

# ***Absolute Standards, Inc. Inorganic Catalog***

***Phone: (800) 368-1131***

***Fax: (800) 410-2577***

***[www.absolutestandards.com](http://www.absolutestandards.com)***



# World Class Manufacturing & Internationally Recognized Quality

As Absolute Standards enters the latter half of our second decade of service, we continue to maintain our position as the industry leader. As the largest supplier of Analytical Reference Materials (ARM)<sup>®</sup> and Performance Evaluation samples, we ship our products to all fifty states, several territories, and over thirty countries.

Focusing on the needs of the global testing body, we strive to provide the highest quality and broadest range of analytical standards to an industry that relies on accuracy and precision. Moreover, Absolute Standards is the *only* company in the industry that has exceeded the international requirements of both ISO/IEC 17025 and ISO 9001:2000 for the manufacture and analytical verification of our *entire* product line.

As an analytical standards manufacturer, we recognize our role as an important link in the analytical testing community. Your analyses require the use of accurate, traceable, and defensible reference materials. It is this requirement that drives Absolute Standards to manufacture products that lead the industry in quality and value.

Our philosophy at Absolute Standards is one of compliance. High expectations backed by quality accreditations help us achieve our goals. Discover how Absolute's commitment can help satisfy your compliance needs.



Stephen J. Arpie, M.S. Technical Director



John P. Criscio, President/CEO

# ORDERING & TECHNICAL INFORMATION

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*To Place an Order...*

please have the following information available:

1. Account #
2. Purchase Order #
3. Part # and Quantity

We are available for orders & technical service from 9am-6pm (EST) by Phone, and 24 hrs. a day by Fax, Mail, & Internet.

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**800-368-1131**

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**800-410-2577**

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Absolute Standards, Inc.

P.O. Box 5585

Hamden, CT 06518

*...Internet...*

(E Mail) [customerserv@absolutestandards.com](mailto:customerserv@absolutestandards.com)

(Home Page) [http://www:absolutestandards.com](http://www.absolutestandards.com)

We accept major credit cards: **MasterCard / VISA / AMEX.**

Orders that are placed before 5pm (EST) are shipped the same day by **FedX & UPS.**

**Prices** are F.O.B. Hamden CT. Terms are Net 30 Days. Terms and conditions of all sales contracts will be governed by the laws of The State of Connecticut. Prices are subject to change without notice.

**Warranty** by Absolute Standards includes that our products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 30 days of receipt. No returns can be made without a Return Authorization Number and instructions of forwarding.

**Liability** by Absolute Standards is limited solely to the replacement of the product or refund of the purchase price. These products are intended for research use only. Owing to their hazardous nature, they should be handled only by qualified, trained personnel familiar with their use.

# Certificates & Accreditations

Please visit our website at [www.AbsoluteStandards.com](http://www.AbsoluteStandards.com) to download a current copy of our Certificates.



# CUSTOM STANDARD QUOTATION REQUEST FORM

Rev #: 1, Date Revised: 01/01/02 - Catalog.

Photocopy at 125 % For Future Use

**Fax To:** Page \_\_\_\_\_ of \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
(800) 410-2577, Technical Service Dept, Absolute Standards, Inc.

**From:**  
Company Contact: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Company Phone: \_\_\_\_\_

Company Fax/Email: \_\_\_\_\_

**Product Description:** \_\_\_\_\_

**Solvent:** \_\_\_\_\_

**Analysis Required - additional charge - (circle one):** yes no

**Date Required:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**Requested Quantity (circle one):** ORGANIC 5 x 1 mL 10 x 1 mL Other x mL

INORGANIC 1 x 100 mL 1 x 500 mL Other x mL

#	Component(s)	CAS # (optional)	Conc. (ug/mL)
(1)	_____	_____	_____
(2)	_____	_____	_____
(3)	_____	_____	_____
(4)	_____	_____	_____
(5)	_____	_____	_____
(6)	_____	_____	_____
(7)	_____	_____	_____
(8)	_____	_____	_____
(9)	_____	_____	_____
(10)	_____	_____	_____

**Absolute Standards, Inc. • ISO 9001/ 17025 ANSI-RAB Accredited  
P.O. Box 5585, Hamden, CT 06518 • Phone (800) 368-1131**

# INORGANIC STANDARDS

Included in this blue section are reference materials for calibration of the following instruments: AA, ICP, ICP-MS, IC, IE & several wet chemical methods. Method references are indicated wherever possible. The CLP section has been updated to include the new revisions. However, if you do not see something you need, please call us. We may already have the material, or can produce a custom blend.



## **AbsoluteGrade™ - Specifications**

- Suitable for ICP AES, DCP AES, ICP MS, High-Accuracy AA Flame or Graphite Furnace work.
- Manufactured Using the Highest-Purity Starting Materials Available (typically 99.999%).
- Digestion in Acid-Cleaned PTFE Labware to Prevent Possible Contamination.
- Class A Volumetric Glassware Used for Pipetting and Diluting where applicable.
- Signed Certificate of Analysis Included with Every Standard.
- Traceable to NIST.
- Formulation Uncertainty Provided for Every Analyte
- Density Measurement Allows wt/wt Use.
- Verification of Impurities in Both Starting Materials and Final Solutions.
- Immediate Shipment from Stock.
- Total U.S. "Right To-Know", and O.S.H.A. compliance.
- Cost-Effective Packaging.

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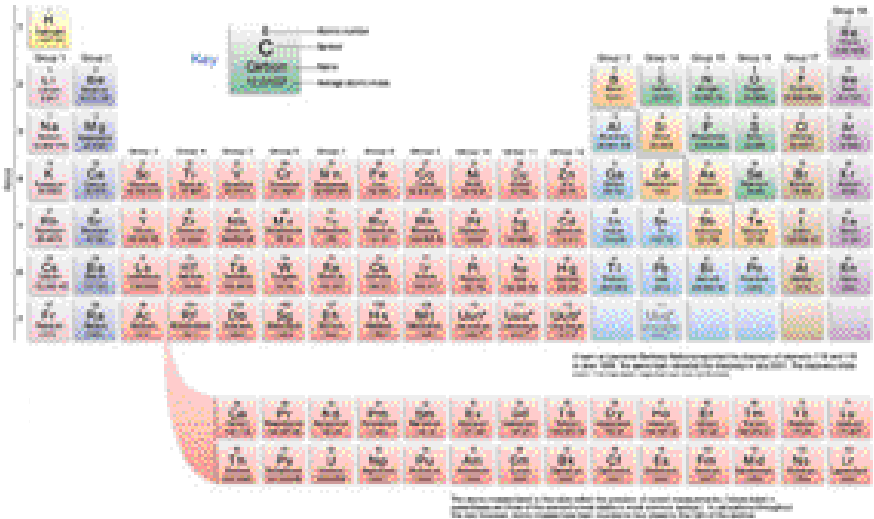
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# Periodic Table

Absolute's state of the art ICP-MS allows our chemists to verify just about every element on the Periodic Table.



Our rigorous Quality Control routine not only ensures that the target elements are accurate, but also that the solution is free from trace impurities.

# Certificate of Analysis

## ABSOLUTE STANDARDS, INC.



ISO 9001 DLS ANSI-RAB ACCREDITED



### Certificate of Analysis

**Conformance:** The "Certificate of Analysis" and the "Certified Weight Report" fulfill the requirements in the current versions of: ISO Guides (9001, 24, 31, 34, 17025) & NIST-NVLAP Handbook 150-19.

**Health & Safety:** See the attached MSDS & Certified Weight Report before use.

**Intended Use:** This Analytical Reference Material (ARM<sup>®</sup>) is intended primarily for use in the characterization of unknowns & the establishment of response factors by qualified personnel. Typical instrumental organic assays include: GC & LC, and inorganic assays include: ICP & AA. The product is for laboratory use only.

**Certified Values:** In production, gravimetric/volumetric readings are certified to be within  $\pm 0.5\%$  of the stated value and are valid between 18°C & 30°C. The measured uncertainty can be found on the Certified Weight Report. All product weighings are performed on an analytical balance that is calibrated to NIST Traceable standard weights & certified by the manufacturer. The volumetric glassware used is Class "A" type & conforms to ASTM E-288 unless otherwise stated. The solvents & compounds used are of the highest practical purity & typically meet or exceed ACS Reagent Grade & ACS Standards Grade specifications.

**Homogeneity & Stability:** No heterogeneity was observed in the preparation, packaging & storage of this standard. Expiration dates can be found on the Certified Weight Report.

**Purity & Identity:** Purity determinations are performed using at least one analytical technique. Identity assays are typically performed using two dissimilar methods.

Organic solutions & neat are typically formulated from materials whose purity & identity have been characterized by GC-MSD & LC-PDA techniques with comparison to a NIST Traceable library of mass spectra when available. Additional characterization techniques may include but are not limited to: refractive index measurements of liquids, melting point measurements of solids, & GC-FID, ECD, PID, ELCD, NPD, LC-PDA measurements for purity.

Inorganic solutions & neat are typically formulated from materials whose purity & identity have been characterized by ICPMS with comparison to a NIST Standard Reference Material when available. Additional characterization techniques may include but are not limited to: titrimetry, and densitometry, AA or ICP.

Final solutions are subjected to instrumental analysis to support the gravimetric values when appropriate. The data for the quality assurance testing is published with the Certified Weight Report. Typical instrumental organic assays include GC and LC. Inorganic assays include ICPMS, titrimetry, and densitometry.

**Storage:** Sealed ampules and other containers should be stored in the dark at temperatures above the freezing point of the solution and not more than 30°C. Certification by Absolute Standards, Inc. is typically valid for 5 years from the date of manufacture (Lot Number). Certified values are not applicable to opened ampules or to materials stored in re-sealable containers. See the "Certified Weight Report" for specific values.

**Usage:** Ampules & bottles should be brought to room temperature (18 to 30°C) before opening. Sonication may be required for high concentration solutions. After opening, care should be exercised to avoid concentration changes owing to evaporation of the solvent or essential components. We recommend that a suitable re-sealable container be available before opening an ampule to decant the standard for short-term storage.

**Legal Notice:** Warranty of products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 10 days of receipt. Liability is limited solely to the replacement of the product or refund of purchase price.

**Certifying Officer:** Stephen J. Arpie, M.S. Director *Stephen J. Arpie*

Absolute Standards, Inc. • 44 Rosotto Drive • Hamden, CT 06514

Voice: 1-203-281-2917 • Fax: 1-203-281-2922

email: [quality@absolutestandards.com](mailto:quality@absolutestandards.com) • www: <http://www.absolutestandards.com>

Document Identification: Certificate of Analysis Rev 5, Date Issued: 01/01/2006

View the next two pages for a complete representation of a typical data package.

**CERTIFIED  
WEIGHT  
REPORT**

**AbsoluteGrade™  
SPECIFICATIONS**

ABSOLUTE STANDARDS, INC • 44 ROSSOTTO DRIVE • HAMDEN, CT 06514 • (800)-368-1131

ISO 9001 Quality System registered  
DLS ANSI/RAB Accredited

CERTIFIED WEIGHT REPORT:

Part Number: **53084**  
Lot Number: **070102**  
Description: **QC Standard 1**

Lot # **L135898**  
Solvent(s): **Nitric Acid**  
**N37G05**  
**Hydrofluoric acid**

2.0% 20.0  
0.025% 0.25  
(mL)

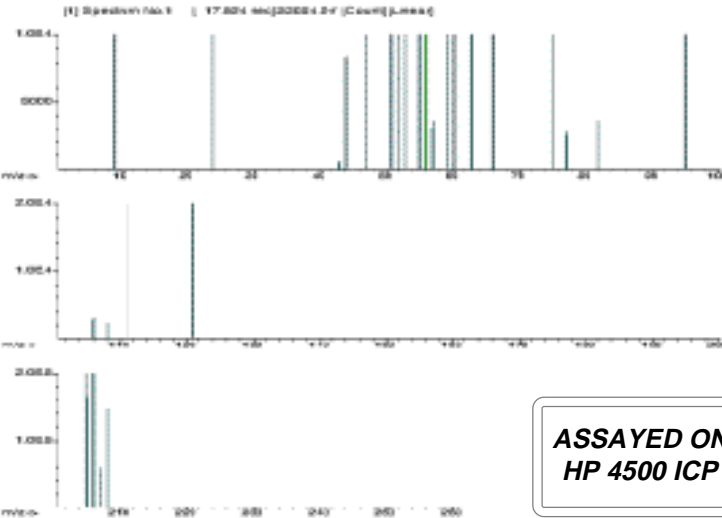
Nominal Concentration (µg/mL): **100**

*Lawrence Barry*  
Formulated By: **Lawrence Barry** 070102

*Pedro L. Rentas*  
Reviewed By: **Pedro L. Rentas** 070102

Weight(s) shown below were combined and diluted to : **999.88** 5E-05 Balance Uncertainty  
**0.025** 0.025 Flask Uncertainty

Compound	Part Number	Lot Number	Dilution Factor	Initial Volume	Initial Uncertainty	Pipette	Initial Conc. (µg/mL)	Final Conc. (µg/mL)	Expanded Uncertainty (+/-) (µg/mL)	MSDS Information (Solvent Safety Info. On Attached pg.)		
										CAS#	OSHA PEL (TWA)	LD50
1. Beryllium acetate (Be)	57104	051100	0.0100	10.00	0.006		10000.04	100.0	0.002334	19049-40-2	0.002 ug/m3	N/A
2. Calcium carbonate (Ca)	58120	012202	0.0100	10.00	0.006		10000.82	100.0	0.002334	00471-34-1	7 mg/m3	N/A
3. Cadmium nitrate (Cd)	58148	091400	0.0100	10.00	0.006		10000.19	100.0	0.002002	10022-68-1	0.2 mg/m3	N/A
4. Chromium nitrate nonahydrate (Cr)	58124	040901	0.0100	10.00	0.006		10000.34	100.0	0.002002	07789-02-8	0.5 mg/m3	ori-rat 3250mg/kg
5. Cobalt nitrate (Co)	57127	020901	0.0100	10.00	0.006		10000.54	100.0	0.002002	10026-22-9	5 mg/m3	ori-rat 694 mg/kg
6. Copper nitrate (Cu)	58129	062001	0.0100	10.00	0.006		10003.59	100.0	0.002001	03251-23-8	N/A	ori-rat 940 mg/kg
7. Iron (III) Nitrate Nonahydrate	58126	061002	0.0100	10.00	0.006		10001.80	100.0	0.002003	07782-61-8	7 mg/m3	N/A
8. Lead nitrate (Pb)	57182	032900	0.0100	10.00	0.006		9999.67	100.0	0.002002	10099-74-8	0.05 mg/m3	500 mg/kg
9. Magnesium nitrate (Mg)	58112	110601	0.0100	10.00	0.006		10000.20	100.0	0.002002	10377-60-3	7 mg/m3	N/A
10. Manganese nitrate (Mn)	57125	060800	0.0100	10.00	0.006		10000.37	100.0	0.002002	15710-66-4	5 mg/m3	N/A
11. Ammonium molybdate (Mo)	58142	082901	0.0100	10.00	0.006		10000.17	100.0	0.002002	13106-76-8	N/A	ori-rat 333 mg/kg
12. Nickel nitrate (Ni)	58128	102600	0.0100	10.00	0.006		10000.03	100.0	0.002002	10377-66-9	5 mg/m3	N/A
13. Selenium oxide (Se)	58134	011900	0.0100	10.00	0.006		10001.32	100.0	0.002002	07746-08-4	0.2 mg/m3	N/A
14. Thallium nitrate (Tl)	57181	120700	0.0100	10.00	0.006		10000.34	100.0	0.002002	10102-45-1	5 mg/m3	N/A
15. Ammonium hexafluorotitanate (Ti)	57122	042400	0.0100	10.00	0.006		9999.90	100.0	0.002002	16962-40-6	N/A	N/A
16. Ammonium Metavanadate (V)	58123	110701	0.0100	10.00	0.006		10000.32	100.0	0.002002	07803-55-6	1.0 mg/m3	ori-rat 630 mg/kg
17. Zinc nitrate (Zn)	58130	041101	0.0100	10.00	0.006		10000.21	100.0	0.002002	10196-18-6	1 mg/m3	ori-rat 1190mg/kg
18. Antimony Oxide (Sb)	58151	071001	0.0100	10.00	0.006		10000.04	100.0	0.002002	07440-36-0	5.0 mg/m3	N/A
19. Arsenic (As)	58133	062000	0.0100	10.00	0.006		10000.48	100.0	0.002002	07440-38-2	0.2 mg/m3	N/A



**ASSAYED ON AN  
HP 4500 ICP MS**

# AbsoluteGrade™ SPECIFICATIONS

## CERTIFIED WEIGHT REPORT

**Absolute Standards, Inc.**

44 Rossetto Drive • Hayden, CT • 06514 • (800) 368-1131

ISO 9001 Quality System Registered

DLS ANSI-RAB Accredited

**AbsoluteGrade™ Solution**

Part# 58084

Lot# 070102

**Certified Concentration (µg/mL)**

(µg/mL)	(4-µg/mL)
100.0	0.002

The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise specified.

**TRACEABILITY DOCUMENTATION:****A) Chemical/Chemical Analysis:**

Method	Traceability	Concentration
EDTA Titration	NIST SRM 923 Lead Nitrate	N/A
Gravimetric Acid plus	NIST Weights	N/A
Redox Titration	NIST SRM 1364 Potassium Dichromate	N/A
Volumetric Titration	NIST SRM 999 Potassium Chloride	N/A

**B) Instrumental Analysis by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS):**

This analytical solution was used against the appropriate NIST SRMs.

**Trace Metals Verification by ICP-MS (µg/mL)**

Al	<0.01	Cd	>	Cy	<0.01	Hf	<0.01	Li	<0.01	Nb	>	Pb	<0.01	Se	>	Th	<0.01	W	<0.01
Ba	>	Co	>	Er	<0.01	Hg	<0.01	Lu	<0.01	Ni	<0.01	Rc	<0.01	Si	<0.01	Ti	<0.01	U	<0.01
As	>	Ce	<0.01	Ku	<0.01	In	<0.01	Mo	>	Cs	<0.01	Rh	<0.01	Ag	<0.01	Tl	>	Y	>
Be	<0.01	Cr	<0.01	Gd	<0.01	Ir	<0.01	Mn	>	Pd	<0.01	Rb	<0.01	Nr	<0.1	Tm	<0.01	Yb	<0.01
Bi	>	Cr	>	Ca	<0.01	Pt	>	Hg	<0.1	P	<0.01	Ru	<0.01	Sm	<0.01	Tm	<0.01	Y	<0.01
Bk	<0.01	Cu	>	Ce	<0.01	La	<0.01	Mo	>	Pt	<0.01	Sr	<0.01	Zr	<0.01	Zn	<0.01	Zn	>
B	<0.01	Cu	>	Au	<0.01	Pb	>	Nd	<0.01	Cl	<0.1	Zr	<0.01	Ta	<0.01	Ti	>	Zr	<0.01

(\*) = Target Element

**C) Physical Characterization:**

Analyzed Density of Solution (g/mL)

1.018

Certified by:

Temperature (°C)

22.6

Homogeneity: No heterogeneity was observed in the preparation of this standard.



We use purified acids, 18 megohm double deionized water, calibrated Class A glassware and the highest purity raw materials available, (typically 99.999%). We meticulously clean our bottles by acid leaching and then triple rinsing with ASTM Type I water prior to use. Our standards are made gravimetrically using balances that are calibrated with weights traceable to NIST. (NIST Test #: 7322-6790). We certify that all our standards are within the stated uncertainties unless otherwise stated, assuming that the bottle is kept tightly capped and stored under normal laboratory conditions.

Reference: Taylor, B.N. and Kuyatt, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington DC, (1994).

# SINGLE COMPONENT SOLUTIONS

## PLASMA EMISSION SPECTROSCOPY REFERENCE STANDARDS

### 1,000 ug/mL Single Components for ICP/AA

Element		Matrix	Part#	\$/100mL	Part#	\$/500mL
Aluminum	Al	Al(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57013	25	58013	65
Antimony	Sb	Sb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub> tr.Tartaric acid	57051	25	58051	65
Arsenic	As	As <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57033	25	58033	65
Barium	Ba	Ba(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57056	25	58056	65
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>	57004	25	58004	65
Bismuth	Bi	Bi(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57083	25	58083	65
Boron	B	H <sub>3</sub> B <sub>3</sub> O <sub>3</sub> /H <sub>2</sub> O	57005	25	58005	65
Cadmium	Cd	Cd(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57048	25	58048	65
Calcium	Ca	CaCO <sub>3</sub> /HNO <sub>3</sub>	57020	25	58020	65
Carbon	C	C(Citric Acid)/HNO <sub>3</sub>	57006	25	58006	65
Cerium	Ce	Ce(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57058	25	58058	65
Cesium	Cs	CsNO <sub>3</sub> /HNO <sub>3</sub>	57055	25	58055	65
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57024	25	58024	65
Chromium-Cr <sup>6+</sup>	Cr <sup>6+</sup>	(NH <sub>4</sub> ) <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> /H <sub>2</sub> O	54161	25	54172	65
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57027	25	58027	65
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57029	25	58029	65
Dysprosium	Dy	Dy <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57066	25	58066	75
Erbium	Er	Er <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57068	25	58068	75
Europium	Eu	Eu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57063	25	58063	75
Gadolinium	Gd	Gd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57064	25	58064	75
Gallium	Ga	Ga <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57031	75	58031	150
Germanium	Ge	(NH <sub>4</sub> ) <sub>2</sub> GeF <sub>6</sub> /tr, HF	57032	25	58032	65
Gold	Au	NH <sub>4</sub> AuCl <sub>4</sub> /HCL	57079	75	58079	150
Hafnium	Hf	Hf <sub>2</sub> O <sub>3</sub> /HCl	57072	30	58072	75
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>	57067	25	58067	75
Indium	In	In <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57049	25	58049	65
Iridium	Ir	IrCl <sub>3</sub> /HCl	57077	75	58077	150
Iron	Fe	Fe(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57026	25	58026	65
Iron-Ferrous	Fe <sup>2+</sup>	(NH <sub>4</sub> )Fe <sub>2</sub> -(SO <sub>4</sub> ) <sub>2</sub> /H <sub>2</sub> SO <sub>4</sub>	54141	25	54174	65
Iron-Total	Fe	[Fe <sup>2+</sup> ]+[Fe <sup>3+</sup> ]/H <sub>2</sub> SO <sub>4</sub>	54140	25	54173	65
Lanthanum	La	LaCl/HNO <sub>3</sub>	57057	25	58057	65
Lead	Pb	Pb(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57082	25	58082	65
Lithium	Li	LiNO <sub>3</sub> /HNO <sub>3</sub>	57003	25	58003	65
Lithium 6 <sup>+</sup>	Li 6 <sup>+</sup>	Li <sub>6</sub> +NO <sub>3</sub> /HNO <sub>3</sub>	59021	200	59097	1000
Lutetium	Lu	Lu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57071	30	58071	75
Magnesium	Mg	Mg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57012	25	58012	65
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57025	25	58025	65
Mercury	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57080	25	58080	65
Mercury-Organic	Hg	MeHgCl/HNO <sub>3</sub>	54170	25	54171	65
Mercury-Total	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> +MeHgCl/HNO <sub>3</sub>	54004	25	54168	65

## PLASMA EMISSION SPECTROSCOPY REFERENCE STANDARDS

## SINGLE COMPONENT SOLUTIONS

### 1,000 ug/mL Single Components for ICP/AA

Element	Matrix	Part#	\$/100mL	Part#	\$/500mL
Molybdenum	Mo (NH <sub>4</sub> )MoO <sub>4</sub> /H <sub>2</sub> O	57042	25	58042	65
Neodymium	Nd Nd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57060	25	58060	75
Nickel	Ni Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57028	25	58028	65
Niobium	Nb (NH <sub>4</sub> )NbF <sub>6</sub> /tr.HF	57041	25	58041	65
Palladium	Pd Pd/HNO <sub>3</sub>	57046	125	58046	200
Phosphorus	P (NH <sub>4</sub> )H <sub>2</sub> PO <sub>4</sub> /HNO <sub>3</sub>	57015	25	58015	65
Platinum	Pt [Pt(NH <sub>3</sub> ) <sub>4</sub> ](NO <sub>3</sub> ) <sub>2</sub> /HCL	57078	75	58078	150
Potassium	K KNO <sub>3</sub> /HNO <sub>3</sub>	57019	25	58019	65
Praesodymium	Pr Pr <sub>6</sub> O <sub>11</sub> /HNO <sub>3</sub>	57059	25	58059	75
Rhenium	Re Re/HNO <sub>3</sub>	57075	50	58075	150
Rhodium	Rh RhCl <sub>3</sub> /HCl	57045	100	58045	400
Rubidium	Rb RbNO <sub>3</sub> /HNO <sub>3</sub>	57037	25	58037	75
Ruthenium	Ru RuCl <sub>3</sub> /HNO <sub>3</sub>	57044	75	58044	150
Samarium	Sm Sm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57062	25	58062	75
Scandium	Sc Sc(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57021	75	58021	150
Selenium	Se SeO <sub>2</sub> /HNO <sub>3</sub>	57034	25	58034	65
Silica	SiO <sub>2</sub> SiO <sub>2</sub> /NaOH	54159	25	54169	75
Silicon	Si (NH <sub>4</sub> ) <sub>2</sub> SiF <sub>6</sub> /HNO <sub>3</sub>	57014	25	58014	65
Silver	Ag AgNO <sub>3</sub> /HNO <sub>3</sub>	57047	25	58047	65
Sodium	Na NaNO <sub>3</sub> /HNO <sub>3</sub>	57011	25	58011	65
Strontium	Sr Sr(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57038	25	58038	65
Sulfur	S (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> /H <sub>2</sub> O	57016	25	58016	65
Tantalum	Ta NH <sub>4</sub> TaF <sub>6</sub> /tr.HF	57073	25	57073	75
Tellurium	Te TeO <sub>2</sub> /HCl	57052	25	58052	150
Terbium	Tb Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>	57065	25	58065	75
Thallium	Tl TlNO <sub>3</sub> /HNO <sub>3</sub>	57081	25	58081	65
Thorium	Th Th(NO <sub>3</sub> ) <sub>4</sub> /HNO <sub>3</sub>	57090	25	57090	65
Thulium	Tm Tm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57069	30	58069	75
Tin	Sn (NH <sub>4</sub> )SnF <sub>6</sub> /HNO <sub>3</sub> /HCL	57050	25	58050	65
Titanium	Ti (NH <sub>4</sub> ) <sub>2</sub> TiF <sub>6</sub> /HNO <sub>3</sub> /tr.HF	57022	25	58022	65
Tungsten	W (NH <sub>4</sub> ) <sub>2</sub> WO <sub>4</sub> /H <sub>2</sub> O	57074	25	58074	65
Uranium	U U <sub>3</sub> O <sub>8</sub> /HNO <sub>3</sub>	57092	25	57092	65
Vanadium	V NH <sub>4</sub> VO <sub>3</sub> /HNO <sub>3</sub>	57023	25	58023	65
Ytterbium	Yb Yb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57070	25	58070	75
Yttrium	Y Y <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57039	25	58039	65
Zinc	Zn Zn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57030	25	58030	65
Zirconium	Zr ZrO <sub>2</sub> /HNO <sub>3</sub>	57040	25	58040	65

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# SINGLE COMPONENT SOLUTIONS

## PLASMA EMISSION SPECTROSCOPY REFERENCE STANDARDS

### 10,000 ug/mL Single Components for ICP/AA

Element		Matrix	Part#	\$/100mL	Part#	\$/500mL
Aluminum	Al	Al(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57113	75	58113	150
Antimony	Sb	Sb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub> tr.Tartaric acid	57151	75	58151	150
Arsenic	As	As <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57133	75	58133	150
Barium	Ba	Ba(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57156	75	58156	150
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>	57104	75	58104	150
Bismuth	Bi	Bi(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57183	75	58183	150
Boron	B	H <sub>3</sub> BO <sub>3</sub> /H <sub>2</sub> O	57105	75	58105	150
Cadmium	Cd	Cd(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57148	75	58148	150
Calcium	Ca	CaCO <sub>3</sub> /HNO <sub>3</sub>	57120	75	58120	150
Carbon	C	C(Citric Acid)/HNO <sub>3</sub>	57106	75	58106	150
Cerium	Ce	Ce(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Cesium	Cs	CsNO <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57124	75	58124	150
Chromium-Cr <sup>6+</sup>	Cr <sup>6+</sup>	(NH <sub>4</sub> ) <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> /H <sub>2</sub> O	54175	75	54176	150
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57127	75	58127	150
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57129	75	58129	150
Dysprosium	Dy	Dy <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Erbium	Er	Er <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Europium	Eu	Eu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Gadolinium	Gd	Gd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Gallium	Ga	Ga <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Germanium	Ge	(NH <sub>4</sub> ) <sub>2</sub> GeF <sub>6</sub> /tr, HF	NA	NA	NA	NA
Gold	Au	NH <sub>4</sub> AuCl <sub>4</sub> /HCL	57179	300	58179	600
Hafnium	Hf	Hf <sub>2</sub> O <sub>3</sub> /HCl	NA	NA	NA	NA
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Indium	In	In <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Iridium	Ir	IrCl <sub>3</sub> /HCl	NA	NA	NA	NA
Iron	Fe	Fe(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57126	75	58126	150
Iron-Ferrous	Fe <sup>2+</sup>	(NH <sub>4</sub> )Fe <sub>2</sub> +(SO <sub>4</sub> ) <sub>2</sub> /H <sub>2</sub> SO <sub>4</sub>	NA	NA	NA	NA
Iron-Total	Fe	[Fe <sup>2+</sup> ]+[Fe <sup>3+</sup> ]/H <sub>2</sub> SO <sub>4</sub>	NA	NA	NA	NA
Lanthanum	La	LaCl/HNO <sub>3</sub>	NA	NA	NA	NA
Lead	Pb	Pb(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57182	75	58182	150
Lithium	Li	LiNO <sub>3</sub> /HNO <sub>3</sub>	57103	75	58103	150
Lithium 6 <sup>+</sup>	Li 6 <sup>+</sup>	Li <sub>6</sub> +NO <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Lutetium	Lu	Lu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Magnesium	Mg	Mg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57112	75	58112	150
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57125	75	58125	150
Mercury	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57180	75	58180	150
Mercury-Organic	Hg	MeHgCl/HNO <sub>3</sub>	NA	NA	NA	NA
Mercury-Total	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> +MeHgCl/HNO <sub>3</sub>	54178	100	NA	NA

## PLASMA EMISSION SPECTROSCOPY REFERENCE STANDARDS

## SINGLE COMPONENT SOLUTIONS

### 10,000 ug/mL Single Components for ICP/AA

Element	Matrix	Part#	\$/100mL	Part#	\$/500mL
Molybdenum	Mo (NH <sub>4</sub> )MoO <sub>4</sub> /H <sub>2</sub> O	57142	75	58142	150
Neodymium	Nd Nd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Nickel	Ni Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57128	75	58128	150
Niobium	Nb (NH <sub>4</sub> )NbF <sub>6</sub> /tr.HF	NA	NA	NA	NA
Palladium	Pd Pd/HNO <sub>3</sub>	57146	500	58146	900
Phosphorus	P (NH <sub>4</sub> )H <sub>2</sub> PO <sub>4</sub> /HNO <sub>3</sub>	57115	75	58115	150
Platinum	Pt [Pt(NH <sub>3</sub> ) <sub>4</sub> ](NO <sub>3</sub> ) <sub>2</sub> /HCL	57178	300	58178	600
Potassium	K KNO <sub>3</sub> /HNO <sub>3</sub>	57119	75	58119	150
Praesodymium	Pr Pr <sub>6</sub> O <sub>11</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Rhenium	Re Re/HNO <sub>3</sub>	NA	NA	NA	NA
Rhodium	Rh RhCl <sub>3</sub> /HCl	NA	NA	NA	NA
Rubidium	Rb RbNO <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Ruthenium	Ru RuCl <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Samarium	Sm Sm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Scandium	Sc Sc(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Selenium	Se SeO <sub>2</sub> /HNO <sub>3</sub>	57134	75	58134	150
Silica	SiO <sub>2</sub> SiO <sub>2</sub> /NaOH	NA	NA	NA	NA
Silicon	Si (NH <sub>4</sub> ) <sub>2</sub> SiF <sub>6</sub> /HNO <sub>3</sub>	57114	75	58114	150
Silver	Ag AgNO <sub>3</sub> /HNO <sub>3</sub>	57147	75	58147	150
Sodium	Na NaNO <sub>3</sub> /HNO <sub>3</sub>	57111	75	58111	150
Strontium	Sr Sr(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57138	75	58138	150
Sulfur	S (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> /H <sub>2</sub> O	57116	75	58116	150
Tantalum	Ta NH <sub>4</sub> TaF <sub>6</sub> /tr.HF	NA	NA	NA	NA
Tellurium	Te TeO <sub>2</sub> /HCl	NA	NA	NA	NA
Terbium	Tb Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Thallium	Tl TlNO <sub>3</sub> /HNO <sub>3</sub>	57181	75	58181	150
Thorium	Th Th(NO <sub>3</sub> ) <sub>4</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Thulium	Tm Tm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Tin	Sn (NH <sub>4</sub> )SnF <sub>6</sub> /HNO <sub>3</sub> /HCL	57150	75	58150	150
Titanium	Ti (NH <sub>4</sub> ) <sub>2</sub> TiF <sub>6</sub> /HNO <sub>3</sub> /tr.HF	57122	75	58122	150
Tungsten	W (NH <sub>4</sub> ) <sub>2</sub> WO <sub>4</sub> /H <sub>2</sub> O	57174	75	58174	150
Uranium	U U <sub>3</sub> O <sub>8</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Vanadium	V NH <sub>4</sub> VO <sub>3</sub> /HNO <sub>3</sub>	57123	75	58123	150
Ytterbium	Yb Yb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	NA	NA	NA	NA
Yttrium	Y Y <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57139	75	58139	150
Zinc	Zn Zn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>	57130	75	58130	150
Zirconium	Zr ZrO <sub>2</sub> /HNO <sub>3</sub>	57140	75	58140	150

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## KITS

ELEMENT/ GROUP  
KITS**Group I Elements Starter Kit  
(5 x 100ml bottles @ 1000ug/mL Each)**

Element		Matrix
Lithium	Li	LiNO <sub>3</sub> /HNO <sub>3</sub>
Sodium	Na	NaNO <sub>3</sub> /HNO <sub>3</sub>
Potassium	K	KNO <sub>3</sub> /HNO <sub>3</sub>
Rubidium	Rb	RbNO <sub>3</sub> /HNO <sub>3</sub>
Cesium	Cs	CsNO <sub>3</sub> /HNO <sub>3</sub>

**Part # 52253 \$80/ 5 x 100 mL****Group II Elements Starter Kit  
(5 x 100ml bottles @ 1000ug/mL Each)**

Element		Matrix
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>
Magnesium	Mg	Mg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Calcium	Ca	CaCO <sub>3</sub> /HNO <sub>3</sub>
Strontium	Sr	Sr(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Barium	Ba	Ba(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>

**Part # 52255 \$80/ 5 x 100 mL****Transition Metals Starter Kit  
(9 x 100ml bottles @ 1000ug/mL Each)**

Element		Matrix
Titanium	Ti	(NH <sub>4</sub> ) <sub>2</sub> TiF <sub>6</sub> /HNO <sub>3</sub> /tr.HF
Vanadium	V	NH <sub>4</sub> VO <sub>3</sub> /HNO <sub>3</sub>
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Iron	Fe	Fe(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Nickel	Ni	Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Zinc	Zn	Zn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>

**Part # 52256 \$150/ 9 x 100 mL**

## ELEMENT/ GROUP KITS

## KITS

### Method 200.7 Complete Single Element Kit (32 x 100ml bottles @ 1000ug/mL Each)

Element		Matrix
Aluminum	Al	Al(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Antimony	Sb	Sb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub> tr.Tartaric acid
Arsenic	As	As <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Barium	Ba	Ba(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>
Boron	B	H <sub>3</sub> BO <sub>3</sub> /H <sub>2</sub> O
Cadmium	Cd	Cd(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Calcium	Ca	CaCO <sub>3</sub> /HNO <sub>3</sub>
Cerium	Ce	Ce(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Iron	Fe	Fe(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Lead	Pb	Pb(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Lithium	Li	LiNO <sub>3</sub> /HNO <sub>3</sub>
Magnesium	Mg	Mg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Mercury	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Molybdenum	Mo	(NH <sub>4</sub> )MoO <sub>4</sub> /H <sub>2</sub> O
Nickel	Ni	Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Phosphorus	P	(NH <sub>4</sub> )H <sub>2</sub> PO <sub>4</sub> /HNO <sub>3</sub>
Potassium	K	KNO <sub>3</sub> /HNO <sub>3</sub>
Selenium	Se	SeO <sub>2</sub> /HNO <sub>3</sub>
Silica	SiO <sub>2</sub>	SiO <sub>2</sub> /NaOH
Silver	Ag	AgNO <sub>3</sub> /HNO <sub>3</sub>
Sodium	Na	NaNO <sub>3</sub> /HNO <sub>3</sub>
Strontium	Sr	Sr(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Thallium	Tl	TlNO <sub>3</sub> /HNO <sub>3</sub>
Tin	Sn	(NH <sub>4</sub> )SnF <sub>6</sub> /HNO <sub>3</sub> /HCL
Titanium	Ti	(NH <sub>4</sub> ) <sub>2</sub> TiF <sub>6</sub> /HNO <sub>3</sub> /HNO <sub>3</sub> /tr.HF
Vanadium	V	NH <sub>4</sub> VO <sub>3</sub> /HNO <sub>3</sub>
Zinc	Zn	Zn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>

**Part # 52250    \$550/ 32 x 100 mL**

## KITS

ELEMENT/ GROUP  
KITS

**Method 200.8**  
**Complete Single Element Kit**  
**(21 x 100ml bottles @ 1000ug/mL Each)**

<b>Element</b>		<b>Matrix</b>
Aluminum	Al	Al(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Antimony	Sb	Sb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub> tr. Tartaric acid
Arsenic	As	As <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Barium	Ba	Ba(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>
Cadmium	Cd	Cd(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Lead	Pb	Pb(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Mercury	Hg	Hg(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Molybdenum	Mo	(NH <sub>4</sub> )MoO <sub>4</sub> /H <sub>2</sub> O
Nickel	Ni	Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Selenium	Se	SeO <sub>2</sub> /HNO <sub>3</sub>
Silver	Ag	AgNO <sub>3</sub> /HNO <sub>3</sub>
Thallium	Tl	TlNO <sub>3</sub> /HNO <sub>3</sub>
Thorium	Th	Th(NO <sub>3</sub> ) <sub>4</sub> /HNO <sub>3</sub>
Uranium	U	U <sub>3</sub> O <sub>8</sub> /HNO <sub>3</sub>
Vanadium	V	NH <sub>4</sub> VO <sub>3</sub> /HNO <sub>3</sub>
Zinc	Zn	Zn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>

**Part # 52251 \$380/ 21 x 100 mL**

**Lanthanide Metals Starter Kit**  
**(14 x 100ml bottles @ 1000ug/mL Each)**

<b>Element</b>		<b>Matrix</b>
Lanthanum	La	LaCl/HNO <sub>3</sub>
Cerium	Ce	Ce(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Praesodymium	Pr	Pr <sub>6</sub> O <sub>11</sub> /HNO <sub>3</sub>
Neodymium	Nd	Nd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Samarium	Sm	Sm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Europium	Eu	Eu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Gadolinium	Gd	Gd <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Terbium	Tb	Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>
Dysprosium	Dy	Dy <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>
Erbium	Er	Er <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Thulium	Tm	Tm <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Ytterbium	Yb	Yb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Lutetium	Lu	Lu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>

**Part # 52254 \$240/ 14 x 100 mL**

**CALIBRATION AND  
MATRIX BLANKS****MATRIX  
BLANKS****MATRIX BLANKS**

Blank solutions are prepared with High-Purity Acids and ASTM Type I Water. Blanks can be used to dilute your multi-element standards to run directly to establish your baseline. An Aqua Regia Blank can be prepared by mixing one part Nitric Acid Blank with three parts HCl Acid Blank.

**Water Blank***ASTM Type I H<sub>2</sub>O*

<b>Part # 52000</b>	<b>\$20/ 100mL</b>
<b>Part # 53000</b>	<b>\$40/ 500mL</b>

**HCl Acid Blank***Matrix 5% HCl*

<b>Part # 52001</b>	<b>\$20/ 100mL</b>
<b>Part # 53001</b>	<b>\$40/ 500mL</b>

**Nitric Acid Blank***Matrix 5% HNO<sub>3</sub>*

<b>Part # 52002</b>	<b>\$20/100mL</b>
<b>Part # 53002</b>	<b>\$40/500mL</b>

## MATRIX MODIFIERS

## GFAA-MATRIX MODIFIERS

### MATRIX MODIFIERS

Matrix Modifiers suppress background interferences and help enhance sensitivity by changing the behavior of the element or the matrix in solution with respect to temperature. These modifiers help prevent the loss of certain elements during pyrolysis by converting the target to a less volatile form. This allows a more optimum graphite furnace program to be utilized.

#### Palladium and Magnesium Nitrate Modifier

Starting Material Pd & Mg(NO<sub>3</sub>)<sub>2</sub>

*Matrix 0.3%(3 mg/mL) Pd & 0.2%(2 mg/mL) Mg in 5% HNO<sub>3</sub>*

**Part # 52311      \$250/100mL**

**Part # 53311      \$450/500mL**

#### Palladium Nitrate Modifier

Starting Material Pd

*Matrix 1%(10 mg/mL) in 2% HNO<sub>3</sub>*

**Part # 57146      \$500/100mL**

**Part # 58146      \$900/500mL**

#### Magnesium Nitrate Modifier

Starting Material Mg(NO<sub>3</sub>)<sub>2</sub>

*Matrix 2%(20 mg/mL) in 5% HNO<sub>3</sub>*

**Part # 52004      \$125/100mL**

**Part # 53004      \$200/500mL**

#### Nickel Nitrate Modifier

Starting Material Ni(NO<sub>3</sub>)<sub>2</sub>

*Matrix 5%(50 mg/mL) in 5% HNO<sub>3</sub>*

**Part # 52003      \$250/100mL**

**Part # 53003      \$350/500mL**

#### Ammonium Nitrate Modifier

Starting Material NH<sub>4</sub>NO<sub>3</sub>

*Matrix 2%(20 mg/mL) in H<sub>2</sub>O*

**Part # 52309      \$250/100mL**

**Part # 53309      \$350/500mL**

#### Ammonium Dihydrogen Phosphate Modifier

Starting Material (NH<sub>4</sub>)H<sub>2</sub>PO<sub>4</sub>

*Matrix 10%(100 mg/mL) in H<sub>2</sub>O*

**Part # 52005      \$350/100mL**

**Part # 53005      \$500/500mL**

#### Calcium Nitrate Modifier

Starting Material Ca(NO<sub>3</sub>)<sub>2</sub> • 4H<sub>2</sub>O

*Matrix 2%(20 mg/mL) in 5% HNO<sub>3</sub>*

**Part # 52310      \$250/100mL**

**Part # 53310      \$350/500mL**

#### Lanthanum Nitrate Modifier

Starting Material LaNO<sub>3</sub>

*Matrix 5%(50 mg/mL) in 5% HNO<sub>3</sub>*

**Part # 52312      \$250/100mL**

**Part # 53312      \$350/500mL**

#### Lanthanum Chloride Modifier

Starting Material LaCl<sub>3</sub>

*Matrix 5%(50 mg/mL) in 5% HCl*

**Part # 52313      \$250/100mL**

**Part # 53313      \$350/500mL**

## GFAA CALIBRATION AND SPIKING SOLUTIONS

## GFAA STANDARDS

### GRAPHITE FURNACE AA CALIBRATION AND SPIKING

#### GFAA Calibration

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	50
Cd	10
Pb	50
Se	100
Tl	50

**Part # 52314      \$85/100 mL**  
**Part # 53314      \$190/500 mL**

#### GFAA Initial Calibration Verification (2nd Source)

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	50
As	25
Cd	5
Pb	25
Se	50
Tl	25

**Part # 52315      \$85/100 mL**  
**Part # 53315      \$190/500 mL**

#### GFAA Spike Standard

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	40
Cd	5
Pb	20
Se	10
Tl	50

**Part # 52316      \$85/100 mL**  
**Part # 53316      \$190/500 mL**

#### GFAA Mercury Standard

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Hg	100

**Part # 57280      \$25/100 mL**  
**Part # 58280      \$50/500 mL**

METHOD  
**CLP**  
ILM 05.2

**USEPA CONTRACT LABORATORY  
PROGRAM STATEMENT OF WORK  
FOR INORGANIC ANALYSIS**

## **Analytical Methods for Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP-AES)**

<b>ACRONYM</b>	<b>DESCRIPTION</b>
<b>Cal</b>	Calibration Standards
<b>CCV</b>	Continuing Calibration Verification: To ensure calibration accuracy during each analysis, run a CCV standard for every wavelength used for each analyte.
<b>CRQL</b>	Contract Required Quantation Limit
<b>CRI</b>	Standard prepared at the CRQL level
<b>ICB/CCB</b>	Initial and Continuing Calibration Blank
<b>ICS</b>	Interference Check Sample: To verify inter-element and background correction factors, the Contractor shall analyze and report the results for the ICS, for all elements on the Target Analyte List (TAL), and for all interferents (target and non-target), at the beginning and end of each analysis run, but not before the ICV. In addition, the Contractor shall analyze and report the results for the ICS at a frequency of not less than once per 20 analytical samples per analysis run.
<b>ICV</b>	Initial Calibration/Verification: Immediately after each of the ICP-AES systems have been calibrated, the accuracy of the initial calibration shall be verified and documented for every analyte by the analysis of the ICV solution(s) at each wavelength used.

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

**INSTRUMENT CALIBRATION STANDARDS**

**Calibration Std. I  
5 Components**

*100 ug/mL in 5% HNO<sub>3</sub>.*

Be  
Cd  
Mn  
Pb  
Zn

**Part # 52149      \$65/100 mL**  
**Part # 53149      \$130/500 mL**

**Calibration Std. II  
5 Components**

*100 ug/mL in 5% HNO<sub>3</sub>.*

Ba  
Co  
Cu  
Fe  
V

**Part # 52150      \$65/100 mL**  
**Part # 53150      \$130/500 mL**

**Calibration Std. III  
2 Components**

*100 ug/mL in 5% HNO<sub>3</sub>.*

As  
Se

**Part # 52151      \$40/100 mL**  
**Part # 53151      \$80/500 mL**

**Calibration Std. IV  
6 Components**

*100 ug/mL in 5% HNO<sub>3</sub>.*

Al  
Ca  
Cr  
K  
Na  
Ni

**Part # 52152      \$65/100 mL**  
**Part # 53152      \$130/500 mL**

**Calibration Std. V  
4 Components**

*100 ug/mL in 5% HNO<sub>3</sub>.*

Ag  
Mg  
Sb  
Tl

**Part # 52153      \$65/100 mL**  
**Part # 53153      \$130/500 mL**

METHOD

**CLP**

ILM 05.2

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

### INITIAL CALIBRATION VERIFICATION (ICV)

After the instrument is calibrated, the calibration must be verified at each wavelength to be used for analysis. It is necessary only to select those elements for verification that are to be subsequently analyzed.

#### ICP-AES

#### Verification Std. 1

**12 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ba	100
Be	40
Cd	50
Co	100
Cu	100
Fe	100
Pb	100
Mn	100
Ni	100
Ag	20
Tl	100
Zn	100

**Part # 52017      \$95/100 mL**

**Part # 53017      \$190/500 mL**

#### ICP-AES

#### Verification Std. 2

**10 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	100
Sb	100
As	100
Ca	1000
Cr	100
Mg	1000
K	1000
Se	100
Na	1000
V	100

**Part # 52018      \$95/100 mL**

**Part # 53018      \$190/500 mL**

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

**CONTINUING CALIBRATION VERIFICATION (CCV)**

Continuing Calibration Verification: To ensure calibration accuracy during each analysis, run a CCV standard for every wavelength used for each analyte.

**ICP-AES  
Continuing Calibration  
Verification Standard  
(CCV)**

**22 COMPONENTS**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ca	2500
Mg	2500
K	2500
Na	2500
Al	200
Ba	200
Fe	100
Co	50
V	50
Ni	40
Cu	25
Zn	20
Mn	15
Cr	10
Ag	10
Be	10
Cd	10
Pb	10
As	10
Se	10
Tl	10
Sb	60

**Part # 52154      \$95/100 mL**  
**Part # 53154      \$190/500 mL**

METHOD

**CLP**

ILM 05.2

## ICP-AES SOLUTION STANDARDS FOR THE SUPERFUND CONTRACT LABORATORY PROGRAM

### CONTRACT REQUIRED QUANTITATION LIMITS (CRQL's)

A standard must be run at double the Contract Required Quantitation Limit (CRQL) or at two times the Instrument Detection Limits (IDL), whichever is greater. This standardization must be performed at the beginning and end of each batch of samples; or at least twice in an 8 hour shift. All elements to be analyzed must be verified except Al, Ba, Ca, Fe, Mg, Na, and K. The CRI Mix 1 contains all the required elements on the Target Analyte List (TAL) in their appropriate concentration ratios. The standard should be diluted by a factor of 1000 prior to use in the "two times CRI" run for ICP analysis. CRI Mix 2 is designed for ICPs equipped with ultrasonic nebulizers and offers all the elements of interest at two times the CRQL level.

#### CRI Mix 1

##### 15 Components

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	120
As	120
Be	10
Cd	10
Cr	20
Co	100
Cu	50
Pb	120
Mn	30
Ni	80
Se	120
Ag	20
Tl	120
V	100
Zn	40

#### CRI Mix 2

##### 15 Components

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	120
As	20
Be	10
Cd	10
Cr	20
Co	100
Cu	50
Pb	6
Mn	30
Ni	80
Se	10
Ag	20
Tl	20
V	100
Zn	40

**Part # 52022      \$125/100 mL**

**Part # 53022      \$250/500 mL**

**Part # 52023      \$125/100 mL**

**Part # 53023      \$250/500 mL**

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

## INTERFERENCE CHECKS

Inter-element and background correction factors must be verified at the beginning and end of each analysis run, or at least twice in an 8 hour shift. Two solutions are required for the interference check: the interferent alone (solution "A<sup>1</sup>"), and the combination of interferents and analytes (solution "AB<sup>1</sup>"). "A<sup>1</sup>" is prepared by diluting Interferents A by a factor of 5. Solution "AB<sup>1</sup>" is prepared by producing a combined solution of Interferents A diluted by a factor of 5 and Analytes B diluted by a factor of 100. For example, combine 20 mL of Interferents A with 1.0 mL of analytes B and dilute the mixture to 100 mL with the calibration blank.

### Interferents A

#### 4 Components

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	2500
Ca	2500
Fe	1000
Mg	2500

**Part # 52024      \$95/100 mL**

**Part # 53024      \$190/500 mL**

### Interferents B

#### 12 Components

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ag	100
Ba	50
Be	50
Cd	100
Co	50
Cr	50
Cu	50
Mn	50
Ni	100
Pb	100
V	50
Zn	100

**Part # 52025      \$95/100 mL**

**Part # 53025      \$190/500 mL**

METHOD

**CLP**

ILM 05.2

## ICP-AES SOLUTION STANDARDS FOR THE SUPERFUND CONTRACT LABORATORY PROGRAM

### SPIKE SAMPLE ANALYSIS

In Spike Sample Analysis, a spike containing the required elements in their respective required amounts, is added to the sample prior to addition of any reagents, digestion, distillation, etc.

#### Spike Sample Standard 1

**18 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	200
Sb	50
As	200
Ba	200
Be	5
Cd	5
Cr	20
Co	50
Cu	25
Fe	100
Pb	50
Mn	50
Ni	50
Se	200
Ag	5
Tl	200
V	50
Zn	50

**Part # 52028      \$280/100 mL**

**Part # 53028      \$560/500 mL**

#### Spike Sample Standard 3 (Soil)

**16 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	400
Ba	400
Be	10
Cd	10
Cr	40
Co	100
Cu	50
Pb	100
Mn	100
Ni	100
Se	400
Ag	10
Tl	400
V	100
Zn	100

**Part # 52031      \$160/100 mL**

**Part # 53031      \$320/500 mL**

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

**Analytical Methods for Inductively Coupled Plasma -  
Mass Spectrometry (ICP-MS)**

**Calibration Standard**

**23 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	100
Sb	100
As	100
Ba	100
Be	100
Bi	100
Cd	100
Cr	100
Co	100
Cu	100
In	100
Pb	100
Mg	100
Mn	100
Ni	100
Sc	100
Se	100
Ag	100
Tb	100
Tl	100
V	100
Y	100
Zn	100

**Part # 52155      \$95/100 mL**

**Part # 53155      \$190/500 mL**

METHOD

**CLP**

ILM 05.2

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

**Tuning Standard****5 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Be	100
Mg	100
Co	100
In	100
Pb	100

**Part # 52156      \$45/100 mL****Part # 53156      \$90/500 mL****INTERNAL STANDARDS**

Element		Matrix	Part#	Conc. (ug/mL)	\$/100mL	Part#	\$/500mL
Bismuth	Bi	Bi(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57083	1000	25	58083	65
Indium	In	In <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57049	1000	25	58049	65
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>	57067	1000	25	58067	75
Lithium	Li	LiNO <sub>3</sub> /HNO <sub>3</sub>	57003	1000	25	58003	65
Lutetium	Lu	Lu <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57071	1000	30	58071	75
Rhodium	Rh	RhCl <sub>3</sub> /HCl	57045	1000	100	58045	400
Scandium	Sc	Sc(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57021	1000	75	58021	150
Terbium	Tb	Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>	57065	1000	25	58065	75
Yttrium	Y	Y <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57039	1000	25	58039	65

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

**ICV / CCV STANDARDS**

**ICP-MS / ICV Standard**

**23 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	50
Sb	50
As	50
Ba	50
Be	50
Bi	50
Cd	50
Cr	50
Co	50
Cu	50
In	50
Pb	50
Mg	50
Mn	50
Ni	50
Sc	50
Se	50
Ag	50
Tb	50
Tl	50
V	50
Y	50
Zn	50

**Part # 52157**

**\$95/100 mL**

**Part # 53157**

**\$190/500 mL**

**ICP-MS / CCV Standard**

**23 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	10
Sb	10
As	10
Ba	10
Be	10
Bi	10
Cd	10
Cr	10
Co	10
Cu	10
In	10
Pb	10
Mg	10
Mn	10
Ni	10
Sc	10
Se	10
Ag	10
Tb	10
Tl	10
V	10
Y	10
Zn	10

**Part # 52158**

**\$95/100 mL**

**Part # 53158**

**\$190/500 mL**

METHOD

**CLP**

ILM 05.2

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

**CONTRACT REQUIRED QUANTITATION LIMITS (CRQL's)**

**CRI Standard**

**23 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	0.1
Sb	0.1
As	0.1
Ba	0.1
Be	0.1
Bi	0.1
Cd	0.1
Cr	0.1
Co	0.1
Cu	0.1
In	0.1
Pb	0.1
Mg	0.1
Mn	0.1
Ni	0.1
Sc	0.1
Se	0.1
Ag	0.1
Tb	0.1
Tl	0.1
V	0.1
Y	0.1
Zn	0.1

**Part # 52159      \$95/100 mL**

**Part # 53159      \$190/500 mL**

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

METHOD

**CLP**

ILM 05.2

**INTERFERENCE CHECK SOLUTIONS (ICS)**

**ICP-MS / Interferents A**

**12 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	100
Ca	100
Fe	100
Mg	100
K	100
Na	100
P	100
SO <sub>4</sub>	100
C	200
Cl	1000
Mo	2
Ti	2

**Part # 52160      \$95/100 mL**  
**Part # 53160      \$190/500 mL**

**ICP-MS / Interferents B**

**20 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	20
As	20
Ba	20
Bi	20
Cd	20
Cr	20
Co	20
Cu	20
In	20
Pb	20
Mn	20
Ni	20
Sc	20
Se	20
Ag	20
Tb	20
Tl	20
V	20
Y	20
Zn	20

**Part # 52161      \$110/100 mL**  
**Part # 53161      \$220/500 mL**

METHOD

**CLP**

ILM 05.2

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM**

In Spike Sample Analysis, a spike containing the required elements in their respective required amounts, is added to the sample prior to addition of any reagents, digestion, distillation, etc.

**ICP-MS / Spike Sample****17 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	2000
Sb	100
As	40
Ba	2000
Be	50
Cd	50
Cr	200
Co	500
Cu	250
Pb	20
Mn	500
Ni	500
Se	10
Ag	50
Tl	50
V	500
Zn	500

**Part # 52162      \$110/100 mL****Part # 53162      \$220/500 mL**

**USEPA CONTRACT LABORATORY  
PROGRAM STATEMENT OF WORK  
FOR INORGANIC ANALYSIS**

METHOD

**CLP**

ILM 05.2

## Cold Vapor Mercury Analysis

Element	Conc. (ug/mL)	Part#	\$/100mL	Part#	\$/500mL
Inorganic Mercury	10	57880	25	58880	50
Inorganic Mercury	20	52009	25	53009	50
Inorganic Mercury	100	57280	25	58280	50
Inorganic Mercury	200	57380	25	58380	50
Inorganic Mercury	1000	57080	25	58080	65
Inorganic Mercury	10000	57180	75	58180	150
Organic Mercury	100	54006	25	NA	NA
Organic Mercury	1000	54170	25	54171	50
Total Mercury	100	54005	25	NA	NA
Total Mercury	1000	54004	25	54168	50
Total Mercury	10000	54178	100	NA	NA

## Total Cyanide Analysis

Analyte	Conc. (ug/mL)	Part#	\$/100mL	Part#	\$/500mL
Simple Cyanide	1000	59017	20	54012	90
Total Cyanide	1000	54150	20	NA	NA
Free & Complexed Cyanide	1000	54165	20	NA	NA

Simple Cyanide is formulated with Potassium Cyanide (KCN), no distillation is required.

Total Cyanide is formulated with Potassium Ferricyanide (III), distillation is required before analysis can be performed.

Free & Complexed Cyanide is formulated with both materials

METHOD

**CLP**

ILM 05.3

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

**ICP-AES ICV  
Water/Soil Matrix  
22 Components  
Matrix 5% HNO<sub>3</sub>**

Element	Conc.(ug/mL)
Al	200
Sb	60
As	10
Ba	200
Be	5
Cd	5
Ca	5000
Cr	10
Co	50
Cu	25
Fe	100
Pb	10
Mg	5000
Mn	15
Ni	40
K	5000
Se	35
Ag	10
Na	5000
Tl	25
V	50
Zn	60

**Part # 52163      \$125/100 mL**  
**Part # 53163      \$250/500 mL**

**ICP-AES CCV  
Water/Soil Matrix  
20 Components  
Matrix 5% HNO<sub>3</sub>**

Element	Conc.(ug/mL)
Al	100
Sb	30
As	5
Ba	100
Ca	2500
Cr	5
Co	25
Cu	12.5
Fe	50
Pb	5
Mn	7.5
Mg	2500
Ni	20
K	2500
Se	17.5
Ag	5
Na	2500
Tl	12.5
V	25
Zn	30

**Part # 52164      \$125/100 mL**  
**Part # 53164      \$250/500 mL**

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

METHOD

**CLP**

ILM 05.3

**ICP-AES CRI Mix****Water Matrix****15 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	60
As	10
Be	5
Cd	5
Cr	10
Co	50
Cu	25
Pb	10
Mn	15
Ni	40
Se	35
Ag	10
Tl	25
V	50
Zn	60

**Part # 59370 \$125/100 mL****Part # 53165 \$250/500 mL****ICP-AES Spike Sample****Water Matrix****18 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	200
Sb	10
As	4
Ba	200
Be	5
Cd	5
Cr	20
Co	50
Cu	25
Fe	100
Pb	2
Mn	50
Ni	50
Se	5
Ag	5
Tl	5
V	50
Zn	50

**Part # 52166 \$125/100 mL****Part # 53166 \$250/500 mL**

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METHOD

**CLP**

ILM 05.3

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

**ICP-AES**

**Interferents A**

**Water Matrix**

**4 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	2500
Ca	2500
Fe	1000
Mg	2500

**Part # 52024 \$95/100 mL**

**Part # 53024 \$190/500 mL**

**ICP-AES**

**Interferents B**

**Water Matrix**

**16 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ag	200
As	100
Ba	500
Be	500
Cd	1000
Co	500
Cr	500
Cu	500
Mn	500
Ni	1000
Pb	50
Sb	600
Se	50
Tl	100
V	500
Zn	1000

**Part # 52167 \$125/100 mL**

**Part # 53167 \$250/500 mL**

Combine  
Interferants Mix A & B  
for ICSAB.  
Dilute Interferants A Mix  
into Interferants B Mix in  
a 1:10 ratio.

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
SOIL MATRIX**

METHOD

**CLP**

ILM 05.3

**ICP-AES ICV  
Water/Soil Matrix  
22 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	200
Sb	60
As	10
Ba	200
Be	5
Cd	5
Ca	5000
Cr	10
Co	50
Cu	25
Fe	100
Pb	10
Mg	5000
Mn	15
Ni	40
K	5000
Se	35
Ag	10
Na	5000
Tl	25
V	50
Zn	60

**Part # 52163 \$125/100 mL**  
**Part # 53163 \$250/500 mL**

**ICP-AES CCV  
Water/Soil Matrix  
20 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	100
Sb	30
As	5
Ba	100
Ca	2500
Cr	5
Co	25
Cu	12.5
Fe	50
Pb	5
Mn	7.5
Mg	2500
Ni	20
K	2500
Se	17.5
Ag	5
Na	2500
Tl	12.5
V	25
Zn	30

**Part # 52164 \$125/100 mL**  
**Part # 53164 \$250/500 mL**

METHOD

**CLP**

ILM 05.3

**ICP-AES SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
SOIL MATRIX**

**ICP-AES CRI****Soil Matrix****16 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	600
As	100
Ba	500
Be	50
Cd	50
Cr	100
Co	500
Cu	250
Pb	100
Mn	150
Ni	400
Se	350
Ag	100
Tl	250
V	500
Zn	600

**Part # 52168      \$125/100 mL****Part # 53168      \$250/500 mL****ICP-AES Spike****Soil Matrix****16 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	200
As	80
Ba	4000
Be	100
Cd	100
Cr	400
Co	1000
Cu	500
Pb	40
Mn	1000
Ni	1000
Se	100
Ag	100
Tl	100
V	1000
Zn	1000

**Part # 52169      \$125/100 mL****Part # 53169      \$250/500 mL**

**See page 43 for Interferants Mixes.**

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

METHOD

**CLP**

ILM 05.3

**ICP-MS**

**ICV**

**Water Matrix**

**16 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	20
As	10
Ba	100
Be	10
Cd	10
Cr	20
Co	10
Cu	20
Pb	10
Mn	10
Ni	10
Se	50
Ag	10
Tl	10
V	10
Zn	20

**Part # 52170 \$125/100 mL**

**Part # 53170 \$250/500 mL**

**ICP-MS / CRQL  
CHECK STANDARD-CRI**

**Water Matrix**

**16 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	20
As	10
Ba	100
Be	10
Cd	10
Cr	20
Co	10
Cu	20
Pb	10
Mn	10
Ni	10
Se	50
Ag	10
Tl	10
V	10
Zn	20

**Part # 52171 \$125/100 mL**

**Part # 53171 \$250/500 mL**

**The CRI and ICV mixes are identical in element and concentration, but are prepared from separate source raw materials as specified by the method.**

METHOD

**CLP**

ILM 05.3

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

**ICP-MS CCV****Water Matrix****16 Components***Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	10.0
As	5.0
Ba	50
Be	5.0
Cd	5.0
Cr	10.0
Co	5.0
Cu	10.0
Pb	5.0
Mn	5.0
Ni	5.0
Se	25.0
Ag	5.0
Tl	5.0
V	5.0
Zn	10.0

**Part # 52172    \$125/100 mL**  
**Part # 53172    \$250/500 mL**

**ICP-MS / Spike Sample****Water Matrix****16 Components***Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	100
As	40
Ba	2000
Be	50
Cd	50
Cr	200
Co	500
Cu	250
Pb	20
Mn	500
Ni	500
Se	10
Ag	50
Tl	50
V	500
Zn	500

**Part # 52173    \$125/100 mL**  
**Part # 53173    \$250/500 mL**

**See page 35 for Mercury and Cyanide Standards**

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
WATER MATRIX**

METHOD

**CLP**

ILM 05.3

**ICP-MS / Interferents A**

**Water Matrix**

**12 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	1000
Ca	1000
Fe	1000
Mg	1000
K	1000
Na	1000
P as PO <sub>4</sub> <sup>3-</sup>	1000
S as SO <sub>4</sub> <sup>2-</sup>	1000
C	2000
Cl	10000
Mo	20
Ti	20

**Part # 52174      \$125/100 mL**

**Part # 53174      \$250/500 mL**

**ICP-MS / Interferents B**

**Water Matrix**

**15 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	20
As	20
Ba	20
Cd	20
Cr	20
Co	20
Cu	20
Pb	20
Mn	20
Ni	20
Se	20
Ag	20
Tl	20
V	20
Zn	20

**Part # 52175      \$125/100 mL**

**Part # 53175      \$250/500 mL**

Dilute and Combine  
Interferents Mix A & B  
for Mix ICSAB.  
Interferents A Mix is 10X  
the method specification  
& Interferents B Mix is  
1000X.

METHOD

**CLP**

ILM 06.X

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
SOIL MATRIX**

ILM 06.X has the same target analyte list as ILM 05.3, however specifications for ICP-MS in soil are given.

**ICP-MS ICV****Soil Matrix****16 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	50
Ba	500
Be	50
Cd	50
Cr	100
Co	50
Cu	100
Pb	50
Mn	50
Ni	50
Se	250
Ag	50
Tl	50
V	50
Zn	100

**Part # 52176     \$125/100 mL****Part # 53176     \$250/500 mL****ICP-MS CRI****Soil Matrix****16 Components***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	50
Ba	500
Be	50
Cd	50
Cr	100
Co	50
Cu	100
Pb	50
Mn	50
Ni	50
Se	250
Ag	50
Tl	50
V	50
Zn	100

**Part # 52177     \$125/100 mL****Part # 53177     \$250/500 mL**

**The CRI and ICV mixes are identical in element and concentration, but are prepared from separate source raw materials as specified by the method.**

**ICP-MS SOLUTION STANDARDS FOR  
THE SUPERFUND CONTRACT  
LABORATORY PROGRAM  
SOIL MATRIX**

METHOD

**CLP**

ILM 06.X

**ICP-MS CCV**

**Soil Matrix**

**16 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	50
As	25
Ba	250
Be	25
Cd	25
Cr	50
Co	25
Cu	50
Pb	25
Mn	25
Ni	25
Se	125
Ag	25
Tl	25
V	25
Zn	50

**Part # 52178      \$125/100 mL**

**Part # 53178      \$250/500 mL**

Method  
**TCLP**  
**(1311)**

**TOXICITY CHARACTERISTIC  
LEACHATE PROCEDURE (TCLP)**

**TOXICITY CHARACTERISTIC LEACHATE PROCEDURE  
(TCLP) STANDARD**

For use in accordance with the "Toxicity Characteristic Rule Regulatory Levels" issued in the Federal Register 55, 1.1846 March 1990: Method 1311.

**(TCLP) Standard**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
As	25
Ba	500
Cd	5
Cr	25
Pb	25
Se	5
Ag	25
Hg*	20

\*Hg is a separate solution.

**Part # 52006      \$95/100 mL**  
**Part # 53006      \$190/500 mL**

**(TCLP) GFAA Standard**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
As	25
Pb	25
Se	5

**Part # 52008      \$50/100 mL**  
**Part # 53008      \$100/500 mL**

**(TCLP) Standard for ICP**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ba	500
Cd	5
Cr	25
Ag	25

**Part # 52007      \$65/100 mL**  
**Part # 53007      \$130/500 mL**

**(TCLP) Cold Vapor Standard**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Hg	20

**Part # 52009      \$25/100 mL**  
**Part # 53009      \$50/500 mL**

## SYNTHETIC PRECIPITATION LEACHING PROCEDURE

Method  
**TCLP  
(1312)**

Element	Matrix	Part#	Conc. (mg/mL)	\$/100mL	Part#	\$/500mL
Cadmium	Cd Cd(NO3)2/HNO3	57048	1.0	25	58048	65
Cadmium	Cd Cd(NO3)2/HNO3	57148	10.0	75	58148	150
Lead	Pb Pb(NO3)2/HNO3	57082	1.0	25	58082	65
Lead	Pb Pb(NO3)2/HNO3	57182	10.0	75	58182	150

### TCLP 1312 METALS

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Cd	1000
Pb	5000

**Part # 52148      \$40/100 mL**

**Part # 53148      \$80/500 mL**

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Concentration  
EPA Method

**6010A**  
**REV-1,7/92**  
**6010B**  
**REV-2,12/96**

**MULTI-ELEMENT SOLUTION  
 STANDARDS FOR  
 SW-846 METHODS - ICP-AES**

**MULTI-ELEMENT CALIBRATION STANDARDS**

**Calibration Standards Set 1-6**

**Part # 52042 \$310/100 mL**

**Part # 53042 \$620/500 mL**

**Calibration Std. 1**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Be	50
Cd	150
Pb	500
Mn	100
Se	200
Zn	150

**Part # 52043 \$80/100 mL**

**Part # 53043 \$160/500 mL**

**Calibration Std. 2**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ba	100
Co	100
Cu	100
Fe	1000
V	100

**Part # 52044 \$80/100 mL**

**Part # 53044 \$160/500 mL**

**Calibration Std. 3**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
As	500
Mo	100

**Part # 52045 \$60/100 mL**

**Part # 53045 \$120/500 mL**

**Calibration Std. 4**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	200
Ca	1000
Cr	20
Li	100
Ni	20
K	400
Na	200
Sr	10

**Part # 52046 \$90/100 mL**

**Part # 53046 \$180/500 mL**

**Calibration Std. 5**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	200
Mg	1000
Ag	50
Tl	200

**Part # 52047 \$80/100 mL**

**Part # 53047 \$160/500 mL**

**Calibration Std. 6**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
P	200

**Part # 57315 \$20/100 mL**

**Part # 58315 \$50/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

**6010A  
REV-1,7/92  
6010B  
REV-2,12/96**

## INTERFERENCE STANDARDS

Interference Standards are used to set or confirm that the appropriate background correction intervals have been set for sequential ICP spectrometers & that the proper inter-element correction factors are set for simultaneous ICP spectrometer systems.

### Interference Standards Set

Includes one each of  
Interference Standards 1,2,3,4,5

**Part # 52038      \$320/100 mL**  
**Part # 53038      \$640/ 500mL**

### Interference Std. 1

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	100
Ba	30
Be	10
Cd	30
Cr	30
Co	30
Cu	30
Pb	100
Mn	20
Hg	5
Ni	30
K	3000
Se	50
Ag	30
Tl	100
V	30
Zn	30

**Part # 52039      \$230/100 mL**  
**Part # 53039      \$460/500 mL**

### Interference Std. 2

*Matrix 2% HNO<sub>3</sub>, tr Tartaric acid*

Element	Conc.(ug/mL)
Sb	1000

**Part # 57051      \$25/100 mL**  
**Part # 58051      \$65/500 mL**

### Interference Std. 3

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Li	300
Mo	300
P	1000
Sr	200
Ti	1000

**Part # 52050      \$80/100 mL**  
**Part # 53050      \$160/500 mL**

### Interference Std. 4

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	400
Ca	2000
Fe	2000
Mg	1000

**Part # 52041      \$50/100 mL**  
**Part # 53041      \$100/500 mL**

### Interference Std. 5

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Na	5000

**Part # 57911      \$50/100 mL**  
**Part # 58911      \$100/500 mL**

**6020/  
6020A**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-MS**

Method 6020/ 6020A is applicable to the determination of metals in low concentrations (sub-ppb) in water and waste extracts using ICP-MS.

**EPA Method 6020/ 6020A**

**MIX A**

**12 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
C	1000
Cl	10000
Al	500
Ca	1500
Fe	1250
Mg	500
Na	1250
P	500
K	500
S	500
Mo	10
Ti	10

**EPA Method 6020/ 6020A**

**MIX B**

**11 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	1.0
Cd	1.0
Cr	2.0
Co	2.0
Cu	2.0
Mn	2.0
Ni	2.0
Se	1.0
Ag	0.5
V	2.0
Zn	1.0

**Part # 59219**      **\$175/100 mL**  
**Part # 59249**      **\$525/500 mL**

**Part # 52331**      **\$125/100 mL**  
**Part # 53331**      **\$250/500 mL**

**ICP-MS Internal  
Standards**

Element	Matrix	Part#	(ug/mL)	\$/100mL	Part#	\$/500mL
Bismuth	Bi	Bi(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57083	1000	25	58083    65
Indium	In	In <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57049	1000	25	58049    65
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>	57067	1000	25	58067    75
Lithium	Li <sup>6+</sup>	Li <sup>6+</sup> NO <sub>3</sub> /HNO <sub>3</sub>	59021	1000	200	59097    1000
Rhodium	Rh	RhCl <sub>3</sub> /HCl	57045	1000	100	58045    400
Scandium	Sc	Sc(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57021	1000	75	58021    150
Terbium	Tb	Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>	57065	1000	25	58065    75
Yttrium	Y	Y <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57039	1000	25	58039    65

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METHOD

**200.7**

Rev 5.0

## MULTI-ELEMENT SOLUTION STANDARDS FOR SW-846 METHODS- ICP-AES

### MIXED CALIBRATION STANDARDS

EPA Method 200.7 covers the Determination of Metals and Trace Elements in Water and Wastes by ICP Atomic Emission Spectroscopy.

#### Mixed Calibration Std. 1

*10 Components*

*Matrix 5% HNO<sub>3</sub>/ tr.HF.*

Element	Conc.(ug/mL)
Ag	50
As	1000
B	100
Ba	100
Ca	1000
Cd	200
Cu	200
Mn	200
Sb	500
Se	500

**Part # 52335      \$80/100 mL**

**Part # 53335      \$160/500 mL**

#### Mixed Calibration Std. 4

*6 Components*

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	1000
Cr	500
Hg	200
Si	1000
Sn	400
Zn	500

**Part # 52056      \$80/ 100 mL**

**Part # 53056      \$160/ 500 mL**

#### Mixed Calibration Std. 2

*6 Components*

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
K	2000
Li	500
Mo	1000
Na	1000
Sr	100
Ti	1000

**Part # 52336      \$75/100 mL**  
**Part # 53336      \$150/500 mL**

#### Mixed Calibration Std. 3

*4 Components*

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ce	200
Co	200
V	200
P	1000

**Part # 52337      \$75/100 mL**  
**Part # 53337      \$150/500 mL**

#### Mixed Calibration Std. 5

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Be	100
Fe	1000
Pb	1000
Mg	1000
Ni	200
Tl	500

**Part # 52057      \$110/100 mL**  
**Part # 53057      \$220/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

METHOD  
**200.7**

Various Revisions

The **Plasma Solution** is used to determine the optimum height above the load coil for viewing the plasma in EPA Method 200.7, Section 7.6.

The **Tuning Solution** is used to determine the optimum height above the load coil for viewing the plasma in EPA Method 200.7, Section 7.7.

**Plasma Solution**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	100
Pb	100
Se	200
Tl	200

**Part # 52058      \$50/100 mL**

**Part # 53058      \$100/500 mL**

**Tuning Solution**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Cu	100
Pb	100

**Part # 52059      \$40/100 mL**

**Part # 53059      \$80/500 mL**

The **Laboratory Performance Check Solution Set** is used to evaluate the performance of the instrument system in EPA Method 200.7, Section 7.8.

**LPC Solution Set**

*Matrix 5% HNO • Dilution : 1 to 100*

**P#52306 LPC-1**

Element	Conc. (ug/mL).
Ag	50
Al	200
As	200
B	200
Ba	200
Be	200
Ca	200
Cd	200
Co	200
Cr	200

**P#52307 LPC-2**

Element	Conc. (ug/mL).
Cu	200
Fe	200
Hg	200
K	1000
Li	200
Mg	200
Mn	200
Mo	200
Na	200
Ni	200

**P#52308 LPC-3**

Element	Conc. (ug/mL).
P	1000
Pb	200
Sb	200
Se	1000
Si	200
Sn*	200
Sr	200
Tl	200
V	200
Zn	200

\* (supplied as a separate solution)

**Part # 52060      \$400/100 mL**

**Part # 53060      \$800/500 mL**

## METHOD

**200.7**

## Various Revisions

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

The Spectral Interference Check Solutions consist of higher-level, concentrated, selected method analytes and are used to evaluate the laboratory's procedure for correcting known inter-element spectral interferences.

**SIC 1** is used to evaluate the Mo inter-element spectral correction factors on the analytes Al, Sb, Se, Sn, and V.

**SIC 1***Matrix H<sub>2</sub>O.*

Dilution : 1 to 10

Element	Conc.(ug/mL)
Mo	500

**Part # 57642      \$20/100 mL****Part # 58642      \$50/500 mL**

**SIC 2** is used to evaluate the Co, Cr, Mn, V, Cu, inter-element spectral correction factors on the analytes Pb, Sb, Mo, As, V, and Zn.

**SIC 2***Matrix 2% HNO<sub>3</sub>.*

Dilution : 1 to 10

Element	Conc. (ug/mL)	Corresponding Interference
Co	100	Pb
Cr	200	Sb
Mn	200	Mo
V	200	As, Be
Cu	400	Zn

**Part # 52061      \$50/100 mL****Part # 53061      \$100/500 mL**

**SIC 3** is used to evaluate the Ni, Al, Fe, inter-element spectral correction factors on the analytes Sb, Zn, As, Ag, Mn, V, Cr.

**SIC 3***Matrix 2% HNO<sub>3</sub>.*

Dilution : 1 to 10

Element	Conc. (ug/mL)	Corresponding Interference
Ni	200	Sb, Zn
Al	300	As
Fe	1500	Ag, Cr, Mn, V

**Part # 52062      \$40/100 mL****Part # 53062      \$80/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

METHOD  
**200.7**  
Various Revisions

### LABORATORY FORTIFYING SOLUTION (LFS)

The Laboratory Fortifying Solution is used in the preparation of the laboratory-fortified blank and the laboratory-fortified sample matrix solutions. The Laboratory-Fortified Blank (**LFB**) is an aliquot of reagent grade water to which known quantities of the method analytes are added in the laboratory. The **LFB** is analyzed exactly like a sample to determine whether method performance is within acceptable control limits. The Laboratory-Fortified Sample Matrix (**LFM**) is an aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The **LFM** is analyzed exactly like a sample to determine whether the sample matrix contributes bias to the analytical result.

#### LFS Solution Set

*Matrix 5% HNO<sub>3</sub>. • Dilution : 1 to 100*

LFS-1		LFS-2		LFS-3	
Element	Conc. (ug/mL).	Element	Conc. (ug/mL).	Element	Conc. (ug/mL).
Ag	25	Cu	250	Sb	250
Al	250	Fe	250	Se	250
As	250	Hg	50	Si	250
B	250	K	250	Sn*	100
Ba	250	Li	250	Sr	250
Be	50	Mn	100	Tl	250
Cd	100	Mo	250	V	100
Co	100	Ni	500	Zn	250
Cr	250	Pb	250		

\* (supplied as a separate solution)

**Part # 52063      \$180/100 mL**

**Part # 53063      \$360/500 mL**

Note:

- The analytes Ca, Mg, and Na are not included in the Fortifying Solution due to their widely varying concentrations in environmental samples
- The analytes B & Si should be disregarded if the samples are processed and diluted in borosilicate labware due to contamination from borosilicate glass.

METHOD  
**200.7**

Various Revisions

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

**Spiking Standard 1**

*Matrix H<sub>2</sub>O*

Element	Conc.(ug/mL)
B	500
Mo	500
Si	2000

**Part # 52064 \$80/100 mL**  
**Part # 53064 \$160/500 mL**

**Spiking Standard 2**

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ca	1000
Mg	2000
K	10,000
Na	3000

**Part # 52065 \$90/100 mL**  
**Part # 53065 \$180/500 mL**

**Spiking Standard 3**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	2000
Ba	2000
Be	50
Cr	200
Co	500
Cu	250
Fe	1000
Mn	500
Ni	500
Ag	50
V	500
Zn	500

**Part # 52066 \$180/100 mL**  
**Part # 53066 \$360/500 mL**

**Spiking Standard 4**

*Matrix 2% HNO<sub>3</sub> tr Tartaric Acid*

Element	Conc.(ug/mL)
Sb	500

**Part # 57651 \$20/100 mL**  
**Part # 58651 \$50/500 mL**

**Spiking Standard 5**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	2000
Cd	50
Pb	500
Se	2000
Tl	2000

**Part # 52067 \$100/100 mL**  
**Part # 53067 \$200/500 mL**

**Spiking Standards Set**

Includes one each of  
Spiking Standards 1,2,3,4,5

**Part # 52068 \$400/100 mL**  
**Part # 53068 \$800/500mL**

**Mercury Standard**

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Hg	200

**Part # 57380 \$25/100 mL**  
**Part # 58380 \$50/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS - ICP-AES**

METHOD

**200.7**

Various Revisions

**Spiking Standard 1***Matrix H<sub>2</sub>O*

Element	Conc.(ug/mL)
B	400
Mo	200
Si	2000
P	400

**Part # 52069 \$90/100 mL****Part # 53069 \$180/500 mL****Spiking Standard 2***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ca	10,000
Mg	10,000
K	10,000
Na	10,000

**Part # 52070 \$120/100 mL****Part # 53070 \$240/500 mL****Spiking Standard 4***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	200

**Part # 57351 \$20/100 mL****Part # 58351 \$50/500 mL****Spiking Standard 5***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	200
Cd	100
Pb	200
Se	400
Tl	400

**Part # 52071 \$100/100 mL****Part # 53071 \$200/500 mL****Spiking Standard 3***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	200
Ba	200
Be	100
Cr	100
Co	200
Cu	200
Fe	400
Li	200
Mn	100
Ni	200
Ag	200
Sr	400
Sn	200
V	200
Zn	200

**Part # 52072 \$180/100 mL****Part # 53072 \$360/500 mL****Spiking Standards Set**Includes one each of  
Spiking Standards 1,2,3,4,5**Part # 52073 \$400/100 mL****Part # 53073 \$800/ 500mL****Mercury Standard***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Hg	200

**Part # 57380 \$25/100 mL****Part # 58380 \$50/500 mL**

METHOD

**200.7**

Various Revisions

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846-200.7 & SDWA 1310, NPDWR**

**DRINKING WATER STANDARDS**

These standards are for use in drinking water compliance monitoring and for the analysis of ground and surface water requiring determination at drinking water contaminant levels. Refer to the US EPA SW-846, Method 1310 and US National Primary Drinking Water Regulations 40 CFR Part 141. The Second Drinking Water Metals Standard includes all metals required for US Appendix 200.7 for analysis by ICP Spectroscopy.

**Drinking Water Standards Set**

Includes one each of  
Primary and Secondary Standards

**Part # 52074      \$140/100 mL****Part # 53074      \$280/500 mL****Primary****Drinking Water Metals***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	10
Ba	100
Cd	5
Cr	10
Pb	10
Se	5
Ag	10
Hg	10

**Part # 52075      \$80/100 mL****Part # 53075      \$160/500 mL****Secondary****Drinking Water Metals***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Cu	100
Fe	30
Mn	5
Zn	500

**Part # 52076      \$65/100 mL**  
**Part # 53076      \$130/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS 200.7 & 6010**

METHOD  
**200.7**  
Various Revisions

### INSTRUMENT WAVELENGTH STANDARDS

For calibration and verification of wavelength accuracy and stability in sequential and simultaneous ICP Spectrometers. Also for use in US EPA SW-846, Method 6010 section 5.6 and Method 200.7 section 7.6.1.

#### Instrument Wavelength Standard

*Matrix 2% HNO<sub>3</sub>*

Al	100	Mg	100
As	100	Mn	100
Cd	100	Ni	100
Cr	100	K	100
Co	100	Na	100
Cu	100	Zn	100
Fe	100	Y	600
Pb	100		

**Part # 52081                      \$110/100 mL**

**Part # 53081                      \$220/500 mL**

#### Instrument Std. 3

*Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	20
La	20
Li	20
Cr	20
Mn	20
Mo	20
Ni	20
P	100
K	100
Sc	20
Na	20

**Part # 52079                      \$90/100 mL**

**Part # 53079                      \$180/500 mL**

#### Instrument Std. 3B

*Matrix 2% HCl*

Element	Conc.(ug/mL)
As	20
La	20
Li	20
Mn	20
Mo	20
Ni	20
P	100
K	100
Sc	20
Na	20
S	100

**Part # 59030                      \$75/100 mL**

METHOD  
**200.7**  
**6010**

**MULTI-ELEMENT SOLUTION  
 STANDARDS FOR  
 SW-846 METHODS 200.7 & 6010**

**QUALITY CONTROL STANDARDS**

Quality control standards are used to check standard curves, perform inter-element correction and other spectral interference checks. Also used in US EPA Method 200.7 and 600/482-055 “Technical Additions to Methods for Chemical Analysis of Water and Wastes.” Available both individually and as a complete set.

**QC Standard 1**  
**19 Components**  
*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	100
Be	100
Ca	100
Cd	100
Cr	100
Co	100
Cu	100
Fe	100
Pb	100
Mg	100
Mn	100
Mo	100
Ni	100
Se	100
Tl	100
Ti	100
V	100
Zn	100

**Part # 52084      \$175/100 mL**  
**Part # 53084      \$350/500 mL**

**QC Standard 2**  
**21 Components**  
*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	100
As	100
Be	100
Ca	100
Cd	100
Cr	100
Co	100
Cu	100
Fe	100
Pb	100
Li	100
Mg	100
Mn	100
Mo	100
Ni	100
Se	100
Sr	100
Tl	100
Ti	100
V	100
Zn	100

**Part # 52085      \$190/100 mL**  
**Part # 53085      \$380/500 mL**

**MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
SW-846 METHODS 200.7 & 6010**

**METHOD  
200.7  
6010**

**QC Standard 3  
15 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	100
Ba	100
Ca	100
Cd	100
Cr	100
Co	100
Cu	100
Fe	100
Pb	100
Mg	100
Mn	100
Ni	100
Na	100
Ti	100
Zn	100

**Part # 52086 \$170/100 mL**

**Part # 53086 \$340/500 mL**

**Calibration Standards Set**

Includes one each of Quality  
Control Standard 1, 3, 5.

**Part # 52089 \$310/100 mL**

**Part # 53089 \$620/500 mL**

**Calibration Standards Set**

Includes one each of Quality  
Control Standard 2, 3, 4.

**Part # 52090 \$310/100 mL**

**Part # 53090 \$620/500 mL**

**QC Standard 4  
7 Components**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	100
Ba	100
B	100
K	1000
Si	50
Ag	100
Na	100

**Part # 52087 \$80/100 mL**

**Part # 53087 \$160/500 mL**

**QC Standard 5  
7 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	100
Ba	100
B	100
K	1000
Si	500
Ag	50
Na	100

**Part # 52088 \$80/100 mL**

**Part # 53088 \$160/500 mL**

METHOD

**200.8****MULTI-ELEMENT  
TUNING STANDARDS****ICP-MS Tuning & Internal Standards Rev 5.5**

These multi-element standards are designed to assist the operator in calibration of the instrument or verification of the mass range.

**ICP-MS Tuning Standard 1***Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Be	10
Co	10
In	10
Pb	10
Mg	10

**Part # 52122**      **\$50/100 mL**  
**Part # 53122**      **\$200/500 mL**

**ICP-MS Tuning Standard 2***Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Li	10
Y	10
Ce	10
Tl	10

**Part # 52123**      **\$50/100 mL**  
**Part # 53123**      **\$200/500 mL**

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## ICP-MS INTERNAL STANDARDS

METHOD

**200.8**

### ICP-MS Internal Standards

These internal standard stock solutions are used for: addition to blanks; calibration standards; as samples for internal standardization; and for use in US EPA SW-846 Method 200.8. Dilute 10 mL to 100 mL before using.

Element	Matrix	Part#	(ug/mL)	\$/100mL	Part#	\$/500mL
Bismuth	Bi	Bi(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57283	100	20	58283 50
Indium	In	In <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57249	100	20	58249 50
Holmium	Ho	Ho <sub>3</sub> O <sub>3</sub> /HNO <sub>3</sub>	57067	1000	25	58067 75
Lithium	Li <sup>6+</sup>	Li <sup>6+</sup> NO <sub>3</sub> /HNO <sub>3</sub>	59036	100	100	59037 300
Rhodium	Rh	RhCl <sub>3</sub> /HCl	57245	100	100	58245 300
Scandium	Sc	Sc(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>	57221	100	20	58221 50
Terbium	Tb	Tb <sub>4</sub> O <sub>7</sub> /HNO <sub>3</sub>	57265	100	20	58265 50
Yttrium	Y	Y <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>	57239	100	20	58239 50

#### Method 200.8 Rev 5.5 ICP-MS Internal Standard *Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sc	10
Y	10
In	10
Tb	10
Bi	10

**Part # 52332      \$50/100 mL**  
**Part # 53332      \$200/500 mL**

#### Multi-Element Internal Standard *Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Bi	10
Ho	10
In	10
Li	10
Sc	10
Tb	10
Y	10

**Part # 52319      \$65/100 mL**  
**Part # 53319      \$200/500 mL**

METHOD

**200.8****MULTI-ELEMENT  
SOLUTION STANDARDS****ICP-MS CALIBRATION STANDARDS REV 5.5**

These multi-element standards are designed to assist the ICP-MS operator in performing concentration verification checks.

**Method 200.8**  
**ICP-MS Calibration Standard 1**  
**19 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	10
Sb	10
As	10
Be	10
Cd	10
Cr	10
Co	10
Cu	10
Pb	10
Mn	10
Hg	5
Mo	10
Ni	10
Se	50
Tl	10
Th	10
U	10
V	10
Zn	10

**Part # 52333**      **\$150/100 mL**

**Part # 53333**      **\$300/500 mL**

**Method 200.8**  
**ICP-MS Calibration Standard 2**  
**2 Components**

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ba	10
Ag	10

**Part # 52334**      **\$40/100 mL**

**Part # 53334**      **\$80/500 mL**

**Method 200.8**  
**ICP-MS Calibration Standard 3**

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Hg	5

**Part # 59388**      **\$25/100 mL**

**MULTI-ELEMENT  
SOLUTION STANDARDS**

METHOD

**200.8**

**ICP-MS VERIFICATION STANDARD**

**ICP-MS Verification Stand. 1  
26 Components**

*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Al	10
As	10
Ba	10
Be	10
Bi	10
Ca	10
Cd	10
Cr	10
Co	10
Cu	10
Fe	10
Ga	10
Pb	10
Li	10
Mg	10
Mn	10
Hg*Separate solution	10
Ni	10
K	10
Se	10
Na	10
Ag	10
Sr	10
Tl	10
V	10
Zn	10

**Part # 52100      \$180/100 mL**

**Part # 53100      \$380/500 mL**

*\*Part# 57880 is included (Hg @ 100ug/mL)*

**ICP-MS Verification Stand. 2  
*Matrix H<sub>2</sub>O***

Element	Conc.(ug/mL)
B	10
Mo	10
S	10
Si	10
Ti	10
W	10

**Part # 52101**

**\$60/100 mL**

**Part # 53101**

**\$120/500 mL**

**ICP-MS Verification Set**

Includes one each of ICP-MS  
Verification 1 and 2.

**Part # 52102**

**\$220/100 mL**

**Part # 52302**

**\$440/500 mL**

METHOD

**200.8**

## MULTI-ELEMENT SOLUTION INTERFERENCE CHECK SOLUTIONS

### ICP-MS Interference Check Solution A 12 Components

*Matrix in 2%-HNO<sub>3</sub>/ tr. HF*

Element	Conc.(ug/mL)
Al	500
Ca	500
Fe	500
Mg	500
Na	500
P	500
K	500
S	500
C	1000
Cl	3600
Mo	10
Ti	10

**Part # 52114      \$100/100 mL**

**Part # 53114      \$450/500 mL**

### ICP-MS Interference Check Solution B 11 Components

*Matrix in 2%-HNO<sub>3</sub>/ tr. HF*

Element	Conc.(ug/mL)
As	0.100
Cd	0.050
Cr	0.100
Co	0.200
Cu	0.100
Ni	0.200
Mn	0.100
Se	0.100
Ag	0.100
V	0.200
Zn	0.100

**Part # 52115      \$100/100 mL**

**Part # 53115      \$450/500 mL**

**MULTI-ELEMENT SOLUTIONS /  
MEMORY CHECK SOLUTIONS**


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 METHOD  
**200.8**


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**Memory Check Solutions**

Method 6020 CLP-M requires that a memory test be performed after calibration of the ICP-MS and before performing any analysis. Combine mixes A and B in equal ratios. This test will determine any memory problems that will affect the quality of the data.

**ICP-MS Memory Check  
Solution A**
**14 Components**
*Matrix in 2%-HNO<sub>3</sub>/ tr. HF*

Element	Conc.(ug/mL)
Al	1000
Mg	1000
Na	1000
C	2000
Cl	7200
S	1000
Ti	20
Sb	20
Be	20
Cr	20
Mn	20
Ni	20
V	20
Zn	20

**Part # 52116      \$100/100 mL**  
**Part # 53116      \$450/500 mL**

**ICP-MS Memory Check  
Solution B**
**14 Components**
*Matrix in 2%-HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ca	1000
Fe	1000
K	1000
P	1000
Mo	20
As	20
Ba	20
Cd	20
Co	20
Cu	20
Pb	20
Se	20
Ag	20
Tl	20

**Part # 52117      \$100/100 mL**  
**Part # 53117      \$450/500 mL**

ICP-MS

MULTI-ELEMENT  
SOLUTION STANDARDS

**Multi-Element Solution 1**  
**29 Components**  
*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ag	10
Al	10
As	10
Ba	10
Be	10
Bi	10
Ca	10
Cd	10
Co	10
Cr	10
Cs	10
Cu	10
Fe	10
Ga	10
In	10
K	10
Li	10
Mg	10
Mn	10
Na	10
Ni	10
Pb	10
Rb	10
Se	10
Sr	10
Tl	10
U	10
V	10
Zn	10

**Multi-Element Solution 2**  
**17 Components**  
*Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ce	10
Dy	10
Er	10
Eu	10
Gd	10
Ho	10
La	10
Lu	10
Nd	10
Pr	10
Sc	10
Sm	10
Tb	10
Th	10
Tm	10
Y	10
Yb	10

**Part # 52134      \$200/100 mL**  
**Part # 53134      \$400/500 mL**

**Part # 52133      \$180/100 mL**  
**Part # 53133      \$360/500 mL**

## MULTI-ELEMENT SOLUTION STANDARDS

## ICP-MS

### Multi-Element Solution 3 10 Components

*Matrix 10% HCL / 1% HNO3.*

Element	Conc.(ug/mL)
Au	10
Hf	10
Ir	10
Pd	10
Pt	10
Rh	10
Ru	10
Sb	10
Sn	10
Te	10

**Part # 52135      \$250/100 mL**

**Part # 53135      \$500/500 mL**

### Multi-Element Solution 4 12 Components

*Matrix H2O tr. HF*

Element	Conc.(ug/mL)
B	10
Ge	10
Mo	10
Nb	10
P	10
Re	10
S	10
Si	10
Ta	10
Ti	10
W	10
Zr	10

**Part # 52136      \$150/100 mL**

**Part # 53136      \$300/500 mL**

### Multi-Element Solution 5 1 Component

*Matrix 2% HNO3.*

Element	Conc.(ug/mL)
Hg	10

**Part # 57880      \$25/100 mL**

**Part # 58880      \$50/500 mL**

### ICP-MS Solution Kit

Includes one each of  
Multi-Element 1, 2, 3, 4, & 5.

**Part # 52137      \$650/5X100 mL**

**Part # 53137      \$1300/5X500 mL**

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 METHOD  
**200.9**


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**DETERMINATION OF TRACE  
 ELEMENTS BY STABILIZED  
 TEMPERATURE  
 GRAPHITE FURNACE AA**

**Method 200.9**  
**Complete Single Element Kit**  
**(16 x 100ml bottles @ 1000ug/mL Each)**

Element		Matrix
Aluminum	Al	Al(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Antimony	Sb	Sb <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub> tr.Tartaric acid
Arsenic	As	As <sub>2</sub> O <sub>3</sub> /HNO <sub>3</sub>
Beryllium	Be	Be <sub>4</sub> O(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>6</sub> /HNO <sub>3</sub>
Cadmium	Cd	Cd(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Chromium	Cr	Cr(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Cobalt	Co	Co(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Copper	Cu	Cu(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Iron	Fe	Fe(NO <sub>3</sub> ) <sub>3</sub> /HNO <sub>3</sub>
Lead	Pb	Pb(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Manganese	Mn	Mn(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Nickel	Ni	Ni(NO <sub>3</sub> ) <sub>2</sub> /HNO <sub>3</sub>
Selenium	Se	SeO <sub>2</sub> /HNO <sub>3</sub>
Silver	Ag	AgNO <sub>3</sub> /HNO <sub>3</sub>
Thallium	Tl	TlNO <sub>3</sub> /HNO <sub>3</sub>
Tin	Sn	(NH <sub>4</sub> )SnF <sub>6</sub> /HNO <sub>3</sub> /HCL

**Part # 52252    \$280/ 16 x 100 mL**

**Palladium and Magnesium Nitrate Modifier**

Starting Material Pd & Mg(NO<sub>3</sub>)<sub>2</sub>

*Matrix 0.3%(3 mg/mL) Pd & 0.2%(2 mg/mL) Mg in 5% HNO<sub>3</sub>*

**Part # 52311    \$250/100mL**

**Part # 53311    \$450/500mL**

## METALS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPECTROSCOPY AND ATOMIC ABSORPTION SPECTROSCOPY

METHOD  
**1620**

The method is a consolidation of US EPA Methods 200.7 (ICP for trace elements), 204.2 (Sb), 206.2 (As), 239.2 (Pb), 270.2 (Se), 279.2 (Tl), 245.5 (Hg), 245.1 (Hg), and 245.2(Hg). The method is used for analysis of trace elements by ICP atomic emission spectroscopy and GFAA spectroscopy, for analysis of mercury by CVAA spectroscopy, and as a semi-quantitative ICP screen for specified elements.

### EPA 1620 Standard 1

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Mn	100
Be	100
Cd	100
Pb	100
Zn	100

**Part # 52139**      **\$60/100 mL**  
**Part # 53139**      **\$120/500 mL**

### EPA 1620 Standard 4

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ca	100
Na	100
Al	100
Cr	100
Ni	100

**Part # 52142**      **\$60/100 mL**  
**Part # 53142**      **\$120/500 mL**

### EPA 1620 Standard 2

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ba	100
Cu	100
Fe	100
V	100
Y	100
Co	100

**Part # 52140**      **\$60/100 mL**  
**Part # 53140**      **\$120/500 mL**

### EPA 1620 Standard 5

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	100
B	100
Mg	100
Ag	100
Tl	100
Ti	100

**Part # 52143**      **\$60/100 mL**  
**Part # 53143**      **\$120/500 mL**

### EPA 1620 Standard 3

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Mo	100
As	100
Se	100

**Part # 52141**      **\$50/100 mL**  
**Part # 53141**      **\$100/500 mL**

### Tin

### EPA 1620 Standard 6

*Matrix 2% HNO<sub>3</sub>/ 6% HCL*

Element	Conc.(ug/mL)
Sn	100

**Part # 57250**      **\$20/100 mL**  
**Part # 58250**      **\$50/500 mL**

METHOD

**1636****DETERMINATION OF HEXAVALENT  
CHROMIUM BY ION  
CHROMATOGRAPHY**

This method is for the determination of dissolved hexavalent chromium (as CrO) in ambient waters at EPA water quality criteria (WQC) levels using ion chromatography (IC). This method was developed by integrating the analytical procedures in EPA Method 218.6 with the quality control (QC) and sample handling procedures necessary to avoid contamination and ensure the validity of analytical results during sampling and analysis for metals at EPA WQC levels.

**Hexavalent Chromium (Cr<sup>6+</sup>)***1000 ug/mL in Water*

**Part # 54161      \$20/100 mL**  
**Part # 54172      \$50/500 mL**

**Hexavalent Chromium (Cr<sup>6+</sup>)***10 mg/mL in Water*

**Part # 54175      \$75/100 mL**  
**Part # 54176      \$150/500 mL**

**PT Study Schedule:****January 15- March 1****April 15- May 30****\* July 15- August 29 (DMR-QA)****October 15- November 29**

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**DETERMINATION OF TRACE  
ELEMENTS IN AMBIENT WATERS BY  
INDUCTIVELY COUPLED PLASMA —  
MASS SPECTROMETRY**

METHOD

**1638**

This method is for the determination of dissolved elements in ambient waters at EPA water quality criteria (WQC) levels using inductively coupled plasma-mass spectrometry (ICP-MS). It may also be used for determination of total recoverable element concentrations in these waters.

**Method 1638 Mix A***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sb	10
Cd	10
Cu	10
Pb	10
Ni	10
Se	10
Tl	10
Zn	10

**Part # 52144      \$60/100 mL**  
**Part # 53144      \$120/500 mL**

**Silver (Ag)****Method 1638/1640 Mix B***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ag	20

**Part # 57847      \$20/100 mL**  
**Part # 58847      \$50/500 mL**

**Internal Standard***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sc	10
Y	10
In	10
Tb	10
Bi	10

**Part # 52145      \$60/100 mL**  
**Part # 53145      \$120/500 mL**

**ICP-MS Tuning Std. 1***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Be	10
Co	10
In	10
Pb	10
Mg	10

**Part # 52122      \$50/100 mL**  
**Part # 53122      \$200/500 mL**

METHOD

**1640**

**DETERMINATION OF TRACE  
ELEMENTS IN AMBIENT WATERS BY  
ON-LINE CHELATION  
PRECONCENTRATION ICP-MS**

This method is for the determination of dissolved elements in ambient waters at EPA water quality criteria (WQC) levels using on-line chelation preconcentration and inductively coupled plasma-mass spectrometry (ICP-MS). It may also be used for determination of total recoverable element concentrations in these waters.

**Method 1640 Mix A***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
As	10
Cd	10
Cu	10
Pb	10
Ni	10
Zn	10

**Part # 52146      \$50/100 mL****Part # 53146      \$100/500 mL****Silver (Ag)****Method 1638/1640 Mix B***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ag	20

**Part # 57847      \$20/100 mL****Part # 58847      \$50/500 mL****Internal Standard***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Sc	10
Y	10
In	10
Tb	10
Bi	10

**Part # 52145      \$60/100 mL****Part # 53145      \$120/500 mL****Method 1640 Tuning Std.***Matrix 2% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Ni	10
Y	10
In	10
Tb	10
Pb	10

**Part # 52147      \$50/100 mL****Part # 53147      \$100/500 mL**

**N-HEXANE EXTRACTABLE MATERIAL (HEM; OIL AND GREASE) AND SILICA GEL TREATED N-HEXANE EXTRACTABLE MATERIAL BY EXTRACTION AND GRAVIMETRY**

METHOD

**1664**

As a party to the Montreal Protocol on Substances that Deplete the Ozone Layer and as required by law under the Clean Air Act Amendments of 1990 (CAAA), the United States is committed to controlling and eventually phasing out the use of chlorofluorocarbons (CFCs). In support of these efforts, Method 1664 was developed by the United States Environmental Protection Agency Office of Science and Technology to replace previously used gravimetric procedures that employed Freon-113, a Class I CFC, as the extraction solvent for the determination of oil and grease and non-polar material.

This method is for determination of n-hexane extractable material (HEM; oil and grease) and n-hexane extractable material that is not adsorbed by silica gel (SGT-HEM; non-polar material) in surface and saline waters and industrial and domestic aqueous wastes. Extractable materials that may be determined are relatively non-volatile hydrocarbons, vegetable oils, animal fats, waxes, soaps, greases, and related materials. The method is based on prior Environmental Protection Agency (EPA) methods for determination of "oil and grease" and "total petroleum hydrocarbons"

**EPA Method 1664  
(Oil & Grease)**

*8000 (ug/mL) in Acetone*

- (1) n-Hexadecane
- (2) Stearic acid

**Part # 91958      \$65/100mL**

## METHOD

**600/4-79-020****MULTI-ELEMENT SOLUTION  
STANDARDS FOR  
GROUNDWATER AND WASTEWATER****GROUNDWATER AND WASTEWATER STANDARDS**

These may be used either as standards or as a means of checking an individual analyst's accuracy and precision. Refer to the US EPA Methods Manual, 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes" for the appropriate Trace Metals I, II, III procedures.

**Trace Metals Set**

Includes one each of  
Trace Metals 1, 2, and 3.

**Part # 52091      \$240/100 mL****Part # 53091      \$480/500 mL****Trace Metals 1***Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	500
As	100
Be	100
Cd	25
Cr	100
Co	100
Cu	100
Fe	100
Pb	100
Mn	100
Hg	5
Ni	100
Se	25
V	250
Zn	100

**Part # 52092      \$130/100 mL****Part # 53092      \$260/500 mL****Trace Metals 2***Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Sb	20
Ag	10
Tl	20

**Part # 52093      \$50/100 mL****Part # 53093      \$100/500 mL****Trace Metals 3***Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ba	500
Ca	500
Mg	100
Mo	500
K	100
Na	500

**Part # 52094      \$75/100 mL****Part # 53094      \$150/500 mL**

## MULTI-ELEMENT SOLUTION STANDARDS FOR TOXIC METALS IN FISH

METHOD

**600/4-79-020**

### ALTERNATE WATER & WASTEWATER STANDARDS

#### Alternate Metals Set

Includes one each of  
Alternate Metals 1 and 2.

**Part # 52095      \$120/100 mL**  
**Part # 53095      \$240/500 mL**

#### Alternate Metals 2

*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Ca	500
Mg	100
K	100
Na	500

**Part # 52097      \$90/100 mL**  
**Part # 53097      \$180/500 mL**

#### Alternate Metals 1

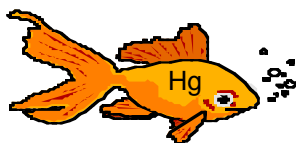
*Matrix 2% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
Al	20
Sb	5
Be	5
Co	10
Cu	10
Fe	20
Mn	10
Ni	10
Tl	5
V	20
Zn	10

**Part # 52096      \$60/100 mL**  
**Part # 53096      \$120/500 mL**

### TRACE METALS IN FISH

For use in methods for the sampling and analysis of priority pollutants in sediments and fish tissue. Refer to the US EPA Methods Manuals, 600/4-79-020 and 600/4-81-055 for the appropriate procedures.



#### Trace Metals in Fish

*Matrix 5% HNO<sub>3</sub>.*

Element	Conc.(ug/mL)
As	100
Cd	5
Cr	20
Cu	50
Pb	10
Hg	100
Ni	2
Se	10
Zn	1000

**Part # 52098      \$90/100 mL**  
**Part # 53098      \$180/500 mL**

**MISC.****MISCELLANEOUS METAL  
STANDARDS****Misc. Spike Solution #1***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
Co	1000
Sr	1000
Al	1000
Ba	1000
Cd	1000
Cr	1000
Cu	1000
Se	1000
V	1000
Be	1000
As	1000

**Part # 59045      \$250/100 mL****Misc. Spike Solution #2***Matrix 5% HNO<sub>3</sub>*

Element	Conc.(ug/mL)
B	1000
Fe	1000
Pb	1000
Mn	1000
Mo	1000
Ni	1000
Tl	1000
Zn	1000
Ag	200
Sb	1000

**Part # 59046      \$250/100 mL****Spike Solution Set**Includes one each of Solution  
#1 & #2.**Part # 52259      \$400/100 mL**

**MISCELLANEOUS METAL STANDARDS**

**MISC.**

**Metals Mix**

*Matrix 2% HNO<sub>3</sub>*

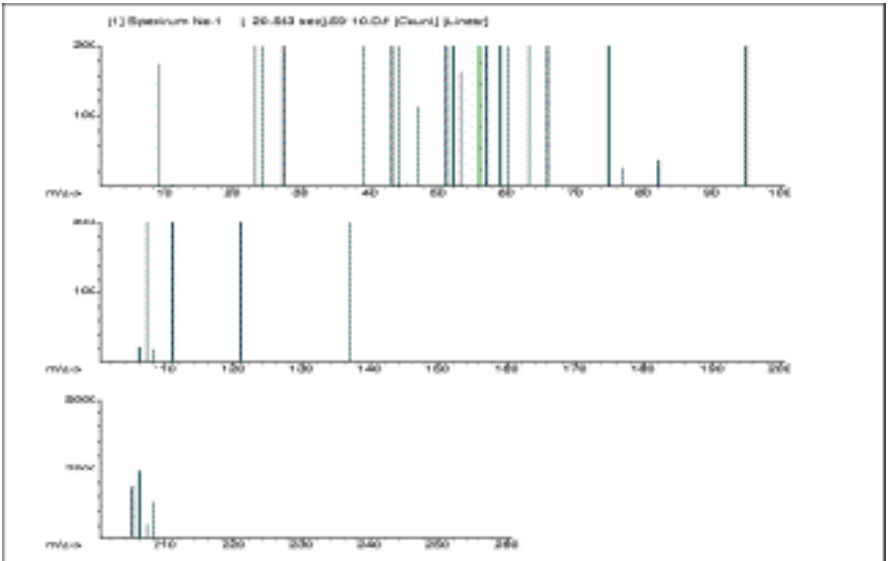
Element	Conc.(ug/mL)	Element	Conc.(ug/mL)
Fe	1000	Cr	10
K	1000	Cu	10
Ca	1000	Mn	10
Na	1000	Mo	10
Mg	1000	Ni	10
Ag	10	Pb	10
Al	10	Sb	10
As	10	Se	10
Ba	10	Tl	10
Be	10	V	10
Cd	10	Zn	10
Co	10	Ti	10

**Part # 59110**

**\$195/100 mL**

**Part # 59153**

**\$500/500 mL**



METHOD

**300.0****DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY****EPA Method 300.0 Anions  
Single Components***1000 ug/mL in Water.*

<b>Calibration Mixes</b>	<b>Part#</b>	<b>100 mL</b>	<b>Part#</b>	<b>500mL</b>
Chloride	54101	\$20	54501	\$90
Fluoride	54102	\$20	54502	\$90
Nitrate as N	54103	\$20	54503	\$50
Nitrite as N	54104	\$20	54504	\$50
Ortho-phosphate as P	54105	\$20	54505	\$90
Sulfate	54106	\$20	54506	\$90
Bromide	54107	\$20	54507	\$90
Bromate	54108	\$20	54508	\$90
Chlorite	54109	\$20	54509	\$90
Chlorate	54110	\$20	54510	\$90

**Complete set of all 10 solutions**

**Part # 54000      \$150/100 mL**  
**Part # 54500      \$750/500 mL**

**Sodium Carbonate****Eluent 100 x Concentrate***0.5 M in Water.*

**Part # 54127      \$25/100 mL**  
**Part # 54527      \$100/500 mL**

**Sodium Bicarbonate****Eluent 100 x Concentrate***0.5 M in Water.*

**Part # 54128      \$25/100 mL**  
**Part # 54528      \$100/500 mL**

**EPA Method 300.0 Eluent 100 x Concentrate***Varied Molarity in Water. 100 mL*

- (1) Sodium carbonate      0.18 M
- (2) Sodium bicarbonate    0.17 M

**Part # 54129      \$25/100 mL**  
**Part # 54529      \$100/500 mL**

## DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY

METHOD  
**300.0**

A small volume of sample, typically 2 to 3 mL, is introduced into an ion chromatograph. The anions of interest are separated and measured, using a system comprised of a guard column, separator column, suppressor device, and conductivity detector. The main differences between Method A and B are the separator columns, guard columns and eluents. In order to use this method for solids, an extraction procedure must be performed. Stability of the solutions must be closely monitored. Store the materials at 4°C.

### EPA Method 300.0 Anions Mix A

*1000 ug/mL in Water.*

- (1) Bromide
- (2) Chloride
- (3) Fluoride
- (4) Nitrate as N
- (5) Nitrite as N
- (6) Ortho-phosphate as P
- (7) Sulfate

**Part # 52118      \$50/100 mL**  
**Part # 53118      \$200/500 mL**

### EPA Method 300.0 Anions Mix A Alternate

*1000 ug/mL in Water.*

- (1) Bromide
- (2) Chloride
- (3) Fluoride
- (4) Nitrate as N
- (5) Ortho-phosphate as P
- (6) Sulfate

**Part # 52320      \$50/100 mL**  
**Part # 53320      \$200/500 mL**

### EPA Method 300.0 Anions Mix B

*1000 ug/mL in Water.*

- (1) Chlorite
- (2) Chlorate
- (3) Bromate

**Part # 52119      \$25/100 mL**  
**Part # 53119      \$100/500 mL**

METHOD  
**300.0**

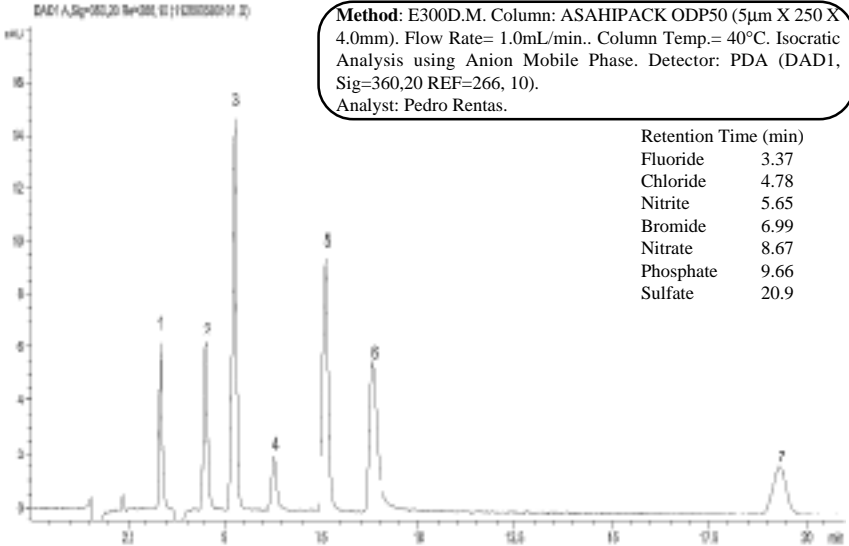
**DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY**

**EPA Method 300.0 Anions  
MIX A**

*Varied ug/mL in Water.*

(1) Bromide	20
(2) Chloride	20
(3) Fluoride	10
(4) Nitrate as N	20
(5) Nitrite as N	20
(6) Ortho-phosphate as P	30
(7) Sulfate	30

**Part # 59010      \$50/100 mL**  
**Part # 59095      \$200/500 mL**



**DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY**

METHOD

**300.0**

**EPA Method 300.0 Anions**

*Varied ug/mL in Water.*

(1) Bromide	200
(2) Chloride	200
(3) Fluoride	100
(4) Nitrate as N	200
(5) Nitrite as N	200
(6) Ortho-phosphate as P	300
(7) Sulfate	300

**Part # 59011      \$100/100 mL**

**Part # 59096      \$200/500 mL**

**Sulphide**

*1000 ug/mL in Water.*

**Part # 54139      \$30/100 mL**

**Part # 54163      \$100/500 mL**

**Chloride (Cl)**

**From CaCl<sub>2</sub>**

*1000 ug/mL in Water.*

**Part # 54155      \$20/100 mL**

METHOD

**300.0****DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY****INORGANIC DISINFECTION BY-PRODUCTS****Inorganic Chlorinated Disinfection  
By-Products***1000 ug/mL in Water.*

- (1) Chlorate ( $\text{ClO}_3^-$ )
- (2) Chlorite ( $\text{ClO}_2^-$ )

**Part # 52105      \$35/100 mL****Part # 53105      \$95/500 mL****Inorganic Brominated Disinfection  
By-Products***1000 ug/mL in Water.*

- (1) Bromate ( $\text{BrO}_3^-$ )
- (2) Bromide ( $\text{Br}^-$ )

**Part # 52106      \$35/100 mL****Part # 53106      \$95/500 mL****Anions***100 ug/mL in Water.*

- (1) Nitrate ( $\text{NO}_3^-$ )-as N
- (2) Nitrite ( $\text{NO}_2^-$ )-as N
- (3) Fluoride ( $\text{F}^-$ )
- (4) Orthophosphate ( $\text{PO}_4^{3-}$ )-as P

**Part # 52107      \$50/100 mL****Part # 53107      \$150/500 mL**

**DETERMINATION OF INORGANIC  
CATIONS BY ION  
CHROMATOGRAPHY**

METHOD  
**300.0**

**Ohio Monthly QC Calibration Check**

*Varied ug/mL in Water.*

Fluoride

**Part # 59076     \$25/100 mL**

**Part # 59176     \$60/500 mL**

**Inorganic Cations  
Ion Chromatography**

**Single Components**

*1000 ug/mL - \$20 /100 mL*

54112	Ammonium, NH <sub>4</sub> <sup>+</sup>	in Water.
54113	Ammonium as N	in Water.
57056	Barium, Ba <sup>2+</sup>	in 2% HNO <sub>3</sub> .
57020	Calcium, Ca <sup>2+</sup>	in 2% HNO <sub>3</sub> .
57003	Lithium, Li <sup>+</sup>	in 2% HNO <sub>3</sub> .
57012	Magnesium, Mg <sup>2+</sup>	in 2% HNO <sub>3</sub> .
57019	Potassium, K <sup>+</sup>	in 2% HNO <sub>3</sub> .
57011	Sodium, Na <sup>+</sup>	in 2% HNO <sub>3</sub> .
57038	Strontium, Sr <sup>2+</sup>	in 2% HNO <sub>3</sub> .

**Complete set of all 9 solutions,  
use Part # 54001 \$130  
SAVE \$50.**

**Additional Inorganic Cations  
Ion Chromatography**

**Single Components**

*1000 ug/mL - \$20/ 100 mL*

54154	Calcium (Ca <sup>2+</sup> )	in Water.
54157	Magnesium, (Mg <sup>2+</sup> )	in Water.
54158	Potassium, (K <sup>+</sup> )	in Water.
54149	Sodium, (Na <sup>+</sup> )	in Water.

METHOD  
**314.0/  
314.1**

## DETERMINATION OF PERCHLORATE BY ION CHROMATOGRAPHY

Method 314.0 was developed for the determination of perchlorate in drinking water by ion chromatography coupled with suppressed conductivity detection.

Method 314.1 employs the use of inline column concentration/matrix elimination ion chromatography coupled with suppressed conductivity detection for the determination of perchlorate in drinking water.

### Method 314 Calibration

*1000 ug/mL in Water*

Sodium Perchlorate ( $\text{NaClO}_4^-$ )

**Part # 57001 \$35/100 mL**

**Part # 54164 \$150/500 mL**

*100 ug/mL in Water*

Sodium Perchlorate ( $\text{NaClO}_4^-$ )

**Part # 59344 \$35/100 mL**

### Laboratory Synthetic Sample Matrix Blank (pH 8.6)

*1000 ug/mL in Water*

- (1) Bicarbonate ( $\text{HCO}_3^-$ )
- (2) Chloride ( $\text{Cl}^-$ )
- (3) Sulfate ( $\text{SO}_4^{2-}$ )

**Part # 54205 \$50/100 mL**

### Laboratory Synthetic Sample Matrix Blank (pH 10)

*25 mg/mL in Water*

- (1) Carbonate ( $\text{CO}_3^{2-}$ )
- (2) Chloride ( $\text{Cl}^-$ )
- (3) Sulfate ( $\text{SO}_4^{2-}$ )

**Part # 59206 \$60/100 mL**

**DETERMINATION OF PERCHLORATE  
BY ION CHROMATOGRAPHY / MASS  
SPECTROSCOPY & NaCl <sup>18</sup>O<sub>4</sub><sup>-</sup> AS AN  
INTERNAL STANDARD**

METHOD  
**332.0**  
*Rev 1.0*

Method 332.0 was developed for the determination of low levels of perchlorate in drinking water by ion chromatography coupled with suppressed conductivity and electrospray ionization mass spectroscopy. To improve the accuracy and performance of this method, <sup>18</sup>-Oxygen enriched perchlorate is utilized as an internal standard.

**Method 332.0 Calibration**

*1000 ug/mL in Water*

Sodium Perchlorate (NaClO<sub>4</sub><sup>-</sup>)

**Part # 57001 \$35/100 mL**

**Part # 54164 \$150/500 mL**

*100 ug/mL in Water.*

Sodium Perchlorate (NaClO<sub>4</sub><sup>-</sup>)

**Part # 59344 \$35/100 mL**

**Method 332.0 Calibration  
Internal Standard**

*1 ug/mL in Water*

Sodium Perchlorate(<sup>18</sup>O) -(NaCl <sup>18</sup>O<sub>4</sub><sup>-</sup>)

**Part # 54022 \$30/ 1 mL**

**Laboratory Synthetic  
Sample Matrix Blank (pH 10)**

*25 mg/mL in Water*

- (1) Carbonate (CO<sub>3</sub><sup>2-</sup>)
- (2) Chloride (Cl<sup>-</sup>)
- (3) Sulfate (SO<sub>4</sub><sup>2-</sup>)

**Part # 59206 \$60/100 mL**

METHOD  
**353.2**

**DETERMINATION OF NITRATE-  
NITRITE NITROGEN BY  
AUTOMATED COLORIMETRY**

This method covers the determination of nitrite singly, or nitrite and nitrate combined in drinking, ground, and surface waters, and domestic and industrial wastes. Stability of the solution must be closely monitored. Detection is by colorimetry. Typical stability is only 1 month. Store the materials at 4°C.

**EPA Method 353.2 Anions Mix**

*1000 ug/mL in Water.*

- (1) Nitrate as N
- (2) Nitrite as N

**Part # 52120      \$20/100 mL**  
**Part # 53120      \$100/500 mL**

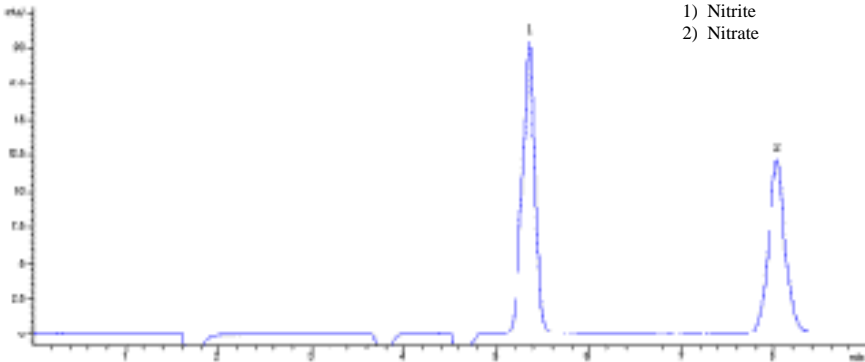
**EPA Method 353.2 Anions Mix**

*Varied ug/mL in Water.*

- (1) Nitrate as N      1000
- (2) Nitrite as N      500

**Part # 54162      \$20/100 mL**  
**Part # 54521      \$100/500 mL**

**Method:** E300D.M. Column: ASAHIPACK ODP50 (5µm X 250 X 4.0mm). Flow Rate= 1.0mL/min.. Column Temp.= 40°C. Isocratic Analysis using Anion Mobile Phase. Detector: PDA (DAD1, Sig=360,20 REF=266, 10).  
Analyst: Pedro Rentas.



**MISCELLANEOUS  
ORGANIC ACIDS / WET CHEMICAL  
CALIBRATION STANDARDS**

METHOD

**Misc.****Acetic Acid (Acetate)***1000 ug/mL in Water.***Part # 54116     \$35/100 mL****Part # 54516     \$150/500 mL****Formic Acid (Formate)***1000 ug/mL in Water.***Part # 54117     \$35/100 mL****Part # 54517     \$150/500 mL****Oxalic Acid (Oxalate)***1000 ug/mL in Water.***Part # 54196     \$35/100 mL****Part # 54596     \$150/500 mL****Organic Acids Mix***1000 ug/mL in Water.*

- (1) Acetic acid
- (2) Formic acid
- (3) Methoxyacetic acid
- (4) Oxalic acid

**Part # 59294     \$350/500 mL****Tetramethyl Ammonium Hydroxide***1000 ug/mL in Water.***Part # 54118     \$35/100 mL****Part # 54518     \$150/500 mL****Total Organic Carbon (TOC)  
& Sulphate***1000 ug/mL in Water.***Part # 54148     \$20/100 mL****Organic Nutrients**

TKN as N, Total Phosphorus as P

*1000 ug/mL in Water***Part # 54152     \$20/100 mL****Inorganic Nutrients**NH<sub>4</sub> as N, NO<sub>3</sub> as N, PO<sub>4</sub> as P*1000 ug/mL in Water***Part # 54153     \$20/100 mL**

METHOD

**Misc.**

**WET CHEMICAL CALIBRATION  
MISCELLANEOUS EPA & STANDARD  
METHODS**

The following section contains several Wet Chemical Reference Materials that can be used as quality control checks or to generate calibration curves. A few popular EPA/SW-846 and Standard Methods are depicted for easy reference. Absolute Standards, Inc. has also generated a completely searchable web-based index of EPA analytes and methods. Please see our web site:

**WWW.AbsoluteStandards.com**

<b>TEST PARAMETER</b>	<b>EPA/ SW-846 STD. METH.</b>	
<b>Conductance @ 25 °C</b> <i>1000 uMHOS/cm in Water.</i> <b>Part # 54131    \$20/100 mL</b>	<b>120.1 9050A</b>	<b>2510B</b>
<b>pH of 6</b> <i>in Water.</i> <b>Part # 54119    \$20/100 mL</b>	<b>150 (1-2) 9040B 9041A 9045C</b>	<b>4500-H<sup>+</sup>-B</b>
<b>Residual Free Chlorine</b> <i>1000 ug/mL in Water.</i> <b>Part # 54124    \$20/100 mL</b>	<b>330 (1-4)</b>	<b>4500-Cl (B-I)</b>
<b>Alkalinity as CaCO<sub>3</sub></b> <i>1000 ug/mL in Water.</i> <b>Part # 54142    \$20/100 mL</b> <b>Part # 54242    \$75/500 mL</b>	<b>310 (1-2)</b>	<b>2320B 2330C 4500-CO<sub>2</sub>-B,D</b>
<b>Color</b> <i>500 Color Units in 10% HCl/H<sub>2</sub>O.</i> Potassium Chloroplatinate Cobaltous Chloride hexahydrate <b>Part # 54255    \$250/100 mL</b>	<b>110.1 110.2 110.3</b>	<b>HACH 8025</b>

**WET CHEMICAL CALIBRATION  
MISCELLANEOUS EPA & STANDARD  
METHODS**

METHOD  
**Misc.**

<b>TEST PARAMETER</b>	<b>EPA/ SW-846 STD. METH.</b>	
<b>Turbidity</b> <i>400 NTU in Water.</i> <b>Part # 54122    \$20/20 mL</b>	180.1	2130B
<b>Phenolics (Total) 4AAP</b> <i>1000 ug/mL in Water.</i> <b>Part # 54136    \$25/100 mL</b>	420 (1-4) 9065 9066 9067	5530 (B-D)
<b>Hexavalent Chromium (Cr 6<sup>+</sup>)</b> <i>1000 ug/mL in Water.</i> <b>Part # 54161    \$20/100 mL</b> <b>Part # 54172    \$50/500 mL</b>	61 218, (4-6) 1636, 1669 3060A, 7195 7196A, 7197 7198, 7199	3500-Cr
<b>Oil &amp; Grease</b> <i>1000 ug/mL in n-Propanol/Glycerol.</i> <b>Part # 54135    \$25/100 mL</b>	413.1 413.2	
<b>Oil &amp; Grease (TPH)</b> <i>4130 ug/mL in Freon 113</i> Iso-octane Hexadecane Chlorobenzene <b>Part # 90416    \$25/1 mL</b>	418.1	
<b>Oil &amp; Grease</b> <i>8 mg/mL in Acetone.</i> <b>Part # 91958    \$65/100 mL</b>	1664 9070A	

METHOD

**Misc.**

**WET CHEMICAL CALIBRATION  
MISCELLANEOUS EPA & STANDARD  
METHODS**

<b>TEST PARAMETER</b>	<b>EPA/ SW-846 STD. METH.</b>	
<b>Calcium Hardness</b> <i>1000 ug/mL in 1% HCl.</i> <b>Part # 54143     \$20/100 mL</b>	130 (1-2)	2340 (B-C)
<b>Total Hardness</b> <i>1000 ug/mL in Water.</i> <b>Part # 54156     \$20/100 mL</b> <b>Part # 54597     \$90/500 mL</b>	130 (1-2)	2340 (B-C)
<b>Simple Cyanide as KCN</b> <i>1000 ug/mL in Water/NaOH.</i> <b>Part # 59017     \$20/100 mL</b>	335.1 9014 9213 OIA-16-77	4500-CN (D-F,I,K)
<b>Total Cyanide as Potassium Ferricyanide</b> <i>1000 ug/mL in Water/NaOH.</i> <b>Part # 54150     \$20/100 mL</b>	335 (2-4)	4500-CN (C-F)
<b>Simple &amp; Total Cyanide</b> <i>1000 ug/mL in Water/NaOH.</i> <b>Part # 54165     \$20/100 mL</b>	See Above	See Above
<b>Perchlorate</b> <i>1000 ug/mL in Water.</i> <b>Part # 57001     \$35/100 mL</b> <b>Part # 54164     \$150/500 mL</b>	9058	4110 (B-C)

**WET CHEMICAL CALIBRATION  
MISCELLANEOUS EPA & STANDARD  
METHODS**

METHOD  
**Misc.**

<b>TEST PARAMETER</b>	<b>EPA/ SW-846 STD. METH.</b>	
<b>MBAS</b> <i>1000 ug/mL in Water.</i> <b>Part # 54160    \$20/20 mL</b>	425.1	5540C
<b>UV 254 Absorbance/DOC as KHP</b> <i>100 ug/mL in Water.</i> <b>Part # 54166    \$20/100 mL</b>		5910B
<b>Non-Filterable Solids (TSS)</b> <i>100 mg Neat</i> <b>Part # 54134    \$20/ 100 mg</b>	160.2	2540D
<b>Total Dissolved Solids (TDS)</b> <i>1000 ug/mL in Water.</i> <b>Part # 54125    \$20/100 mL</b>	160.1	2540C
<b>Total Solids</b> <i>100 mg Neat</i> <b>Part # 54167    \$20/ 100 mg</b>	See Above	See Above
<b>Total Organic Halides (TOX) as 2,4,6-Trichlorophenol</b> <i>Cl @ 100 ug/mL</i> <b>Part # 54194 in Water    \$20/ 20 mL</b> <b>Part # 54243 in Methanol \$20/ 20 mL</b>	9020B 9022	5320B

METHOD

**Misc.**

**WET CHEMICAL CALIBRATION  
MISCELLANEOUS EPA & STANDARD  
METHODS**

<b>TEST PARAMETER</b>	<b>EPA/ SW-846 STD. METH.</b>	
<b>Total Kjeldahl Nitrogen from Glycine</b> <i>1000 ug/mL in Water</i> <b>Part # 54132 \$20/100 mL</b>	<b>351 (1-4)</b> <b>1687</b> <b>1688</b>	<b>4500-Norg (B-C)</b>
<b>Total Phosphorus as P</b> <i>1000 ug/mL in Water</i> <b>Part # 54133 \$20/100 mL</b>	<b>365 (2-4)</b>	<b>4500-P-E</b>
<b>Phosphate (PO<sub>4</sub><sup>3-</sup>) as P</b> <i>1000 ug/mL in Water</i> <b>Part # 54105 \$20/100 mL</b> <b>Part # 54505 \$90/500 mL</b>	<b>60</b> <b>300.0</b> <b>6010B</b> <b>7580</b>	<b>4110B,C</b> <b>4500-P (B-F)</b>
<b>Total Organic Carbon (TOC) from KHP</b> <i>1000 ug/mL in Water.</i> <b>Part # 59179 \$20/100 mL</b>	<b>415 (1-2)</b> <b>9060</b>	<b>5310 (B-D)</b>
<b>Total Organic Carbon (TOC) from Sucrose</b> <i>1000 ug/mL in 1% HCl/Water.</i> <b>Part # 54126 \$20/100 mL</b>	<b>415 (1-2)</b> <b>9060</b>	<b>5310 (B-D)</b>
<b>Silica (SiO<sub>2</sub>)</b> <i>1000 ug/mL in Water / tr. NaOH</i> <b>Part # 54159 \$20/100 mL</b> <b>Part # 54169 \$75/500 mL</b>	<b>200.7</b> <b>200.15</b> <b>370.1</b>	<b>4500-Si (B-G)</b>

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# CUSTOM STANDARD QUOTATION REQUEST FORM

Rev #: 1, Date Revised: 01/01/02 - Catalog.

**Photocopy at 125 % For Future Use**

**Fax To:** Page \_\_\_\_\_ of \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
(800) 410-2577, Technical Service Dept, Absolute Standards, Inc.

**From:**  
Company Contact: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Company Phone: \_\_\_\_\_

Company Fax/Email: \_\_\_\_\_

**Product Description:** \_\_\_\_\_

**Solvent:** \_\_\_\_\_

**Analysis Required - additional charge - (circle one):** yes no

**Date Required:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**Requested Quantity (circle one):** ORGANIC 5 x 1 mL 10 x 1 mL Other x mL

INORGANIC 1 x 100 mL 1 x 500 mL Other x mL

#	Component(s)	CAS # (optional)	Conc. (ug/mL)
(1)	_____	_____	_____
(2)	_____	_____	_____
(3)	_____	_____	_____
(4)	_____	_____	_____
(5)	_____	_____	_____
(6)	_____	_____	_____
(7)	_____	_____	_____
(8)	_____	_____	_____
(9)	_____	_____	_____
(10)	_____	_____	_____