



# Certificate of Analysis

**ULTRAGrade™ Solution**  
**Copper ICP / ICP-MS Standard**  
**10000 µg/mL**

**Catalog Number:** ICP-129  
**Lot Number:** R00892  
**Job Number:** J00016854  
**Lot Issue Date:** 08/23/2013  
**Expiration Date:** 09/30/2020

**Starting Material:** copper (II) nitrate hydrate  
**Starting Material Purity:** 99.999%  
**Starting Material Lot #:** BH02515  
**Matrix:** 2% nitric acid in low TOC water (< 50 ppb)  
**Atomic Weight Cu:** 63.55

**Certified Value:** 10004 ± 20 µg/mL

This Certified Reference Material (CRM) was manufactured and verified in accordance with ULTRA's ISO 9001 registered quality system. The analyte concentration(s) were prepared and verified by an ISO Guide 34 / ISO 17025 accredited laboratory, and compared to calibration standards independently prepared using NIST SRM(s). The certified value and uncertainty value at the 95% confidence level for each analyte is determined gravimetrically.

**Classical Wet Assay Method:** Theoretical, based on gravimetric measurements

**Confirmation by Inductively Coupled Plasma Spectroscopy (ICP / ICP/MS) vs. NIST SRM 3114**

ULTRA uses purified acids, 18 megohm double deionized water, calibrated Class A glassware & meticulously cleaned bottles in the manufacturing of ULTRAGrade standards. Balances used in the manufacturing of this standard are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1 and ISO 9001.

**Trace Metallic Impurities in Solution Standard in µg/mL:**

* Al <0.005 ND	* Ga <0.005 ND	n Nb	n S
* Sb <0.005 ND	n Ge	n Os	n Ta
* As <0.005 ND	n Au	* Pd <0.005 ND	n Te
* Ba <0.005 ND	n Hf	* P <0.005 ND	n Tb
* Be <0.005 ND	n Ho	* Pt <0.005 ND	* Tl <0.005 ND
* Bi <0.005 ND	* In <0.005 ND	* K <0.005 ND	n Th
* B <0.005 ND	n Ir	n Pr	n Tm
* Cd <0.005 ND	* Fe <0.005 D	n Re	* Sn <0.005 ND
* Ca <0.005 ND	* La <0.005 ND	n Rh	* Ti <0.005 ND
n Ce	* Pb <0.005 ND	n Rb	n W
n Cs	* Li <0.005 ND	n Ru	n U
* Cr <0.005 ND	n Lu	n Sm	* V <0.005 ND
* Co <0.005 ND	* Mg <0.040 D	n Sc	n Yb
s Cu	* Mn <0.005 ND	* Se <0.005 ND	n Y
n Dy	* Hg <0.005 ND	* Si <0.005 ND	* Zn <0.005 ND
* Er <0.005 ND	* Mo <0.005 ND	* Ag <0.005 ND	n Zr
* Eu <0.005 ND	n Nd	* Na <0.005 ND	
* Gd <0.005 ND	* Ni <0.005 ND	* Sr <0.005 ND	

\* - element checked for  
ND – not detected

I – spectral interference  
D – detected

n – not checked for  
s – solution standard element

**Density of Solution (measured at 20.00°C ± 0.05°C):** 1.0325 g/mL



ISO 9001 Registered Quality System – TUV USA

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