

Certificate of Analysis

Ca

Catalogue Number: 500K1CA-HNO₃

Description: ULTRASPEC Single Element Aqueous CRM. – Calcium @ 1 000 ±3 µg/mL

Starting Material: Calcium Carbonate 99.999 %

Lot Number: CA057CL

Expiration Date: November 2021.

Analysis of Solution by Inductively Coupled Plasma Spectroscopy (ICP-AES)
traceable to NIST Standard Reference Material 3109a.

Matrix: 5% HNO₃

Trace Metallic Impurities (µg/mL)

Element	Conc.(ppm)	Element	Conc.(ppm)	Element	Conc.(ppm)
Ag	< 0.005	Ho	< 0.006	S	*
Al	< 0.013	In	< 0.034	Sb	< 0.029
As	< 0.001	Ir	< 0.016	Sc	< 0.002
Au	< 0.004	K	< 0.093	Se	< 0.027
B	< 0.017	La	< 0.004	Si	< 0.005
Ba	< 0.0005	Li	< 0.003	Sm	< 0.003
Be	< 0.001	Lu	< 0.0006	Sn	< 0.037
Bi	< 0.026	Mg	0.003	Sr	0.013
Ca	Matrix	Mn	< 0.0002	Ta	< 0.013
Cd	< 0.003	Mo	< 0.016	Tb	< 0.006
Ce	< 0.019	Na	< 0.011	Te	< 0.014
Co	< 0.007	Nb	< 0.009	Th	< 0.012
Cr	< 0.004	Nd	< 0.018	Ti	< 0.001
Cs	*	Ni	< 0.006	Tl	< 0.013
Cu	< 0.0003	Os	*	Tm	< 0.007
Dy	< 0.004	P	< 0.034	U	< 0.137
Er	< 0.008	Pb	< 0.041	V	< 0.001
Eu	< 0.002	Pd	< 0.007	W	< 0.015
Fe	< 0.002	Pr	< 0.213	Y	< 0.003
Ga	< 0.011	Pt	< 0.017	Yb	< 0.0008
Gd	< 0.003	Rb	< 0.027	Zn	< 0.0008
Ge	< 0.011	Re	< 0.004	Zr	< 0.007
Hf	< 0.025	Rh	< 0.024		
Hg	*	Ru	< 0.008		

* : NotTested

This ICP-AES & ICP-MS Standard is guaranteed to be stable and accurate to within ± 0.3% of the actual concentration up to the expiry date, provided the solution is kept tightly capped and stored under normal laboratory conditions. For these solutions, 18 megohm/cm double deionized water, high-purity acids, Class A glassware and acid-cleaned bottles are used. A Material Safety Data Sheet is available upon request.

Certification Date: 07 May, 2020.

Certified by:

Jan De Bruyn, Chemist

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Instructions for Use:

Primary usage of this CRM is in neat form or diluted serially with matrix of a purity at or greater than the purity of the original matrix solution. If dilutions is required the diluent must be compatible with all certified analytes and contain stabilizers appropriate for the period of intended use. The CRM can also be used as a spike or with a spike, again with appropriate compatibility considerations. All solutions should be thoroughly mixed, by shaking, prior to use and never pipetted directly from the bottle. All surfaces that come into contact with the solution must be thoroughly cleaned and leached prior to use. Dilutions should be performed only with Class A volumetric glassware.

Method of Preparation:

Clean laboratory procedures and techniques have been used throughout the preparation. All materials, equipment, analytical instrumentation and personnel have been qualified prior to use. The highest purity acids applicable, 18 megohm, double deionized water, acid-leached triple-rinsed bottles (where appropriate), and Class A/calibrated volumetrics have been used in all preparations.

Homogeneity:

The homogeneity of the CRM has been confirmed by procedures consistent with ISO 17025:2005, ISO Guide 34:2009, and ASTM D D6362-98 Appendix X2. Random, replicate samples of final, packaged material have been analyzed to prove homogeneity in accordance with our internal procedure -----.

Since the procedure is highly homogeneous, any sample size taken for analysis would be within the uncertainty budget. This is consistent with the intended use of the CRM.