

# CALIBRATION CONFIDENCE BEGINS WITH AGILENT CERTIFIED REFERENCE MATERIALS

## Agilent CRMs for Atomic Spectroscopy

Agilent inorganic standards are the *only* full line of inorganic, metallo-organic, and bio-diesel Certified Reference Materials manufactured under ISO 17025 and ISO Guide 34 requirements for AA, MP-AES, ICP-OES, and ICP-MS applications. So, you can be sure you're getting the industry's highest quality.

Together with genuine Agilent parts and supplies, Agilent Certified Reference Materials help your Spectroscopy lab maximize instrument performance and productivity.

These standards can be used with Agilent, PerkinElmer, and Thermo instruments and are available in different formats and concentrations, including:

- Single element standards from 10 to 10,000 ug/mL
- Multi-element standards
- Wear metal and metallo-organic standards
- Bio-diesel standards
- Instrument tuning and wavelength calibration standards (Agilent, PerkinElmer)
- Matrix modifiers and buffers

To learn more about the Certified Reference Materials go to [agilent.com/chem/spectroscopystandards](http://agilent.com/chem/spectroscopystandards)

## REQUEST YOUR POSTER

Discover **10 Tips** to achieve precise, accurate calibration data – and keep your Agilent, PerkinElmer, and Thermo spectroscopy instruments running at peak performance.



Request yours now at [agilent.com/chem/CRMposter](http://agilent.com/chem/CRMposter)



**Agilent Technologies**

# The Agilent Certificate of Analysis:

*Proof* that you're getting the industry's highest-quality standards

All Agilent inorganic spectroscopy standards include a Certificate of Analysis (CoA) that details the certified concentration, measurement uncertainty, and actual concentration values for up to 68 trace impurities (assayed using an Agilent ICP-MS for ICP-OES/ICP-MS standards). In addition, the CoA details the method used for certification, intended use, instructions for proper use, and recommendations for appropriate conditions of storage.

Intended use

Manufactured in an ISO 9001, ISO Guide 34 facility and certified in an ISO/IEC 17025 testing laboratory

Made from the highest purity raw materials and solvents

Agilent ICP-MS\* used to assay the impurities


Traceable to NIST

Instructions for proper use and appropriate conditions of storage

Period of validity

Date of release

Date of expiration verified by short and long-term stability studies for all standards



## CERTIFICATE OF ANALYSIS

**Agilent Product Name:** Copper Standard: 1000 µg/mL Cu in 5% HNO<sub>3</sub>  
**Agilent Part No.:** 5190-8348  
**Lot No.:** Sample

Product Specifications				
Analyte	Starting Material	CAS #	Matrix	Certified Concentration
<b>Cu</b>	Cu	7440-50-8	5% HNO <sub>3</sub>	994 ± 2 µg/mL (w/v)
				984 ± 2 µg/g (w/w)

**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), atomic absorption spectroscopy (flame AAS or GFAAS), microwave plasma atomic emission spectroscopy (MP-AES), x-ray fluorescence spectroscopy (XRF), and other techniques for elemental analysis.

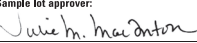
**Certification & Traceability:** This CRM was manufactured under a quality management system that is accredited to ISO Guide 34, ISO/IEC 17025, and registered to ISO 9001. This CRM was prepared to a nominal concentration of 1000 µg/mL by gravimetric methods using 99.999% pure copper (Cu) metal dissolved in high purity nitric acid (HNO<sub>3</sub>) and diluted with ASTM Type I Water. The balances used in the preparation of this CRM are calibrated regularly with traceability to NIST. All volumetric dilutions are performed in Class A calibrated glassware. The certified concentration and uncertainty were determined using the "High Performance ICP-OES" protocol developed by NIST and both the certified concentration and uncertainty values are traceable to NIST SRM 3114, lot #011017. The uncertainty associated with the certified concentration represents the expanded uncertainty at the 95% confidence level using a coverage factor of k=2.

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

Trace Concentrations (µg/L)															
Ag	<0.5	Ce	<0.2	Gd	<0.2	Lu	<0.2	Pb	<1	Se	<2	Tl	<0.5		
Al	<2	Co	<1	Ge	0.969	Mg	<5	Pd	<0.5	Si	<100	Tm	<0.2		
As	<2	Cs	<0.5	Hf	<0.2	Mn	<1	Pr	<0.2	Sm	<0.2	U	<0.5		
Au	<0.5	Cr	<0.5	Hg	<0.5	Mo	<0.5	Pt	<0.5	Sr	<0.5	V	<1		
B	<5	Cu	Major	Ho	<0.2	Na	<25	Rb	<0.5	Sr	<1	W	<0.5		
Ba	<1	Dy	<0.2	In	nd	Nb	<0.5	Re	<0.2	Ta	<0.5	Y	<0.5		
Be	<0.5	Er	<0.2	Ir	<0.2	Nd	<0.2	Rh	<5	Tb	<0.5	Yb	<0.2		
Bi	<0.2	Eu	<0.2	K	<25	Ni	9	Ru	<0.5	Te	<1	Zn	<2		
Ca	<25	Fe	<10	La	<0.5	Os	<0.5	Sb	<0.5	Th	<0.5	Zr	<0.5		
Cd	<0.5	Ga	<0.5	Li	<2	P	<100	Sc	<5	Ti	<2				

**Instructions for Use:** Agilent Technologies recommends 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) avoid pipetting directly from the CRM's original container, (3) use a minimum sub-sample size of 500 µL, (4) make dilutions using calibrated balances or certified volumetric class A flasks and pipettes, (5) dilute to volume using the same matrix as the original CRM, and (6) never pour used product back into the original container. The solution should be kept tightly capped. Store at controlled room temperature per USP 35 (10,30,60). Do not freeze, heat, or expose to direct sunlight. Minimize exposure to moisture or high humidity.

**Period of Validity:** Agilent Technologies ensures the accuracy of this solution until the expiration 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.

Sample lot approver:  
  
 Julie M. MacIntosh  
 QA Manager

**Date of release:** 9 February 2015  
**Date of expiration:** 31 August 2016

Certified concentration(s) reported (with uncertainty values in w/v and w/w)

Assayed by high performance ICP-OES, a method developed by NIST to assure direct traceability to the appropriate NIST 3100 Series of single-element SRMs

Method(s) used to determine certified concentrations

Actual concentration values reported for up to 68 impurity elements

\*Impurities in wear metal, metallo-organic and biodiesel standards assayed using ICP-OES, XRF or other elemental analysis techniques

To learn more about the CRMs go to [agilent.com/chem/spectroscopystandards](http://agilent.com/chem/spectroscopystandards)

To request your free poster go to [agilent.com/chem/CRMposter](http://agilent.com/chem/CRMposter)

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