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POWER PLANTS



WASTE
MANAGEMENT



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CENTRES

WAM series WASTE ASSAY MONITORS



MAIN ADVANTAGES

- Monitor configuration to customer requirements
- Segmented or tomographic analysis of the activity and density distribution in the drum
- Analysis of measured spectrometric data
- Peak attenuation correction
- Optional Fast-Scan function
- Detector with optional adjustable collimator
- Integrated waste drum weighing
- Measurement of the density of the material in the waste drum
- Integrated control software

PURPOSE

The WAM series monitors are intended for the quantitative and qualitative characterization of radioactive wastes deposited in waste drums with varying height, shape and weight. Typical applications are analyses of low-level and intermediate-level waste to be deposited in a radioactive waste repository.

Three series of WAM monitors are available:

- **WAM-200** series – a segmented gamma scanner (SGS), which evaluates the distribution of activity in drums in up to 9 vertical segments.
- **WAM-300** series – a segmented gamma scanner, which evaluates the distribution of activity and material density in drums in up to 9 vertical segments.
- **WAM-400** series – a tomographic gamma scanner (TGS), which evaluates the distribution of activity and material density in all parts of drums.

Due to the variable customers' requirements for measuring different types and sizes of waste drums,

various waste activities, different requirements for handling the drums, etc., the WAM series monitors can be customized.

All WAM series monitors include:

- Rotating platform for measured waste drums with integrated weighing scale
- HPGe detector, cooled by liquid nitrogen, with 15 % efficiency and a fixed collimator that measures radionuclides in a selected waste drum segment
- Vertical lifting mechanism, which ensures measurement of the waste drum over its entire height
- A data processing system, which provides comprehensive waste drum analysis

The WAM-300 and WAM-400 series also includes:

- Sealed radionuclide source to correct for non-homogeneous material distribution in the waste drum. Eu-152 is used as standard, in case of need other nuclides can be used, e.g. Se-75.

It is also possible add to the WAM monitors the following options and features:

- HPGe detector with different efficiency corresponding to the activity of the waste in the waste drum.
- Detector cooling: electric or hybrid (combination of liquid nitrogen and electric cooling)
- 1 to 4 collimated dose rate detectors for Fast-Scan function
- Collimator with adjustable aperture, for measuring a wide range of activities in waste drums, with automatic setting of the aperture using the Fast-Scan function
- Manual or automatic waste drum handling system
- Swab wipe system for the measurement of waste drum's surface contamination
- Barcode, QR or RFID reader for waste drum identification

Segmented gamma scanner

The WAM-200 assumes a homogeneous distribution of sources of activity and material density in the drum. WAM-300 assumes a homogeneous distribution of sources of activity and material density in the defined vertical segments. With a homogeneous distribution of activity and density, WAM-200 and WAM-300 enable measurements with an error of 5-20%.

Tomographic gamma scanner

WAM-400 is suitable for measuring drums with high heterogeneity in the distribution of activity sources and material density in the entire barrel volume. WAM-400 provides measurement with an error typically in the range of 5-20% (max. 50%). In addition, the WAM-400 identifies the position, activity and density of hotspots in the measured drum.

Operation

When the waste drum is loaded onto the rotating platform, it is weighed. The operator is then asked to enter the measurement input information and then the measurement can be started.

When integrated, the Fast-Scan function performs a quick measurement using dose rate detectors to determine the maximum dose rate at the waste drum surface. Accordingly, the aperture size of the HPGe detector collimator is automatically adjusted to achieve the optimal detection efficiency.

Then, WAM-300 and WAM-400 series monitors perform the waste drum density measurement with the radionuclide source to determine the average density of the material in the drum. Depending on the measured density, the corresponding peak attenuation correction factor is set for evaluation.

After that, the waste drum is gradually measured by an HPGe detector in individual cylindrical segments over its entire height.

After measurement, the monitor will provide a user a report with the total and mass activity of the radionuclides present in all measured parts, as well as the total and mass activity of the waste in the waste drum for each radionuclide.

WAM monitors are controlled by **WAMIS** software, which has the following functions:

- Starting new waste drum measurements
- Manual WAM control, performing calibrations
- Archiving of waste drum measurements made
- Archiving of calibrations performed
- Archiving status and error messages
- Printing reports of waste drum's measurements made
- Printing WAM calibration reports

SPECIFICATIONS

Detector	HPGe
• Typical efficiency	10 - 30 %
• Efficiency for WAM-400	50 %
Measuring range for ¹³⁷ Cs	3 kBq ~ 3 TBq
Resolution FWHM (122 keV)	< 0,85 keV
Resolution FWHM (1330 keV)	< 1,85 keV
Ratio Peak to Compton	60 : 1
Temperature	from 5 to 55 °C
Humidity	max. 80 % non-condensing
Pressure	86 – 106 kPa
Power supply	220 – 240 VAC
Fast-Scan detector	collimated CdTe
Typical weight of the waste drum	< 800 kg
Typical diameter of the waste drum	610 mm
Typical volume of the waste drum	200 l

RELATED PRODUCTS

MK-30P	Sample Measurement System
PAM-170	Portable Activity Meter
MDG-12S	Directional Dose Rate Meter



WAM-200