

Purpose

This document lists the specific methods that Bubble Technology Industries (BTI) performs in accordance with ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*. Please note that BTI is not accredited by a third party. Compliance is confirmed through an internal audit program that meets the requirements of ISO 9001:2008 and ISO/IEC 17025:2005. **This scope was not issued by an accreditation body.**

All radiochemical analysis methods and survey meter calibration methods, including those not listed below, are performed within a quality management system that is ISO 9001 certified by BSI under certificate number FM 502976.

Testing Field: Radiochemical Testing

Type of Test	Test Object	Test Parameter	Available Isotopes	Method Reference
Gas flow proportional counting	Cloth swipes, Filter papers, Cotton swabs	Gross Beta Activity	DU, ¹⁴ C, ¹⁴⁷ Pm, ⁶⁰ Co, ¹³⁷ Cs, ³⁶ Cl, ⁹⁰ Sr/ ⁹⁰ Y, ⁵⁵ Fe, ¹⁹² Ir, ⁹⁹ Tc	Internally-developed methods described in SOPs BTI-RS-E-3-0004 and BTI-RS-E-3-0005
Gas flow proportional counting	Water (non-drinking)	Gross Beta Activity	¹³⁷ Cs, ⁶⁰ Co, ³⁶ Cl, ⁹⁰ Sr	Internally-developed methods described in SOPs BTI-RS-E-3-0034 and BTI-RS-E-3-0005
Gas flow proportional counting	Air filters (filter paper)	Gross Beta Activity	¹³⁷ Cs, ³⁶ Cl, ⁹⁰ Sr	Internally-developed methods described in SOPs BTI-RS-E-3-0004 and BTI-RS-E-3-0005
Gamma spectroscopy	Cloth swipes, Filter papers, Cotton swabs	Gamma activity	¹³³ Ba, ¹⁰⁹ Cd, ⁵⁷ Co, ⁷⁵ Se, ²² Na, ¹³⁷ Cs	Internally-developed methods described in SOPs BTI-RS-E-3-0003 and BTI-RS-E-3-0036
Gamma spectroscopy	Water (non-drinking)	Gross gamma activity	⁶⁰ Co, ²² Na, ¹³⁷ Cs	Internally-developed methods described in SOPs BTI-RS-E-3-0034 and BTI-RS-E-3-0036
Gamma spectroscopy	Air filter (charcoal canister and filter paper)	Gamma activity	²² Na, ¹³⁷ Cs	Internally-developed methods described in SOP BTI-RS-E-3-0036
Liquid scintillation counting	Miscellaneous liquid	Low energy beta activity	¹⁴ C, ³⁶ Cl, ³ H, ⁶³ Ni	Internally-developed methods described in SOPs BTI-RS-E-3-0029, BTI-RS-E-3-0010, and BTI-RS-E-3-0035
Alpha spectroscopy	Miscellaneous solid	Alpha activity	All alpha-emitting radioisotopes ⁽¹⁾	Internally-developed methods described in SOP BTI-RS-E-3-0009

⁽¹⁾ All isotopes are counted relative to ²⁴¹Am.

Calibration Field: Ionizing Radiation and Radioactivity Measurements

Calibration Object	Quantity	Calibration Isotope	Range (H*(10) Rates)	CMC (\pm) ⁽²⁾	Method Reference
Gamma survey meter	Accuracy of dose rate	¹³⁷ Cs ⁽³⁾	~0.50 μ Sv/h to ~5000 μ Sv/h	11% reading	SOP BTI-RS-C-3-0002
Neutron survey meter	Accuracy of dose rate	²⁵² Cf ⁽⁴⁾	~3.4 μ Sv/h to ~170 μ Sv/h	13% reading	SOP BTI-RS-C-3-0005

⁽²⁾ The CMC is the calibration and measurement capability of the laboratory. It represents the smallest uncertainty that a customer can expect for a calibration measurement. The estimated uncertainty for a measurement may be higher due to the characteristics of the particular survey meter. CMCs are expanded uncertainties produced using a coverage factor of $k = 2$, which defines an interval estimated to have a level of confidence of 95%.

⁽³⁾ This source is traceable to the SI through the National Research Council of Canada (NRC).

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