

CD285-3013

High Sensitivity Calorimeter for 3013 Canisters

Introduction

The ANTECH CD285-3013 High Sensitivity Calorimeter for 3013 Canisters is designed to measure plutonium in 3013 canisters using either isothermal or “heat-flow” operation.

It is applicable to a wide range of plutonium measurement requirements. These include international safeguards measurements, shipper-receiver difference measurements, and in-plant accountancy measurements. It can also be used for anomaly resolution in passive neutron coincidence counting or segmented gamma-ray scanning.

The CD285-3013 employs dual application thermopile technology and can be used in either the isothermal mode or the heat flow mode of operation. In isothermal mode the design has been optimised to achieve short measurement durations. In heat-flow mode the design has been optimised to achieve high precision and accuracy.

The CD285-3013 is available in either transportable or fixed installation configurations. The transportable variant can be moved to measurement sites so that it is not necessary to move Special Nuclear Material (SNM). The fixed installation version is designed to be used with robot controlled sample loading, which ANTECH is also able to supply.

The modular design of the CP285-3013 facilitates installation, maintenance and the use of the instrument in a variety of measurement applications. In the standard configuration the calorimeter is capable of measuring plutonium bearing samples that can be contained in standard 3013 cylindrical canisters with nominal external dimensions 125 mm (4.921 in) diameter and 254 mm (10 in) high. The calorimeter has a variable sample power measurement range from below 0.5 watts to 25 watts and an operating temperature range of 20 to 50 degrees centigrade.

Features

- True isothermal “air bath” absolute calorimetry measurements (isothermal operation)
- High accuracy end precision (“heat-flow” operation)
- Automatic software algorithms for equilibrium sample power prediction and measurement end point determination
- Automatic plutonium and americium decay correction
- Comprehensive and traceable electrical calibration capability that reduces dependence on plutonium standards
- Comprehensive user friendly windows based user interface software

Benefits

- Absolute or relative measurement of sample thermal power (isothermal or “heat-flow”)
- Reduced criticality hazard as water is not used as a heat sink
- Measurement times with equilibrium sample power prediction of between 2 and 8 hours (depending on the sample packaging)
- Total mass of plutonium determined with error propagation when plutonium isotopic data is provided on a file or ‘on-line’ from ANTECH Plutonium Gamma-ray Isotopic Measurement System
- Custom designs are available from ANTECH for different sample container dimensions and different measurement sensitivities
- Short delivery time of less than six months for custom designs

Specification

External dimensions (H x W x D)	1470 mm x 1230 mm x 690 mm
Overall height of removable hoist	1870 mm
Weight of complete trolley mounted instrument	300 kg
Thermal power measurement accuracy	Better than 0.5% over the operating range and better than 0.2% at 1.0 W power (7.5 in diameter sample)
Variable measurement chambers operating range	20 - 50 °c
Measurement range	5 mW - 20 W
Power consumption	300 - 600 W 110/230 VAC