

Certificate of Analysis

Multi-Element Aqueous Certified Reference Material



Product Name: ICP-MS KED Setup Solution

Product No.: VHG-LPENXKED-SUS-250

Lot No.: 1031722

Matrix: 1% HNO₃

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), or alternative techniques for elemental detection, such as flame or furnace atomic absorption spectroscopy (AA or GFAA).

Analyte	Certified Concentration & Uncertainty	Analyte	Certified Concentration & Uncertainty
Co	10.00 ± 0.05 µg/L	Ce	1.000 ± 0.005 µg/L

Certification & Traceability:

This CRM was manufactured, processed, and/or certified under a quality management system that is registered/accredited **ISO 17034, ISO/IEC 17025 and 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 **NIST SRMs (see reverse side)**. The solution was diluted with filtered (0.22 µm), 18 M-ohm deionized water and stabilized with the appropriate high-purity acid as indicated in the listed matrix. The balances used in the preparation of this CRM are calibrated regularly with traceability to NIST, using a calibration provider that is accredited to ISO/IEC 17025 by a mutually recognized accreditation body. 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. The uncertainty associated with each certified concentration represents the expanded uncertainty at the 95% confidence level using a coverage factor of k=2.

Instructions for Use:

We recommend 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) not pipette directly from the CRM's original container, (3) never pour used product back into the original container, (4) make dilutions using calibrated balances or certified Class A volumetric flasks and pipettes, (5) use a minimum sub-sample size of 500 µL, and (6) dilute with the same matrix as the original CRM or other chemically suitable matrix. The solution should be kept tightly capped and stored under normal laboratory conditions. Do not freeze, heat, or immerse the bottle or its contents, and avoid exposure to direct sunlight or moisture.

Period of Validity:

LGC Standards ensures the accuracy of this solution for **12 months** from the certification 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.

Chuck Goudreau, Certifying Officer

See Container for Exp. Date
Certification Date



ISO 17034 Accredited: Reference Materials
 Producer, Certificate # 2848.02
 ISO/IEC 17025 Accredited: Chemical Testing,
 Certificate # 2848.01

Conditions of Sale and Supply: All CRMs & RMs sold are subject to applicable LGC Standard Terms and Conditions of Sale.



Quality Certifications

This CRM was prepared under a quality management system that is accredited to the following:

- ISO 17034:2016 Accredited: Reference Materials Producer, A2LA Certificate No. 2848.02 – General Requirements for the Competence of Reference Material Producers
- ISO 17034 references additional requirements specified in ISO Guide 31 and ISO Guide 35
- ISO/IEC 17025:2017 Accredited: Chemical Testing, A2LA Certificate No. 2848.01 – General Requirements for the Competence of Testing and Calibration Laboratories
- ISO 9001:2015 Certified: Quality Management Systems, Registrar: TUV NORD Certificate Registration No. 56 100 19560101

Health and Safety Information

Refer to the **Safety Data Sheet** (SDS), which can be obtained at lgcstandards.com

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 internal procedures for the 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 LGC for further information about this CRM.

VHG™ CRMs are traceable to the following NIST SRMs:

Analyte	Aq. SRM	MOSRM	Analyte	Aq. SRM	MO SRM	Analyte	Aq. SRM	MO SRM
Ag	3151	VHG™	Hf	3122	VHG™	S	3154	2770
Al	3101a	VHG™	Hg	3133	3133	Sb	3102a	3102a
As	3103a	3103a	Ho	3123a	VHG™	Sc	3148a	3148a
Au	3121	VHG™	In	3124a	3124a	Se	3149	3149
B	3107	3107	K	3141a	3141a	Si	3150	VHG™
Ba	3104a	VHG™	La	3127a	3127a	Sm	3147a	VHG™
Be	3105a	3105a	Li	3129a	3129a	Sn	3161a	VHG™
Bi	3106	3106	Lu	3130a	VHG™	SO ₄ ⁻²	3181	VHG™
Br ⁻	3184	VHG™	Mg	3131a	3131a	Sr	3153a	3153a
Ca	3109a	3109a	Mn	3132	3132	Ta	3155	VHG™
Cd	3108	VHG™	Mo	3134	3134	Tb	3157a	VHG™
Ce	3110	3110	Na	3152a	VHG™	Te	3156	VHG™
Cl ⁻	3182	1818a	Nb	3137	VHG™	Th	VHG™	VHG™
Co	3113	3113	Nd	3135a	VHG™	Ti	3162a	3162a
Cr	3112a	VHG™	Ni	3136	VHG™	Tl	3158	3158
Cs	3111a	VHG™	NO ₃	3185	VHG™	Tm	3160a	VHG™
Cu	3114	VHG™	P	3139a	3139a	U	3164	VHG™
Dy	3115a	VHG™	Pb	3128	VHG™	V	3165	VHG™
Er	3116a	VHG™	Pd	3138	VHG™	W	3163	3163
Eu	3117a	VHG™	PO ₄ ⁻³	3186	VHG™	Y	3167a	3167a
F ⁻	3183	VHG™	Pr	3142a	VHG™	Yb	3166a	VHG™
Fe	3126a	VHG™	Pt	3140	3140	Zn	3168a	3168a
Ga	3119a	VHG™	Rb	3145a	VHG™	Zr	3169	3169
Gd	3118a	VHG™	Re	3143	VHG™			
Ge	3120a	VHG™	Rh	3144	3144			

VHG™: Indicates VHG™ RM as NIST SRM is not available