Certificate of Analysis

ISO Guide 34 Reference Material

Product Number: ICP-045
Lot Number: CS-0714

Lot Issue Date: 13-Feb 2018
Expiration Date: 31-Mar 2021

Product Name: Rhodium ICP Standard

Description:
This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Analyte Concentration	Traceability & Method
rhodium	rhodium(III) nitrate	RM13599	99.997%	1000 ± 6 µg/mL	NIST SRM 3144; ICP-OES

Solvent: 2.5% nitric acid in low TOC water (< 50 ppb)

Non-Certified Values:

Density: 1.015 g/mL @ 20 ± 4°C

Trace Metallic Impurities in Solution Standard in µg/mL

*___	Al	<0.050 D	*___	Ga	<0.005 D	*___	Nb	<0.005 D	n___	S	
*___	Sb	<0.005 D	*___	Ge	<0.005 D	n___	Os		*___	Ta	<0.005 D
n___	As		*___	Au	<0.005 D	*___	Pd	<0.005 D	*___	Te	<0.005 D
*___	Ba	<0.005 D	*___	Hf	<0.005 D	n___	P		*___	Tb	<0.005 D
*___	Be	<0.005 D	*___	Ho	<0.005 D	*___	Pt	<0.05 D	*___	Tl	<0.005 D
*___	Bi	<0.005 D	*___	In	<0.005 D	*___	K	<0.005 D	*___	Th	<0.005 D
*___	B	<0.05 D	*___	Ir	<0.005 D	*___	Pr	<0.005 D	*___	Tm	<0.005 D
*___	Cd	<0.005 D	*___	Fe	<0.10 D	*___	Re	<0.005 D	*___	Sn	<0.005 D
*___	Cs	<0.005 D	*___	La	<0.005 D	s___	Rh		*___	Ti	<0.05 D
*___	Ca	<0.110 D	*___	Pb	<0.005 D	*___	Rb	<0.005 D	*___	W	<0.005 D
*___	Ce	<0.005 D	*___	Li	<0.005 D	*___	Ru	<0.005 D	*___	U	<0.005 D
*___	Cr	<0.005 D	*___	Lu	<0.005 D	*___	Sm	<0.005 D	*___	V	<0.005 D
*___	Co	<0.05 D	*___	Mg	<0.01 D	*___	Sc	<0.005 D	*___	Yb	<0.005 D
*___	Cu	<0.020 D	*___	Mn	<0.005 D	*___	Se	<0.005 D	*___	Y	<0.005 D
*___	Dy	<0.005 D	n___	Hg		n___	Si		*___	Zn	<0.01 D
*___	Er	<0.005 D	*___	Mo	<0.005 D	*___	Ag	<0.005 D	*___	Zr	<0.01 D
*___	Eu	<0.005 D	*___	Nd	<0.005 D	*___	Na	<0.005 D			
*___	Gd	<0.005 D	*___	Ni	<0.01 D	*___	Sr	<0.005 D			

* - element checked; i - spectral interference; n – element not checked; D – element detected; ND – element not detected; s - standard element

ANAB ACCREDITED ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

250 Smith Street North Kingstown, Rhode Island 02852 **www.agilent.com/quality**

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Storage: Store at Room Temperature (15° to 30°C).

Traceability:
Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

Estimation of Uncertainties:
The true value is reported, with its uncertainty value calculated at the 95% confidence level.

Homogeneity:
This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

Intended Use:
This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

Instructions for Use:
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

Expiration of Certification:
The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.

Maintenance of Certification:
The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

John Russo
President

Monica Bourgeois
Director of QA/RA

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