

SPECIFICATION

Mixed radionuclide alpha reference standard

1. Scope

- 1.1. This Specification describes the requirement for a mixed radionuclide alpha reference standard (the “Standard”), traceable to national standards and suitable for calibration of alpha spectroscopy detectors.
- 1.2. The Standard shall be supplied to Tripoli, Libya (Technical Cooperation Project LIB7005).

2. Applicable Documents

- 2.1. IAEA Safety Standards; Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards No. GSR Part 3 International Atomic Energy Agency, Vienna, 2014.
- 2.2. IAEA Safety Standards; Schedules of Provisions of the IAEA Regulations for the Safe Transport of Radioactive Material No. SSG-33 International Atomic Energy Agency, Vienna, 2012.

3. Requirements

3.1. Functional and Performance Requirements

The Standard shall meet the following functional and performance requirements:

- 3.1.1. Be packed in a suitable container.
- 3.1.2. Packaging and outside of the container shall have no trace of radioactive contamination.

3.2. Technical Requirements

The Standard shall meet the following technical requirements:

- 3.2.1. The Standard shall be supplied as mixed radionuclides homogeneously electrodeposited on a stainless-steel disc.
- 3.2.2. The diameter of the stainless-steel disc shall be 19mm.
- 3.2.3. The Standard shall be supplied with a calibration certificate in the English language which includes a traceability statement to a National Metrology Institute or similar. The certificate shall include information on:
 - 3.2.3.1. The traceability of the activity concentrations.
 - 3.2.3.2. The reference date for which the stated activity concentrations are applicable.
 - 3.2.3.3. The activity concentrations and associated uncertainty for each radionuclide.
 - 3.2.3.4. The source of nuclear data used for obtaining the reference values.
 - 3.2.3.5. A statement on the possible presence of impurities, if any.



- 3.2.4. The Standard shall include a mixture of radionuclides such as Pu-239, Am-241 and Cm-244.
- 3.2.5. The total (sum) activity of the Standard shall be in the range of 300 Bq, and the relative activity concentrations of each radionuclide shall be suitable for the efficiency calibration of an alpha detector.
- 3.2.6. The relative uncertainty of the reported activity concentrations of each radionuclide shall be no greater than 3 % at the 95 % confidence level (coverage factor $k=2$).

4. Marking

The Standard shall have all safety markings in English language.

5. Packing

The Standard, for the shipment by air to Tripoli, Libya shall be packed in accordance with international standards that are applicable for the shipment by air of this kind of radioactive material.

6. Quality Requirements

- 6.1. The production of the Standard (source) shall be in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.
- 6.2. The Contractor shall document the compliance with this quality assurance system.

7. Testing and Acceptance

- 7.1. The Standard, prior to shipment, shall be tested for conformance of the Standard with manufacturer's performance specifications and the minimum requirements specified herein.
- 7.2. The Standard may be tested by the recipient to demonstrate that the performance meets the manufacturer's performance specifications and the minimum requirements specified herein.

8. Warranty and Support

The Contractor shall provide minimum warranties for the Standard in accordance with the IAEA General Conditions of Contract.

9. Deliverable Data Items

The Contractor shall provide one (1) certificate in the English language stating the information required in section 3.2.2 above.
