

## Single Element Metallo-Organic Standard

### Calcium (Ca) Sulfur Free Concentrate

Product #: VHG-ROSFCA2-25G

Matrix: Hydrocarbon

Lot #: 104346-2

Element	Certified Concentration and Uncertainty	
Ca	2.18 wt%	+/- 1% relative

This solution is intended for use as a calibration or reference standard for the analysis of this analyte in petroleum products or other organic matrices using x-ray fluorescence (XRF) spectrometry.

**Certification:** VHG standards are manufactured and certified under a quality control system that is accredited to both **ISO 9001** and **ISO/IEC 17025**. This standard was prepared using sulfur-free raw materials. The certified concentration is based upon the assayed concentration of the raw material and all gravimetric procedures used in the preparation of this certified standard. The uncertainty associated with the certified concentration is +/- 1% relative, which is the sum of the estimated errors due to the assay and purity of the raw material, the gravimetric preparation of the solution and transpiration through the container wall. Secondary verification of the certified concentration was done using ICP-AES and these data are traceable to **NIST SRM 3109a**.

**Tools:** The balances used in the preparation of VHG CRMs are calibrated regularly with traceability to NIST.

Trace Concentrations (µg/g)							
Ag	<4	Cr	<4	Na	<4	Sr	20.3
Al	94.6	Cu	<4	Ni	<4	Ti	<4
As	<4	Fe	<4	P	<4	Tl	<4
B	<4	Hg	<4	Pb	<4	V	<4
Ba	<4	K	<4	S	<20	Y	<4
Be	<4	La	<4	Sb	<4	Zn	<4
Bi	<4	Li	<4	Sc	<4	Zr	<4
Ca	Major	Mg	285	Se	<4		
Cd	<4	Mn	5.3	Si	41.1		
Co	<4	Mo	<4	Sn	<4		

**Recommendations:** VHG guarantees the accuracy of this solution for **12 Months** from the certification date shown below, provided it is kept tightly capped in its original container and stored under normal laboratory conditions. Do not freeze, heat, or expose to direct sunlight. Minimize exposure to moisture or high humidity. We recommend that the solution is thoroughly mixed by repeated shaking or swirling of the bottle immediately prior to use. Fresh solutions should be prepared daily and any dilutions to lower concentrations may have reduced storage life. To achieve the highest accuracy the analyst should: (1) use only pre-cleaned containers and transfer-ware, (2) make dilutions using calibrated balances or certified volumetric class A flasks and pipettes, and, (3) dilute with the same matrix as the original standard, (4) never pour used product back into the original container.

VHG Labs, Inc.



Q. A. Manager

See Exp. on Container  
Certification Date

VHG Labs, Inc. waives all responsibility for any damages resulting from the usage and/or implementation of the products/data described herein.

**VHG Standards are Traceable to the Following NIST SRMs:**

Analyte	Aq. SRM	MO SRM		Analyte	Aq. SRM	MO SRM		Analyte	Aq. SRM	MO SRM
Ag	3151	1077a		Hf	3122	—		S	3154	2770
Al	3101a	1075a		Hg	3133	3133		Sb	3102a	3102a
As	3103a	3103a		Ho	3123a	—		Sc	3148a	3148a
Au	3121	—		In	3124a	3124a		Se	3149	3149
B	3107	3107		K	3141a	3141a		Si	3150	1066a
Ba	3104a	1051b		La	3127a	3127a		Sm	3147a	—
Be	3105a	3105a		Li	3129a	3129a		Sn	3161a	1057b
Bi	3106	3106		Lu	3130a	—		SO <sub>4</sub> <sup>2-</sup>	3181	—
Br	3184	—		Mg	3131a	3131a		Sr	3153a	3153a
Ca	3109a	3109a		Mn	3132	3132		Ta	3155	—
Cd	3108	1053a		Mo	3134	3134		Tb	3157a	—
Ce	3110	3110		Na	3152a	1069b		Te	3156	—
Cl	3182	1818a		Nb	3137	—		Th	3159	—
Co	3113	3113		Nd	3135a	—		Ti	3162a	3162a
Cr	3112a	1078b		Ni	3136	1065b		Tl	3158	3158
Cs	3111a	—		NO <sub>3</sub> <sup>-</sup>	3185	—		Tm	3160a	—
Cu	3114	1080a		P	3139a	3139a		U	3164	—
Dy	3115a	—		Pb	3128	1059c		V	3165	1052b
Er	3116a	—		Pd	3138	—		W	3163	3163
Eu	3117a	—		PO <sub>4</sub> <sup>3-</sup>	3186	—		Y	3167a	3167a
F	3183	—		Pr	3142a	—		Yb	3166a	—
Fe	3126a	1079b		Pt	3140	3140		Zn	3168a	3168a
Ga	3119a	—		Rb	3145a	—		Zr	3169	3169
Gd	3118a	—		Re	3143	—				
Ge	3120a	—		Rh	3144	3144				