



# Certificate of Analysis

**ULTRAGrade™ Solution**  
**Titanium ICP Standard**  
**1000 µg/mL**

**Catalog Number:** ICP-022  
**Lot Number:** J00341  
**Job Number:** J00008190  
**Lot Issue Date:** 04/04/2008  
**Expiration Date:** 05/31/2015

**Starting Material:** Ammonium Hexafluorotitanate  
**Starting Material Purity:** 99.998%  
**Starting Material Lot No.:** BH00150  
**Matrix:** 2% nitric acid, with trace hydrofluoric acid, in low TOC water (< 50 ppb)  
**Atomic Weight Ti:** 47.90

**Certified Value:** 1001 ± 2 µg/mL

This Certified Reference Material (CRM) was manufactured and verified in accordance with ULTRA's ISO 9001:2000 registered quality system, and the analyte concentrations were verified by our ISO 17025 accredited laboratory. The certified value and uncertainty value, at the 95% confidence level, for each analyte determined gravimetrically.

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

**Confirmation by Inductively Coupled Plasma Spectroscopy (ICP / ICP-MS) vs. NIST SRM 3162a**

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/NCCL Z-540-1 and ISO 9001

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

* Al <0.005 D	* Ga <0.005 ND	n Nb	n S
* Sb <0.005 ND	n Ge <0.005 ND	n Os	n Ta
* As <0.005 ND	n Au	n 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 D	* La <0.005 ND	n Rh	s Ti
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 <0.005 D	n Sc	n Yb
* Cu <0.005 ND	* Mn <0.005 ND	* Se <0.005 ND	n Y
n Dy	* Hg <0.005 ND	* Si <0.030 D	* 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 21.0°C ± 0.5°C): 1.010 g/mL



William J. Leary  
Quality Assurance Manager

ISO 9001 Registered Quality System – TUV USA