

## High Sensitivity Large sample Tritium Calorimeter Model 350-375

### *Benefits*

- Absolute measurement of sample thermal power in Isothermal mode
- Easy to use software
- Short measurement times compared to traditional calorimeters
- Comprehensive and traceable electrical calibration capability reduces dependence on Pu standards
- The calorimeter determines the tritium mass and activity by measuring the total heat output resulting from the radioactive decay of tritium
- Latest high density thermoelectric technology



### *Features*

- Most sensitive large sample calorimeter available today
- Isothermal and heat flow measurements
- True isothermal “air bath” absolute calorimetry measurements
- Automatic measurements for prediction, equilibrium and end point determination
- Automatic plutonium and americium decay correction
- Custom designs are available from ANTECH for different sizes of sample containers
- Sample lifting device with fail safe hoist (Certified)

## *Description*

The 350 series calorimeters determines the tritium mass in grams (g) and activity in units of Curies (Ci) or Becquerels (Bq) by measuring the total heat output resulting from the radioactive decay of tritium. The design has application to a wide range of measurement requirements. These include in-plant accountancy measurements, shipper - receiver difference measurements, the identification of empty transport containers and international safeguards measurements. The instrument also has a role in replacing a proportion of measurements performed using the PVTc technique as the calorimetry measurement process is non-intrusive.

The instrument is designed to measure tritium with a mass or activity ranging from over 10 g or 100 kCi ( $3.7 \times 10^{15}$  Bq) down to less than 10 mg or 100 Ci (3.7 TBq). Measurement uncertainty ranges from better than 0.2 % at 50 kCi to between 5 % and 10 % below 1 kCi. Measurement times range from less than 2 hours to 4 - 5 hours depending on the temperature of the getter and the quantity of tritium being measured.

The calorimetry measurement method is independent of sample pressure, chemical composition and the presence of any other non-radioactive material, for example hydrogen, deuterium and helium. The measurement procedure is automated and requires almost no manual intervention, with the exception of loading and unloading the calorimeter. A calorimetric measurement of the tritium decay heat provides a direct measure of the total tritium activity or tritium mass based on precise electrical power measurement.

User friendly software is included that operates under NT4 or Windows 2000 and is fully network compatible. Both end point power and equilibrium fitting software routines are included in the standard package, as are decay correction for both tritium and plutonium.

Measurement data is archived and can be analysed off line at any time.

Variations to the standard design for different requirements and for special sample types or sample packaging can be accommodated.

## *Specification*

- Thermal power measurement accuracy better than 1.0% over the operating range and better than 0.2% at 1.0 Watts power.
- Custom design parameters means variable measurement chambers can be accommodated
- Measurement range from 5mW to 20 Watts. The minimum power sensitivity 5mW with 100% RSD
- Two versions are available. Unit can be mounted on a single trolley or the control console and thermal element can be separated by up to 5 meters
- Weight of trolley mounted version is 300kg
- Power consumption 1000 watts maximum 110/230VAC