REPORT OF ANALYSIS

VHG Labs Quality Product

Single-Element Aqueous RM

Osmium (Os) – 1000 µg/mL — Product #: VHG-POSH-500

Matrix: 20% HCl — Lot #: 1001011-1

Element	Certified Concentration
Os	1000 ± 5 µg/mL (w/v)
	963 ± 5 µg/g (w/w)

Intended Use: This solution is intended for use as a reference material (RM) or calibration standard for inductively coupled plasma optical emission spectroscopy (ICP-OES), inductively coupled plasma mass spectrometry (ICP-MS), flame or furnace atomic absorption spectroscopy (AA or GFAA), and other techniques for elemental analysis.

Certification & Traceability: VHG Labs RMs are manufactured, processed, and/or certified under a quality management system that is registered/accredited to **ISO 9001**, **ISO Guide 34**, and **ISO/IEC 17025**. This RM was prepared to a nominal concentration of 1000 µg/mL by gravimetric methods using 99.99% pure ammonium hexachloroosmate [$(NH_4)_2OsCl_6$] dissolved in high purity hydrochloric acid (HCl) and diluted with filtered (0.22 µm), 18 M-ohm deionized water. The balances used in the preparation of VHG RMs 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 concentration was determined based upon gravimetric procedures. Secondary verification of the certified concentration was performed using ICP-OES. The uncertainty associated with the certified concentration is ±0.5% relative, which is the sum of the estimated errors due to the purity of the raw materials, the gravimetric preparation of the solution, and transpiration through the container. This represents the expanded uncertainty at the 95% confidence level using a coverage factor of k=2. The expanded uncertainty will increase at a rate of 0.008% per month after the Stable-Pak™ bag is opened.

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

Trace Concentrations (µg/L)

Ag	<0.5	Co	<1	Ge	37	Lu	<0.2	P	<100	Sb	5	Te	<1
Al	<2	Cs	<0.5	Hf	<0.2	Mg	<5	Pb	<1	Sc	<5	Ti	<2
As	5	Cr	<0.5	Hg	<0.5	Mn	<1	Pd	1	Se	<2	Tl	19
Au	<.5	Cu	<1	Ho	<0.2	Mo	<0.5	Pr	<0.2	Si	<100	Tm	<0.2
B	<5	Dy	<0.2	In	nd	Na	38	Pt	2	Sm	<0.2	V	<1
Ba	<1	Er	<0.2	Ir	15	Nb	<0.5	Rb	<0.5	Sn	<0.5	W	<0.5
Bi	3	Eu	<0.2	K	<25	Nd	<0.2	Re	85	Sr	<1	Y	<0.5
Ca	46	Fe	14	La	<0.5	Ni	<2	Rh	2	Ta	<0.5	Yb	<0.2
Cd	<0.5	Ga	<0.5	Li	<2	Os	MAJOR	Ru	<0.5	Tb	<0.5	Zn	<2
Ce	<0.2	Gd	<0.2										

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 RM'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 RM 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 ensures the accuracy of this solution for **24 months** from the certification date shown below or **12 months** from the date the Stable-Pak™ bag is opened, 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 Exp. date on container
Certification Date

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

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ISO 9001
ISO Guide 34
ISO/IEC 17025
ISO/IEC 17043