

Certificate of Analysis

Product Description:

Name: ICP-MS Tuning Solution 4
Part Number: **ICP-MS-TS-4**
Lot Number: **SAMPLE**
Matrix: 2% HNO₃
Purity: 99.98% - 99.9999%

Certified Values:

Element	($\mu\text{g/mL}$)	SRM ID	SRM Lot#	Element	($\mu\text{g/mL}$)	SRM ID	SRM Lot#
Al	10.00 \pm 0.05	*		In	10.00 \pm 0.05	3124a	110516
Ba	10.00 \pm 0.06	*		Pb	10.00 \pm 0.06	3128	101026
Be	10.0 \pm 0.1	3105a	090514	Mg	10.00 \pm 0.05	3131a	140110
Bi	10.00 \pm 0.05	3106	991212	Ni	10.00 \pm 0.05	3136	120619
Ce	10.00 \pm 0.05	3110	090504	V	10.00 \pm 0.06	3165	992706
Co	10.00 \pm 0.05	3113	000630	Y	10.00 \pm 0.05	3167a	120314

The Certified values are based on gravimetric and volumetric preparation, and verified against SRM 3100 series developed by National Institute of Standards and Technology (NIST) via inductively coupled plasma optical emission spectrometry (ICP-OES) using an internal laboratory developed method. The uncertainty in the certified value is calculated for a 95% confidence interval and coverage factor k is about 2

* Refer to Traceability Information, Section d

Preparation Information:

The standard is generally prepared from single element standard solutions that are ISO Guide 34 certified reference materials. Highest purity source materials were purchased from qualified vendors per ISO 9001:2008 guidelines and assayed by ICP-OES for conformity prior to use. Sub-boiling distilled high-purity acid has been used to place the materials in solution and to stabilize the standard. The matrix is as noted above in 18 megaohm deionized water.

Traceability Information:

The traceability of this standard is maintained through an unbroken chain of comparisons to appropriate standards with suitable procedure and measurement uncertainties. The maintenance of the base and derived units of International System of Units (SI) with traceability of measurement results (contemporary metrology) to SI ensures their comparability over time as follows.

a. Standard Weight and Analytical Balance

The standard weights (NBS weights Inventory No 20231A) are calibrated every two years by South Carolina Metrology Laboratory that is a participant in "NIST Weights and Measures Measurement Assurance Program" with a certificate of measurement traceability to NIST primary standards.

The balances are calibrated yearly by the ISO 17025 accredited metrology service, and are verified weekly by an in-house method using standard weights.

b. Volumetric Device

The calibration of volumetric vessels is checked annually using the ASTM method E542

c. Thermometer

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High-Purity Standards is certified to ISO 9001:2008 and accredited to ISO/IEC 17025:2005 and ISO Guide 34:2009.

The standard thermometers are calibrated every year by the ISO 17025 accredited metrology service. The thermometers used in-house are verified against the standard thermometers yearly.

d. **Calibration Standards**

The Calibration Standards are traceable to SRM 3100 Series Spectrometric Standard Solutions or second sources.

Packaging and Storage Conditions:

The standard is packaged in a pre-cleaned polyethylene bottle. To maintain the integrity of this product, the solution should be kept tightly capped and stored under normal laboratory conditions.

Refer to Material Safety Datasheet (MSDS) for hazardous information.

Expiration Information:

The expiry date is guaranteed to be valid for twelve months from the shipping date provided. For this reason, standards from the same lot may have different expiration dates.

Preparation Date: June 11, 2015

Shipped Date:

Expiration Date:

Certificate Issue Date: June 15, 2015

Quality Information:



**ISO/IEC 17025:2005 Accreditation
Certificate Number AT-1529**



**Angel Sellers
Quality Manager**

NOTICE: HPS products are intended for laboratory use only. All products should be handled and used by trained professional personnel. The responsibility for the safe handling and use of these products rests solely with the buyer and/or user. The data and information as stated was furnished by the manufacturer of the product. The information provided in this certificate pertains only to the lot number specified. None of the information provided in this certificate may be used, reproduced or transmitted in any form or by any means without written approval from High Purity Standards.