

SPECIFICATIONS

ALPHA / BETA COUNTING SYSTEM

1. Scope

This specification describes the requirements for a portable alpha / beta counter, hereinafter referred to as the “System”. The System will be used for analysing water samples (with necessary sample preparation for dry residue of low-level liquid media) with low beta activity to strengthen the radioanalytical analysis capacity in Rivne Nuclear Power Plant (RNPP). The System shall include:

- One (1) alpha/ beta counter;
- One (1) Communication software;
- One (1) Computer for data collection (download and store) with necessary cables;
- One (1) $^{90}\text{Sr}+^{90}\text{Y}$ calibration source.

2. Applicable Documents

The following documents shall be applicable for this Specification to the extent specified hereinafter:

- INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR OFFICE, Occupational Radiation Protection, IAEA Safety Standards Series No. GSG-7, IAEA, Vienna (2018)

In the event of conflict between the documents listed above and the content of this Specification, the content of this Specification shall take precedence to the extent of the conflict.

3. Requirements

3.1. Functional, Performance and Technical Requirements

The System shall meet the following equipment and functionality:

The System shall:

- 3.1.1. Have alpha and beta detection capacity;
- 3.1.2. The detector of the System shall be silicon-based semiconductor detector;
- 3.1.3. Detector area shall be at least 20 cm²;
- 3.1.4. Have active background protection with protective detector included in the anti-coincidence circuit;
- 3.1.5. Have passive background protection with lead, with a wall thickness of at least 20 mm;
- 3.1.6. Beta particles energy measurement range shall be from 0.125 MeV to 2.2 MeV;
- 3.1.7. Beta channel activity measurement range shall be from 0.2 Bq to 10⁴ Bq;
- 3.1.8. Sensitivity to beta-radiation $^{90}\text{Sr}+^{90}\text{Y}$ calibration source shall not be less than 0.25 s⁻¹· Bq⁻¹;
- 3.1.9. Have calibration standard with Sr-90 50 mm diameter;
- 3.1.10. Have detector installation tool and base;
- 3.1.11. Have AC to DC power converter;

- 3.1.12. Be operational with supply voltage $220\text{ V} \pm 10\%$ (50 Hz);
- 3.1.13. The total assembly weight of the System shall not be more than 30 kg;
- 3.1.14. Have a communication software with all needed components to download results into a Microsoft SQL server database. The software interface and operation manual shall be in the English language; and
- 3.1.15. Have a desktop computer and monitor, compatible with the equipment software with 20inch display, and the latest Windows operating system.

5. Marking

The System shall have all safety markings in English language.

6. Packing

The System, for the shipment to the End-User, shall be packed in accordance with international standards that are applicable for the shipment of this kind of equipment.

7. Quality Requirements

The System shall be manufactured and shipped in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.

The Contractor shall document the compliance with this quality assurance system.

8. Testing and Acceptance

The System, prior to shipment, shall be tested for conformance of the System with manufacturer's performance specifications and the minimum requirements specified herein.

9. Deliverable Data Items

The Contractor shall provide two complete sets of operation and servicing manuals and technical drawings in the English language.

10. Support

The Contractor shall identify a support plan appropriate for the End-User, with full contact details. In-country or regional support is preferred.

The Contractor shall list required consumables, any routine or preventative maintenance that is recommended, and components where replacement is expected within a typical ten-year life span.

11. Warranty

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

The Contractor shall clearly note the manufacturer's guarantee conditions, the routine or preventive maintenance required to ensure operation of the System.