Agilent

CERTIFICATE OF ANALYSIS

Agilent Product Name: Calibration Mix 2, 125mL

Agilent Part No: 6610030600

Lot No: 0010813828

Product Specifications

Analyte	Starting Material	CAS #	Certified Conc.	Analyte	Starting Material	CAS #	Certified Conc.
Ag	Ag	7440-22-4	**100.0 ± 0.5 mg/L**	**Mn**	Mn	7439-96-5	**100.0 ± 0.5 mg/L**
Al	$Al(NO_3)_3$	7784-27-2	**100.0 ± 0.5 mg/L**	**Ni**	Ni	7440-02-0	**100.0 ± 0.5 mg/L**
As	As	7440-38-2	**100.0 ± 0.5 mg/L**	**Pb**	Pb	7439-92-1	**100.0 ± 0.5 mg/L**
Ba	$Ba(NO_3)_2$	10022-31-8	**100.0 ± 0.5 mg/L**	**Se**	Se	7782-49-2	**100.0 ± 0.5 mg/L**
Be	$Be_4O(C_3H_3O_2)_6$	19049-40-2	**100.0 ± 0.5 mg/L**	**Th**	$Th(NO_3)_4$	13823-29-5	**100.0 ± 0.5 mg/L**
Cd	Cd	7440-43-9	**100.0 ± 0.5 mg/L**	**Tl**	Tl	7440-28-0	**100.0 ± 0.5 mg/L**
Co	Co	7440-48-4	**100.0 ± 0.5 mg/L**	**U**	U_3O_8	1344-59-8	**100.0 ± 0.5 mg/L**
Cr	$Cr(NO_3)_3$	13548-38-4	**100.0 ± 0.5 mg/L**	**V**	V_2O_5	1314-62-1	**100.0 ± 0.5 mg/L**
Cu	Cu	7440-50-8	**100.1 ± 0.5 mg/L**	**Zn**	Zn	7440-66-6	**100.1 ± 0.5 mg/L**

Matrix: 5% HNO_3

Intended Use: This solution is intended for use as a certified reference material or calibration standard for inductively coupled plasma optical emission spectroscopy (ICP-OES), inductively coupled plasma mass spectrometry (ICP-MS), atomic absorption spectroscopy (flame AAS or GFAAS), microwave plasma atomic emission spectroscopy (MP-AES), x-ray fluorescence spectroscopy (XRF), and other techniques for elemental analysis.

Certification & Traceability: This CRM was manufactured under a quality management system that is accredited to **ISO 17034**, **ISO/IEC 17025**, and registered to **ISO 9001**. This CRM was prepared to the certified concentrations shown above by gravimetric methods using single-element concentrates that were certified using the "High Performance ICP-OES" protocol developed by NIST and are directly traceable to the NIST SRMs listed below. This solution was stabilized using high purity nitric acid (HNO_3) and diluted with filtered (0.22µm), 18 M-ohm deionized water. The balances used in the preparation of this CRM are calibrated regularly with traceability to NIST. All volumetric dilutions are performed in Class A calibrated glassware. The certified concentrations were determined based upon gravimetric procedures. Secondary verification of the certified concentrations was performed using ICP-OES that was calibrated and/or referenced against NIST SRMs: 3151, 3101a, 3103a, 3104a, 3105a, 3108, 3113, 3112a, 3114, 3132, 3136, 3128, 3149, 3159, 3158, 3164, 3165, and 3168a. The uncertainty associated with each certified concentration represents the expanded uncertainty at the 95% confidence level using a coverage factor of k=2.

Uncertified Values: Agilent ICP-MS was used to determine trace metal concentrations for this product (nd = not determined).

Trace Concentrations (µg/L)

Ag	MAJOR	Co	MAJOR	Ge	<0.5	Lu	<0.2	P	<100	Sb	<0.5	Te	<1
Al	MAJOR	Cs	<0.5	Hf	<0.2	Mg	<5	Pb	MAJOR	Sc	<5	Ti	<2
As	MAJOR	Cr	MAJOR	Hg	1	Mn	MAJOR	Pd	<0.5	Se	MAJOR	Tl	MAJOR
Au	<0.5	Cu	MAJOR	Ho	<0.2	Mo	0.9	Pr	<0.2	Si	<100	Tm	<0.2
B	<5	Dy	<0.2	In	nd	Na	<25	Pt	<0.5	Sm	0.3	V	MAJOR
Ba	MAJOR	Er	<0.2	Ir	<0.2	Nb	<0.5	Rb	<0.5	Sn	<0.5	W	<0.5
Bi	0.7	Eu	2	K	<25	Nd	<0.2	Re	<0.2	Sr	2	Y	<0.5
Ca	<25	Fe	22	La	<0.5	Ni	MAJOR	Rh	5	Ta	<0.5	Yb	<0.2
Cd	MAJOR	Ga	3	Li	<2	Os	<0.5	Ru	<0.5	Tb	<0.5	Zn	MAJOR
Ce	0.3	Gd	<0.2										

Instructions for Use: Agilent recommends that the solution be thoroughly mixed by repeated shaking or swirling of the bottle immediately prior to use. To achieve the highest accuracy the analyst should: (1) use only pre-cleaned containers and transferware, (2) avoid pipetting directly from the CRM's original container, (3) use a minimum sub-sample size of 500µL, (4) make dilutions using calibrated balances or certified volumetric class A flasks and pipettes, (5) dilute to volume using the same matrix as the original CRM, and (6) never pour used product back into the original container. The solution should be kept tightly capped and stored under normal laboratory conditions. Do not freeze, heat, or expose to direct sunlight. Minimize exposure to moisture or high humidity.

Period of Validity: Agilent ensures the accuracy of this solution until the expiration date shown below, provided the instructions for use are followed. During the period of validity, the purchaser will be notified if this product is recalled due to any significant changes in the stability of the solution.

Sample lot approver:

Date of release: 8 December 2021
Date of expiration: 30 June 2023

Chuck Goudreau, Certifying Officer

Hazard Information: Refer to the Safety Data Sheet (SDS), which can be obtained at www.agilent.com/chem/sds.

Homogeneity: This solution was determined to be homogeneous by procedures consistent with the requirements of ISO 17034 and ISO Guide 35. Replicate samples of the finished solution were analyzed to confirm its homogeneity, in accordance with QSP 6-13 Assessment of Homogeneity and Stability. To ensure homogeneity, users should not take a smaller sub-sample than specified in the Instructions for Use, as doing so will invalidate the certified values and uncertainties.

Further Information: Please contact Agilent for further information about this CRM.

Quality Certifications: This CRM was prepared under a quality management system that is:

- Registered to ISO 9001 – Quality Management Systems – Requirements (TUV NORD Cert. Reg. No. 44 100 16560231)
- Accredited to ISO 17034– General Requirements for the Competence of Reference Material Producers (A2LA Cert. No. 2848.02)
    - ISO 17034 references additional requirements specified in ISO Guide 31 and ISO Guide 35.
- Accredited to ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories (A2LA Cert. No. 2848.01)
- LGC Standards, 276 Abby Road, Manchester, NH 03103