Detector (DoD) mode as required by the drum matrix and activity heterogeneity to deliver optimal accuracy in the shortest possible time.

The technique is applicable to the measurement of activity from extremely low levels to extremely high levels and across a large range of densities. It is capable of measuring waste in a variety of matrices and chemical forms and locating and quantifying "discrete items" as defined by the UK LLWR.



As in the standard TGS, Segmented Gamma Scanner (SGS) or open detector techniques, the drum is rotated about its vertical axis as horizontal segments are scanned. This allows for any inconsistencies in the matrix density whilst building a vertical profile of gamma-ray transmission and nuclide concentration. The UDASS also utilises both the storage of the transmission source within a tungsten shielded safe and a fully automated variable aperture collimator. The variable aperture collimator with its in-built filter mechanism greatly increases the range of activity that can be assayed on one measurement system without the need for any manual alteration. Laser alignment during assembly and PLC motor control ensures optimum alignment of the transmission source and the detector once the source leaves the safe. When the transmission source is stored in the safe, there is typically a leakage of less than 1 µSv/hr near the surface of the safe. In the safe storage position the detector does not detect any gamma-rays from the transmission source.

All three measurement modes use the same large diameter high efficiency and high purity germanium detector to maximise the sensitivity of the measurements. A pre-scan of both emission and transmission measurements are carried out to allow the optimum measurement approach and the fill level of the drum to be identified. Based upon the pre-scan results, the UDASS software proposes measurement mode and parameters which the SQEP operator can either accept or modify as appropriate. During the pre-scan process, detector standardisation checks are carried out to assure measurement accuracy on every drum measured. On completion of the main measurement scan, the UDASS records all measurement data and system parameters, analyses the measurement results and provides a detailed measurement report. This data package is then scrutinised and checked by ANTECH assay experts before the reports are issued to the customer.



UDASS Drum Measurement Services



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Waste-Led Decommissioning & Legacy Waste

Recategorisation

Delivering:

- Lowest Waste Disposal Costs
- Fast Accurate Waste Assay & Analysis
- UKAS Quality Assured Results
- The removal of unnecessary waste storage costs releasing funds to New Build.

No Capital Purchase,

No Ownership Costs,

No Equipment Disposal Costs.

The service is delivered using the Universal Drum Assay and Segregation System (UDASS) which has been specifically designed to optimise segregation at the ILW/LLW, LLW/VLLW and VLLW/exempt boundaries. The UDASS Measurement Service delivers fast, accurate and defensible radionuclide content measurements for optimised categorisation of radioactive wastes in drums.

The UDASS measurement service is carried out on your site with a fully calibrated instrument and a SQEP operator.

Measurement quality assurance is supported by automatic checks within the software to ensure compliance. The UDASS requires valid background, measurement control and standardisation checks to be passed before an assay measurement can progress.

Assay data is presented in a standard report which enables waste consignment documentation to be prepared.

Data reviewed and validated offline by a SQEP radiometric physicist and reviewed for quality control and assurance in line with the ANTECH QMS.

Completed, reviewed reports are submitted to the end user in a timely manner for recommendation on consignment.

Key Features

- Ability to measure drums with very low and very high activity, low and high density and homogeneous and heterogeneous matrices with one measurement instrument
- UDASS Measurement processes and procedures compliant with IEC/ISO 17025
- Built-in measurement control checks to support data quality validation.
- UDASS measurement report suitable for demonstrating compliance with UK LLWR Waste Acceptance Criteria.
- Accurate measurements allow more drums to be classified to a lower category, minimising waste disposal costs.
- Trained ANTECH technicians for on-site installation, setting to work and demobilisation.
- SQEP UDASS operators and expert data reviewers to deliver robust measurement data.
- Identification and quantification of discrete items as required by the UK LLWR Waste Acceptance Criteria.
- GammaScan SGS analysis complies with Standard Test Method for Non-destructive Assay by Segmented Passive Gamma-ray Scanning ASTM standard number C1133-0.3
- TGS transmission mode complies with ASTM standard number C1718
- Non-destructive assay of 200 litre drums with a 320 litre overpack drum option
- Typical measurement time of 30 minutes although increased accuracy and precision can be achieved by extending the measurement time

Site Requirements:

The UDASS requires a flat sheltered location with 3m x 4m of clear space. (Optionally the system can be supplied in an isofreight container for ease of site deployment and installation).

The system is controlled from a workstation which is a 21" panel PC in a customer enclosure that can be sited at a distance of up to 75m from the UDASS. The data and control cables between the workstation and the UDASS fit through a 25mm diameter aperture.



The basic system can be supplied with input/output conveyors to assist with the drum handling. Conveyors offer the option of operating the system in a batch mode allowing for greater drum throughput. More floor space will be required to accommodate the conveyors.

Powered from a single phase 240Vac (50/60Hz) supply. No water, liquid nitrogen or compressed air is required.

Segments	Time (s)	Collimator Height (mm)	Rotations	Filter	Scan Height (mm)		
Pre-Scan	8	14	64.00	2	Retracted	808	
Emission	32	7	18.00	1	Retracted	808	
Transmission	N/A	30	4.00	N/A	Retracted	N/A	
Measurement Control	W/S-SGS Scan	Segments	Time (s)	Collimator Height (mm)	Rotations	Filter	Scan Height (mm)
Emission	32	35	64.00	2	Retracted	808	

Nuclide	Activity (Bq)	Uncertainty 2σ (%)	Comments
Am-241	7.54E+003	7.1	
Cs-137	4.78E+003		MDA
Eu-152	2.43E+004		MDA
Co-60	4.73E+003		MDA
Ba-133	4.74E+003		MDA

Parameter	Units	Value	Uncertainty	Level	Test Case Value	Permitted Limit
Gross Mass	kg	49.00	0.50			
Net Mass	kg	37.00	0.50			
Volume	l	2.19E+002	1.00E+000			
LLW Alpha Concentration	Bq/g	8.71E+001	6.25E+000	20	9.33E+001	≤ 4.00E+003
LLW Beta-Gamma Concentration	Bq/g	4.34E+001	1.33E+000	20	4.47E+001	≤ 1.20E+004
VLLW Activity Concentration	Bq/g	1.10E+002	7.23E+000	20	1.38E+002	> 4.00E+000
LA-LLW Activity Concentration	Bq/g	1.30E+002	7.22E+000	20	1.38E+002	> 2.00E+002
VLLW Activity Concentration	Bq/cm ²	2.99E+001	1.60E+000	20	3.15E+001	> 4.00E+000
Total Activity	Bq	6.39E+006	2.33E+000	20		
Total Pu Mass	g	0.00	0.00	20		
U-235 Mass	g	0.00	0.00	20		
Total Plutonium Mass	g	0.00	0.00	20		