



SPECIFICATION

Ultra-pure chemicals

1. Scope

This Specification describes the requirements for ultrapure acids used for the determination of Uranium and Plutonium isotopes and other actinides in the environmental samples (hereinafter referred to as the “Goods”). There are some tasks for determining the impurities in several matrixes as well.

The applied measurement technique and the quantity level to be measured require the use of ultra-pure chemicals.

2. Applicable Documents

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

- ISO 14644: Cleanrooms and associated controlled environments
- Handbook of recommended practices – prepared by Contamination Control Division of Institute of Environmental Sciences and Technology, especially: IEST-STD-CC1246D – Product Cleanliness Levels and Contamination Control Program.

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. Definitions, Acronyms, and Abbreviations

The following definitions, acronyms, and abbreviations shall apply throughout this Specification unless defined otherwise hereinafter:

- IEST shall mean Institute of Environmental Sciences and Technology
- ppt shall mean parts per trillion
- w/w shall mean mass percent.

4. Requirements

4.1. Functional and Performance Requirements

The Goods shall meet the following requirements:

- a) The Goods shall be packed properly for the use in the clean environment; and
- b) The impurity level of the chemicals shall allow the determination of
 - i. Uranium isotopes in nanogram level
 - ii. Plutonium isotopes in femtogram level.



4.2. Technical Requirements

The Goods shall meet the following technical requirements:

- a) The impurity level of all key metals shall be under 10ppt;
- b) Uranium and Thorium content shall be under 1ppt;
- c) Lead content shall be under 10ppt;
- d) Unopened, sealed products shall be able to be stored for 3 years between 15-25°C with minimum exposure to light;
- e) Goods shall be provided in a range of unit bottle sizes, starting from 250mL as a minimum amount; and
- f) The following quality of the product and quality of the bottle shall be provided:
 - i. Nitric acid, w/w 67-69%, in Fluoropolymer FEP or PFA bottles;
 - ii. Hydrochloric acid, w/w 32-35%, in Fluoropolymer FEP or PFA bottles;
 - iii. Hydrobromic acid, w/w 44-49% in Fluoropolymer FEP bottles;
 - iv. Hydrofluoric acid, w/w 47-51%, in Fluoropolymer FEP or PFA bottles;
 - v. Hydrogen peroxide, w/w 30-32%, in Fluoropolymer FEP bottles;
 - vi. Perchloric acid, w/w 65-71%, in Fluoropolymer FEP bottles;
 - vii. Sulphuric acid, w/w 93-98%, in Fluoropolymer FEP bottles;
 - viii. Ammonia solution, w/w 20-22%, in Fluoropolymer FEP bottles; and
 - ix. Acetic acid, w/w ≥99%, in Fluoropolymer FEP bottles.

5. Marking

The Goods shall have all safety markings in English language.

6. Packing

The Goods, for the shipment to the IAEA Seibersdorf, shall be packed in accordance with international standards that are applicable for the shipment of this kind of Goods.

7. Quality Requirements

- 7.1. The Goods shall be manufactured and shipped and in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.
- 7.2. The Contractor shall document the compliance with this quality assurance system.

8. Testing and Acceptance

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



The Goods shall be tested by the Contractor to demonstrate that the performance meets the manufacturer's performance specifications and the minimum requirements specified herein as determined by the IAEA.

The impurity of the Goods shall be checked by the Contractor prior to shipment. Checking of the impurities shall be conducted in clean room conditions (Class 100 according to IEST-STD-CC1246D or ISO Class 5 according to ISO 14644).

The results of the testing of the Goods shall be documented by the Contractor in a protocol.

9. Deliverable Data Items

The Contractor shall provide the Goods Safety Data Sheet to each ordered Goods in the English language.

10. Shipment Schedule

The Contractor shall be capable of providing multiple deliveries of the Goods per year (at least three in number) in accordance with individual purchase orders.
