HIGH-PURITY STANDARDS

CATALOG OF ANALYTICAL STANDARDS 2010

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ISO 9001:2008 CERTIFIED
ISO/IEC 17025:2005
ISO GUIDE 34

www.highpuritystandards.com

Welcome to the HPS 2010 Catalog

High-Purity Standards continues to grow and expand its product lines. We have added a new category of Bio-fuel calibration standards and we have expanded our industrial hygiene products and our multi-element solution product lines. The Certificates of Analysis for our single-element standards reflect the expansion of our quality system to include ISO Guide 34 compliance.

BIO-IC-CAL is a NIST-traceable anion standards for chloride and sulfate. BIO-IC-CAL is a 5-solution set designed to establish the calibration curve of varying concentrations plus a quality control check to meet ASTM D7328. These anions when present in ethanol biofuel present significant corrosion problems and can also clog fuel injectors. Limits have been set on the concentrations of these anions in ethanol for quality assurance as defined in ASTM D4806, and the concentration ranges provided by BIO-IC-CAL fulfill these requirements. These standards are in an aqueous matrix. Organic matrices are available upon request.

In 2009 as a part of our trace metals on filters line, we added beryllium oxide solids on filters. These standards are a result of our work with the Beryllium Health and Safety Committee and include two different sources of high-fired beryllium oxide, one being NIST SRM 1877. Our industrial hygiene standards come on nitrocellulose filters. With increased interest in PTFE, we have begun an expansion of our QC-TMFM to the PTFE filter. Please see page 17 of this catalog for more details.

As a manufacturer of certified reference materials, we determined that we needed to expand our quality system to be ISO Guide 34 compliant. The most apparent change is in our Certificates of Analysis for our single-element standards. We want our customers to have complete confidence in this cornerstone of our product-line.

Custom Designed Products: Over half of our business is devoted to manufacturing custom standards. With the president's 50 plus years of experience in the preparation of spectrometric standard solutions and solids, he or his staff will gladly discuss how we can best meet your needs. Custom products can be manufactured in aqueous or organic matrices. We custom manufacture metal solutions in basic matrices for use in mining applications. Our industrial hygiene standards include a variety of filter media, and both dissolved or solid inorganic components.

Packaging Options: Most of our solutions are offered in 100mL, 250mL and 500mL sizes. If you are interested in one of our products, but the size or packaging does not meet your need, we will gladly provide you a quotation. Pricing for 100 or smaller, 250, 500, and 1000 mL or larger solutions are available upon request. A variety of packaging options are available to accommodate your special requests. This includes packaging in smaller volumes to minimize contamination from multiple uses, minimize waste, or to avoid hazardous shipping.

Quality System: High-Purity Standards holds certificates for ISO Guide 9001:2008 and ISO/IEC 17025:2005. We anticipate receipt of ISO Guide 34 accreditation early in 2010. We welcome our customers comments on our products and services. We understand that customer satisfaction is the cornerstone of our quality program.

Website: This catalog is a representation of the HPS product line. Our web site, www.highpuritystandards.com, provides a complete and up-to-date listing of our catalog items. Visit our website to view our complete listing, see any new or reduced price products, or simply to contact us or give us feedback.

Theodore C. Rains, Ph.D.
President

Connie Rains Hayes
CEO

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More about High-Purity Standards...

High-Purity Standards, Inc. was founded in 1990 by Dr. Theodore Rains following his retirement from the National Institute of Standards and Technology (NIST). During his time at NIST, Dr. Rains developed many procedures now used at HPS. Today, High-Purity Standards serves the scientific community with standards and reference material for both organic and inorganic analyses.

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Ordering Information

Find this online @ highpuritystandards.com/oi

Placing an Order

There are four methods available for ordering:

By Internet	www.highpuritystandards.com (secure server)
By E-Mail	info@highpuritystandards.com
By Telephone	(866) 767-4771 Toll Free (8:00 A.M. – 5:30 P.M. E.S.T)
By Fax (24 hours)	(866) 767-4771 Toll Free
By Mail	P.O. Box 41727 Charleston, SC 29423

Pricing and Terms of Sale

Prices are quoted FOB Charleston, SC, USA and are subject to change without notice. High-Purity Standards accepts payment via credit card (VISA, MASTERCARD, AND AMERICAN EXPRESS) or purchase order. Invoices for purchase orders are marked 30 Days Net from date of invoice. If a written purchase order is to follow a telephone order, please clearly indicate on the hard copy **"Confirmation only. Do not duplicate order."**

Return Policy

We will accept any unopened catalog item returned for any reason within 30 days of purchase, and you will receive full credit. A restocking fee of 20% per item will be assessed for any item returned after 30 days. Any catalog item or custom mix can be returned for replacement if the item is found to be erroneous. ALL returns must be authorized. Please call (866) 767-4771 to receive a return authorization number (RA#).

Certificate of Analysis and Safety Sheets

Each product will include a Certificate of Analysis and a Material Safety Data Sheet. NIST traceability documentation is included in the Certificate of Analysis.

Shipping

Orders for catalog items are generally shipped the same day if the order is received before 2pm (ET). Shipment dates for custom blends are confirmed with the receipt of an order. Our standard method of shipment is ground service. Expedited delivery services are available. Shipping charges are prepaid and added to the invoice. Any additional charges incurred by hazardous shipping regulations and COD requests will be paid by the customer.

Laboratory Use

HPS products are intended for laboratory use only. They are not intended for medical, food, drug, or household use. All products should be handled and used by trained professional personnel only. The responsibility for the safe handling and use of these products rests solely with the buyer and/or user.

Custom Designed Blends

Find this online @ highpuritystandards.com/cdb

HPS welcomes requests for multielement special mixtures designed by our customers. With the president's 50 plus years of experience in the preparation of spectrometric standard solutions, he or his staff will gladly discuss with you the inter-element compatibility and stability of your designed mixture. Special mixtures can be prepared and certified within three to five days of receipt of the purchase order. The shipping date of your custom blend will be confirmed upon order.

Pricing for 100 or smaller, 250, 500, and 1000 mL or larger solutions are available upon request. A variety of packaging options are available to accommodate your special requests. In addition to aqueous solutions, mixes are available in a variety of oils and organic solvents as well as on filter media. High-Purity Standards has developed the technique of placing solids (metals, salts, oxides) or solution on a variety of filter matrices. These filters are suitable for monitoring air particles by X-ray or chemical dissolution and analyses. The catalog items listed on page 17 are an example of what can be placed on different filter media.

Contact us today to discuss your special mix needs.

Analytical Reagents

Acid Reagent Blanks

Catalog No.	Description	Volume
RB-HNO3-2	2% Nitric Acid Reagent Blank	500 mL
RB-HNO3-5	5% Nitric Acid Reagent Blank	500 mL
RB-HCl-2	2% Hydrochloric Acid Reagent Blank	500 mL
RB-HCl-5	5% Hydrochloric Acid Reagent Blank	500 mL
RB-H2O	High-Purity D.I. 18 megaohm Water	500 mL

High-Purity Subboiling Distilled Acids

All acids are bottled in Teflon FEP (fluorinated ethylene propylene) bottles. All acids must be shipped as hazardous and hazardous shipping charges will apply in addition to your regular shipping charges.

Catalog No.	Description	Volume
SB-HNO3-500	Nitric Acid	500 mL
SB-HNO3-1L	Nitric Acid	1000 mL
SB-HCl-500	Hydrochloric Acid	500 mL
SB-HCl-1L	Hydrochloric Acid	1000 mL

Single-Element Standards

Find this online @ highpuritystandards.com/ses

For the following standards, concentrations include both 1000 and 10.00 (10,000 µg/mL) in aqueous solution unless noted otherwise. The selection of single elements listed below are maintained in stock. Refer to page 7 for information on dilutions of these products. Most standards are packaged in 100, 250, and 500 mL HDPE or LDPE laboratory grade bottles. The density is provided on the Certificate of Analysis as additional information for the user.

The accuracy of all standards is verified against NIST Spectrometric Standard Solutions. A Certificate of Analysis and Material Safety Data Sheet are included with each standard. Standards are certified accurate for a period of 18 months from the date of shipment unless stated otherwise on the Certificate of Analysis.

Element	Source	Concentration	Matrix	Catalog No.	Concentration	Matrix	Catalog No.
Aluminum	Al metal	1000 µg/mL	2% HNO_3	**10001-1**	10 mg/mL	10% HNO_3	**10M1-1**
Aluminum	Al metal	1000 µg/mL	2% HCl	**10001-2**	10 mg/mL	10% HCl	**10M1-2**
Antimony	Sb metal	1000 µg/mL	20% HCl	**10002-2**	10 mg/mL	50% HCl	**10M2-2**
Antimony	Sb metal	1000 µg/mL	5% HNO_3 + 0.1% HF	**10002-3**	10 mg/mL	10% HNO_3 + 2% HF	**10M2-3**
Antimony	Sb metal as Sb^{+3}	1000 µg/mL	20% HCl	**10002-6**			
Antimony	Sb metal	1000 µg/mL	5% Tartaric Acid + 2% HNO_3	**10002-8**			
Arsenic	As metal	1000 µg/mL	2% HNO_3	**10003-1**	10 mg/mL	20% HNO_3	**10M3-1**
Arsenic	As metal	1000 µg/mL	2% HCl	**10003-2**	10 mg/mL	10% HCl	**10M3-2**
Arsenic	As_2O_3 as As^{+3}	1000 µg/mL	2% HCl	**10003-6**			
Arsenic	As_2O_3 as As^{+5}	1000 µg/mL	2% NaOH + Tr Br_2	**10003-7**			
Barium	$BaCO_3$	1000 µg/mL	2% HNO_3	**10004-1**	10 mg/mL	4% HNO_3	**10M4-1**
Barium	$BaCO_3$	1000 µg/mL	2% HCl	**10004-2**	10 mg/mL	5% HCl	**10M4-2**
Beryllium	Be acetate	1000 µg/mL	2% HNO_3	**10005-1**	10 mg/mL	4% HNO_3	**10M5-1**
Beryllium	Be acetate	1000 µg/mL	2% HCl	**10005-2**	10 mg/mL	10% HCl	**10M5-2**
Bismuth	Bi metal	1000 µg/mL	2% HNO_3	**10006-1**	10 mg/mL	4% HNO_3	**10M6-1**
Bismuth	Bi metal	1000 µg/mL	2% HCl	**10006-2**			
Boron	H_3BO_3	1000 µg/mL	H_2O	**10007-4**	5 mg/mL	H_2O	**5M7-4**
Boron					10 mg/mL	2% NH_4OH	**10M7-7**
Cadmium	Cd metal	1000 µg/mL	2% HNO_3	**10008-1**	10 mg/mL	4% HNO_3	**10M8-1**
Cadmium	Cd metal	1000 µg/mL	2% HCl	**10008-2**	10 mg/mL	10% HCl	**10M8-2**
Calcium	$CaCO_3$	1000 µg/mL	2% HNO_3	**10009-1**	10 mg/mL	4% HNO_3	**10M9-1**
Calcium	$CaCO_3$	1000 µg/mL	2% HCl	**10009-2**	10 mg/mL	5% HCl	**10M9-2**
Carbon	$Na_2C_2O_4$	1000 µg/mL	H_2O	**100071-4**			
Carbon as TOC	$KHC_8H_4O_4$	1000 µg/mL	H_2O	**100071-9**			
Cerium	CeO_2	1000 µg/mL	2% HNO_3	**100010-1**	10 mg/mL	4% HNO_3	**10M10-1**
Cerium	CeO_2	1000 µg/mL	2% HCl	**100010-2**	10 mg/mL	10% HCl	**10M10-2**
Cesium	Cs_2CO_3	1000 µg/mL	1% HNO_3	**100011-1**	10 mg/mL	1% HNO_3	**10M11-1**
Cesium	Cs_2CO_3	1000 µg/mL	1% HCl	**100011-2**	10 mg/mL	1% HCl	**10M11-2**
Chromium	Cr metal	1000 µg/mL	2% HNO_3	**100012-1**	10 mg/mL	10% HNO_3	**10M12-1**
Chromium	Cr metal	1000 µg/mL	2% HCl	**100012-2**	10 mg/mL	10% HCl	**10M12-2**
Chromium	Cr metal as Cr^{+3}	1000 µg/mL	2% HCl	**100012-6**			
Chromium	$K_2Cr_2O_7$ as Cr^{+6}	1000 µg/mL	H_2O	**100012-7**	10 mg/mL	H_2O	**10M12-7**
Cobalt	Co metal	1000 µg/mL	2% HNO_3	**100013-1**	10. mg/mL	4% HNO_3	**10M13-1**

These standards are sold in our standard 100, 250, and 500 mL sizes.

Single-Element Standards

Find this online @ highpuritystandards.com/ses

Element	Source	Concentration	Matrix	Catalog No.	Concentration	Matrix	Catalog No.
Cobalt	Co metal	1000 µg/mL	2% HCl	**100013-2**	10 mg/mL	10% HCl	**10M13-2**
Copper	Cu metal	1000 µg/mL	2% HNO_3	**100014-1**	10 mg/mL	4% HNO_3	**10M14-1**
Copper	Cu metal	1000 µg/mL	2% HCl	**100014-2**	10 mg/mL	10% HCl	**10M14-2**
Dysprosium	Dy_2O_3	1000 µg/mL	2% HNO_3	**100015-1**	10 mg/mL	4% HNO_3	**10M15-1**
Dysprosium	Dy_2O_3	1000 µg/mL	2% HCl	**100015-2**	10 mg/mL	4% HCl	**10M15-2**
Erbium	Er_2O_3	1000 µg/mL	2% HNO_3	**100016-1**	10 mg/mL	4% HNO_3	**10M16-1**
Europium	Eu_2O_3	1000 µg/mL	2% HNO_3	**100017-1**	10 mg/mL	4% HNO_3	**10M17-1**
Gadolinium	Gd_2O_3	1000 µg/mL	2% HNO_3	**100018-1**	10 mg/mL	4% HNO_3	**10M18-1**
Gadolinium	Gd_2O_3	1000 µg/mL	2% HCl	**100018-2**	10 mg/mL	4% HCl	**10M18-2**
Gallium	Ga metal	1000 µg/mL	2% HNO_3	**100019-1**	10 mg/mL	4% HNO_3	**10M19-1**
Gallium	Ga metal	1000 µg/mL	2% HCl	**100019-2**	10 mg/mL	10% HCl	**10M19-2**
Germanium	$(NH_4)_2GeF_6$	1000 µg/mL	1% HNO_3	**100020-1**	10 mg/mL	1% HNO_3	**10M20-1**
Germanium	Ge metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100020-3**	10 mg/mL	10% HNO_3 + 2% HF	**10M20-3**
Gold	Au metal	1000 µg/mL	2% HCl	**100021-2**	10 mg/mL	10% HCl	**10M21-2**
Hafnium	Hf metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100022-3**	10 mg/mL	4% HNO_3 + 2% HF	**10M22-3**
Holmium	Ho_2O_3	1000 µg/mL	2% HNO_3	**100023-1**	10 mg/mL	4% HNO_3	**10M23-1**
Holmium	Ho_2O_3	1000 µg/mL	2% HCl	**100023-2**	10 mg/mL	4% HCl	**10M23-2**
Indium	In metal	1000 µg/mL	2% HNO_3	**100024-1**	10 mg/mL	4% HNO_3	**10M24-1**
Indium	In metal	1000 µg/mL	2% HCl	**100024-2**	10 mg/mL	10% HCl	**10M24-2**
Iridium	Ir Salt	1000 µg/mL	2% HCl	**100025-2**			
Iron	Fe metal	1000 µg/mL	2% HNO_3	**100026-1**	10 mg/mL	10% HNO_3	**10M26-1**
Iron	Fe metal	1000 µg/mL	2% HCl	**100026-2**	10 mg/mL	10% HCl	**10M26-2**
Iron*	Fe metal as Fe^{+2}	1000 µg/mL	2% HCl + 1% Hydroxylamine Hydrochloride	**100026-6**			
Iron	Fe metal as Fe^{+3}	1000 µg/mL	2% HNO_3	**100026-7**			
Lanthanum	La_2O_3	1000 µg/mL	2% HNO_3	**100027-1**	10 mg/mL	4% HNO_3	**10M27-1**
Lanthanum	La_2O_3	1000 µg/mL	2% HCl	**100027-2**	10 mg/mL	2% HCl	**10M27-2**
Lead	Pb metal	1000 µg/mL	2% HNO_3	**100028-1**	10 mg/mL	4% HNO_3	**10M28-1**
Lead	Pb metal	1000 µg/mL	2% HCl	**100028-2**			
Lithium	Li_2CO_3	1000 µg/mL	1% HNO_3	**100029-1**	10 mg/mL	1% HNO_3	**10M29-1**
Lithium	Li_2CO_3	1000 µg/mL	1% HCl	**100029-2**	10 mg/mL	1% HCl	**10M29-2**
^{6}Lithium	$^6Li_2CO_3$	1000 µg/mL	1% HNO_3	**100029-6I**			
Lutetium	Lu_2O_3	1000 µg/mL	2% HNO_3	**100030-1**	10 mg/mL	4% HNO_3	**10M30-1**
Lutetium	Lu_2O_3	1000 µg/mL	2% HCl	**100030-2**	10 mg/mL	4% HCl	**10M30-2**
Magnesium	Mg metal	1000 µg/mL	2% HNO_3	**100031-1**	10 mg/mL	4% HNO_3	**10M31-1**
Magnesium	Mg metal	1000 µg/mL	2% HCl	**100031-2**	10 mg/mL	10% HCl	**10M31-2**
Manganese	Mn Acetate	1000 µg/mL	2% HNO_3	**100032-1**	10 mg/mL	4% HNO_3	**10M32-1**
Manganese	Mn Acetate	1000 µg/mL	2% HCl	**100032-2**	10 mg/mL	10% HCl	**10M32-2**
Mercury	Hg metal	1000 µg/mL	2% HNO_3	**100033-1**	10 mg/mL	10% HNO_3	**10M33-1**
Mercury	Diphenylmercury	1000 µg/mL	2% HNO_3	**100033-1D**			
Molybdenum	Mo metal	1000 µg/mL	2% HCl	**100034-2**	10 mg/mL	10% HCl	**10M34-2**
Molybdenum	Mo metal	1000 µg/mL	2% HNO_3 + 0.1% HF	**100034-3**	10 mg/mL	4% HNO_3 + 2% HF	**10M34-3**

NOTE: *100026-6 Fe^{+2} Exp Date: 3 Months

These standards are sold in our standard 100, 250, and 500 mL sizes.

Single-Element Standards

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Element	Source	Concentration	Matrix	Catalog No.	Concentration	Matrix	Catalog No.
Molybdenum	$(NH_4)_2MoO_4$	1000 µg/mL	H_2O	**100034-4**	10 mg/mL	H_2O	**10M34-4**
Neodymium	Nd_2O_3	1000 µg/mL	2% HNO_3	**100035-1**	10 mg/mL	4% HNO_3	**10M35-1**
Neodymim	Nd_2O_3	1000 µg/mL	2% HCl	**100035-2**	10 mg/mL	4% HCl	**10M35-2**
Nickel	Ni metal	1000 µg/mL	2% HNO_3	**100036-1**	10 mg/mL	4% HNO_3	**10M36-1**
Nickel	Ni metal	1000 µg/mL	2% HCl	**100036-2**	10 mg/mL	10% HCl	**10M36-2**
Niobium	Nb metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100037-3**	10 mg/mL	4% HNO_3 + 1% HF	**10M37-3**
Osmium	$(NH_4)_2OsCl_6$	1000 µg/mL	10% HCl	**100070-2**			
Palladium	Pd metal	1000 µg/mL	10% HNO_3 + Tr HCl	**100038-1**	10 mg/mL	10% HNO_3 + Tr HCl	**10M38-1**
Palladium	Pd metal	1000 µg/mL	5% HCl	**100038-2**	10 mg/mL	10% HCl	**10M38-2**
Phosphorus	$NH_4H_2PO_4$	1000 µg/mL	0.05% HNO_3	**100039-1**	10 mg/mL	0.05% HNO_3	**10M39-1**
Phosphorus	KH_2PO_4	1000 µg/mL	0.05% HNO_3	**100039-1K**	10 mg/mL	0.05% HNO_3	**10M39-1K**
Platinum	Pt metal	1000 µg/mL	5% HCl	**100040-2**	10 mg/mL	10% HCl	**10M40-2**
Potassium	KNO_3	1000 µg/mL	1% HNO_3	**100041-1**	10 mg/mL	1% HNO_3	**10M41-1**
Potassium	KCl	1000 µg/mL	1% HCl	**100041-2**	10 mg/mL	1% HCl	**10M41-2**
Praseodymium	Pr_6O_{11}	1000 µg/mL	2% HNO_3	**100042-1**	10 mg/mL	4% HNO_3	**10M42-1**
Praseodymium	Pr_6O_{11}	1000 µg/mL	2% HCl	**100042-2**	10 mg/mL	4% HCl	**10M42-2**
Rhenium	Re metal	1000 µg/mL	2% HNO_3	**100043-1**	10 mg/mL	4% HNO_3	**10M43-1**
Rhenium	Re metal	1000 µg/mL	2% HCl	**100043-2**			
Rhodium	$RhCl_3$	1000 µg/mL	10% HCl	**100044-2**	10 mg/mL	10% HCl	**10M44-2**
Rubidium	$RbNO_3$	1000 µg/mL	1% HNO_3	**100045-1**	10 mg/mL	1% HNO_3	**10M45-1**
Rubidium	Rb_2CO_3	1000 µg/mL	1% HCl	**100045-2**	10 mg/mL	1% HCl	**10M45-2**
Ruthenium	$(NH_4)_2RuCl_6$	1000 µg/mL	2% HCl	**100046-2**	10 mg/mL	5% HCl	**10M46-2**
Samarium	Sm_2O_3	1000 µg/mL	2% HNO_3	**100047-1**	10 mg/mL	4% HNO_3	**10M47-1**
Samarium	Sm_2O_3	1000 µg/mL	2% HCl	**100047-2**	10 mg/mL	4% HCl	**10M47-2**
Scandium	Sc_2O_3	1000 µg/mL	2% HNO_3	**100048-1**	10 mg/mL	4% HNO_3	**10M48-1**
Scandium	Sc_2O_3	1000 µg/mL	2% HCl	**100048-2**	10 mg/mL	10% HCl	**10M48-2**
Selenium	Se metal	1000 µg/mL	2% HNO_3	**100049-1**	10 mg/mL	10% HNO_3	**10M49-1**
Selenium	Se metal	1000 µg/mL	2% HCl	**100049-2**	10 mg/mL	10% HCl	**10M49-2**
Silicon	Na_2SiO_3	1000 µg/mL	H_2O	**100050-4**	10 mg/mL	H_2O	**10M50-4**
Silicon	$(NH_4)_2SiF_6$	1000 µg/mL	H_2O	**100050-4F**	10 mg/mL	H_2O	**10M50-4F**
Silver	Ag metal	1000 µg/mL	2% HNO_3	**100051-1**	10 mg/mL	4% HNO_3	**10M51-1**
Sodium	Na_2CO_3	1000 µg/mL	1% HNO_3	**100052-1**	10 mg/mL	1% HNO_3	**10M52-1**
Sodium	NaCl	1000 µg/mL	1% HCl	**100052-2**	10 mg/mL	1% HCl	**10M52-2**
Strontium	$Sr(NO_3)_2$	1000 µg/mL	1% HNO_3	**100053-1**	10 mg/mL	1% HNO_3	**10M53-1**
Strontium	$SrCO_3$	1000 µg/mL	2% HCl	**100053-2**	10 mg/mL	10% HCl	**10M53-2**
Sulfur	H_2SO_4	1000 µg/mL	H_2O	**100054-5**	10 mg/mL	H_2O	**10M54-5**
Tantalum	Ta metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100055-3**	10 mg/mL	5% HNO_3 + 2% HF	**10M55-3**
Tellurium	Te metal	1000 µg/mL	20% HCl	**100056-2**	10 mg/mL	40% HCl	**10M56-2**
Tellurium	Te metal	1000 µg/mL	2% HNO_3 + 0.2% HF	**100056-3**	10 mg/mL	5% HNO_3 + 2% HF	**10M56-3**
Terbium	Tb_4O_7	1000 µg/mL	2% HNO_3	**100057-1**	10 mg/mL	4% HNO_3	**10M57-1**
Terbium	Tb_4O_7	1000 µg/mL	2% HCl	**100057-2**	10 mg/mL	4% HCl	**10M57-2**

These standards are sold in our standard 100, 250, and 500 mL sizes.

Single-Element Standards

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Element	Source	Concentration	Matrix	Catalog No.	Concentration	Matrix	Catalog No.
Thallium	Tl metal	1000 µg/mL	2% HNO_3	**100058-1**	10 mg/mL	4% HNO_3	**10M58-1**
Thorium	ThO_2	1000 µg/mL	2% HNO_3	**100059-1**	10 mg/mL	4% HNO_3	**10M59-1**
Thorium	ThO_2	1000 µg/mL	2% HCl	**100059-2**			
Thulium	Tm_2O_3	1000 µg/mL	2% HNO_3	**100060-1**	10 mg/mL	4% HNO_3	**10M60-1**
Thulium	Tm_2O_3	1000 µg/mL	2% HCl	**100060-2**	10 mg/mL	4% HCl	**10M60-2**
Tin	Sn metal	1000 µg/mL	20% HCl	**100061-2**	10 mg/mL	60% HCl	**10M61-2**
Tin	Sn metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100061-3**	10 mg/mL	5% HNO_3 + 2% HF	**10M61-3**
Titanium	Ti metal	1000 µg/mL	20% HCl	**100062-2**	10 mg/mL	40% HCl	**10M62-2**
Titanium	Ti metal	1000 µg/mL	2% HNO_3 + 0.1% HF	**100062-3**	10 mg/mL	5% HNO_3 + 2% HF	**10M62-3**
Tungsten	W metal	1000 µg/mL	2% HNO_3 + 1% HF	**100063-3**	10 mg/mL	5% HNO_3 + 2% HF	**10M63-3**
Uranium	U_3O_8	1000 µg/mL	2% HNO_3	**100064-1**	10 mg/mL	4% HNO_3	**10M64-1**
Vanadium	NH_4VO_3	1000 µg/mL	2% HNO_3	**100065-1**	5 mg/mL	5% HNO_3	**5M65-1**
Vanadium	NH_4VO_3	1000 µg/mL	2% HCl	**100065-2**	10 mg/mL	10% HCl	**10M65-2**
Vanadium	NH_4VO_3				10 mg/mL	10% HNO_3 + Tr HF	**10M65-3**
Ytterbium	Yb_2O_3	1000 µg/mL	2% HNO_3	**100066-1**	10 mg/mL	4% HNO_3	**10M66-1**
Ytterbium	Yb_2O_3	1000 µg/mL	2% HCl	**100066-2**	10 mg/mL	4% HCl	**10M66-2**
Yttrium	Y_2O_3	1000 µg/mL	2% HNO_3	**100067-1**	10 mg/mL	4% HNO_3	**10M67-1**
Yttrium	Y_2O_3	1000 µg/mL	2% HCl	**100067-2**	10 mg/mL	4% HCl	**10M67-2**
Zinc	Zn metal	1000 µg/mL	2% HNO_3	**100068-1**	10 mg/mL	4% HNO_3	**10M68-1**
Zinc	Zn metal	1000 µg/mL	2% HCl	**100068-2**	10 mg/mL	10% HCl	**10M68-2**
Zirconium	$ZrO(NO_3)_2$	1000 µg/mL	0.5% HNO_3	**100069-1**			
Zirconium	$ZrOCl_2$	1000 µg/mL	2% HCl	**100069-2**	10 mg/mL	2% HCl	**10M69-2**
Zirconium	Zr metal	1000 µg/mL	2% HNO_3 + 0.5% HF	**100069-3**	10 mg/mL	4% HNO_3 + 2% HF	**10M69-3**

Single-Element Dilutions

All single-element standards are available as dilutions at any concentration. Most economical pricing is available for 10 and 100 ppm standards. Call Customer Service for pricing.

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP Multielement Standards

Find this online @ highpuritystandards.com/icpms

The multielement standards listed on the next several pages are prepared from high-purity metals or salts in subboiling distilled acids. We have listed only our most popular items. Please refer to our website or CD catalog for a complete list. If you still do not find what you need, we will be pleased to provide a quotation. Refer to page 3 for more information.

The uncertainty of the standards is certified to ± 0.5% of the stated concentrations against NIST SRM Spectrometric Standard Solutions. Each standard is accompanied by a Certificate of Analysis and a Material Safety Data Sheet.

Standards are certified accurate for a period of one year from the date of shipment.

ICP Working Calibration Solutions

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-WS-1	Al	10 µg/mL	Pb	10 µg/mL	Sn	10 µg/mL	2% HNO_3 + Tr HF
	Sb	10	Mo	10	Ti	10	
	As	10	Se	10	Zn	10	
	Be	1	Ag	1			
	Fe	10	Tl	10			
ICP-WS-2	Ba	10	Cr	10	Ni	10	2% HNO_3
	Bi	10	Co	10	K	50	
	B	10	Cu	10	Na	50	
	Cd	10	Mg	50	Sr	10	
	Ca	50	Mn	10	V	10	
ICP-WS-3	Au	10	Pd	10	Ru	10	5% HCl
	Ir	10	Pt	50	Te	50	
	Os	10	Rh	10			
ICP-WS-4	Ce	10	La	10	Tb	10	2% HNO_3
	Dy	10	Lu	10	Th	10	
	Er	10	Nd	10	Tm	10	
	Eu	10	Pr	10	U	10	
	Gd	10	Sm	10	Yb	10	
	Ho	10	Sc	10	Y	10	

Wavelength Calibration Solution

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
WAVECAL	As	20 µg/mL	Mo	20 µg/mL	Sc	20 µg/mL	2% HCl
	La	20	Ni	20	Na	20	
	Li	20	P	100	S	100	
	Mn	20	K	100			
WAVECAL-2	Al	50	Cr	50	Mn	50	5% HNO3
	As	50	Co	50	Mo	50	
	Ba	50	Cu	50	Ni	50	
	Cd	50	Pb	50	K	500	
	Se	50	Sr	50	Zn	50	

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP Analytical Mixtures

HPS analytical mixtures are designed to calibrate the instrument response or as a quality control check for the analysis of geological, wastewater, air particulate, soil, plant, and animal tissue samples.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-AM-1	Ba	25 µg/mL	Mo	50 µg/mL	Mg	100 µg/mL	Na	500 µg/mL	2% HNO_3 + Tr HF
	Ca	250	K	500					
ICP-AM-2	Sb	200	B	100	Ag	200	Tl	200	2% HNO_3 + Tr HF
ICP-AM-3	Al	100	Co	100	Hg	5	Cr	100	2% HNO_3
	As	50	Cu	100	Ni	50	Mn	100	
	Be	10	Fe	50	Se	50	Zn	100	
	Cd	100	Pb	100	V	100			
ICP-AM-4	Sb	100	Se	100	Sn	100	Mg	100	20% HCl
	Ca	100	Na	100	Te	100	S	100	
ICP-AM-5	Al	100	Cr	100	Pb	100	Zn	100	5% HCl
	As	100	Co	100	Mn	100			
	Ba	100	Cu	100	Ni	100			
	Be	100	Fe	100	Cd	100			
ICP-AM-6	Al	100	Co	100	K	100	Cr	100	4% HNO_3 + Tr HF
	Sb	100	Cu	100	Si	100	Ni	100	
	Ba	100	Fe	100	Ag*	100	Zn	100	*Solution B
	Be	100	Pb	100	Na	100	Ca	100	4% HNO_3
	B	100	Li	100	Sr	100	Mn	100	
	Cd	100	Mg	100	Tl	100	V	100	
ICP-AM-7	As	1000	Cd	250	Pb	1000	Se	250	4% HNO3
	Ba	10,000	Cr	1000	Hg*	50	Ag	1000	*Sol B - 5% HNO_3
ICP-AM-10	Al	1000	Fe	2500	Mg	5000			4% HNO3
	Ca	10,000	Mn	2500					
ICP-AM-11	Sb	1000	Si	2000	Mo	200			4% HNO_3 + 1% HF
	B	1000	Sn	1000	Ti	200			
ICP-AM-12	Al	100	Co	100	Se	100	Cd	100	4% HNO_3 + Tr HF
	Sb	100	Cu	100	Tl	100	Mo	100	
	As	100	Pb	100	V	100	Th*	100	*Solution B
	Be	100	Mn	100	Zn	100	Cr	100	4% HNO_3
	Ni	100	U	100					
ICP-AM-15	Ca	10,000	Mg	10,000	K	10,000	Na	10,000	5% HNO3
ICP-AM-16	Ca	1000	Mg	1000	K	1000	Na	1000	5% HNO3
	Fe	1000							

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP Multielement Standards

Find this online @ highpuritystandards.com/icpms

Initial Check Verification Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICV-1	Al	100 µg/mL	Cu	100 µg/mL	K	200 µg/mL	4% HNO_3 + Tr HF
	As	100	Fe	100	Se	200	
	Ba	50	Pb	100	Si*	100	
	Be	50	Li	100	Na*	162	
	Bi	100	Mg	100	S*	200	
	B	100	Mn	50	Sr	100	*Solution B H_20
	Cd	50	Mo	100	Tl	100	
	Ca	100	Ni	100	V	50	
	Cr	50	P	200			
	Co	50	Zn	50			
ICV-2	Sb	100	Sn	100	Ti	100	15% HCl
ICV-3	Au	50	Pd	50	Pt	50	2% HCl
ICV-4	Al	200	Co	50	K	5000	4% HNO_3 + Tr HF
	Sb	60	Cu	25	Se	5	
	As	10	Fe	100	Ag	10	
	Ba	200	Pb	5	Na	5000	
	Be	5	Mg	5000	Tl	10	
	Cd	5	Mn	15	V	50	
	Ca	5000	Ni	40			
	Cr	10	Zn	20			

Continuing Check Verification Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CCV-1	Al	200 µg/mL	Cu	200 µg/mL	K	500 µg/mL	4% HNO_3 + Tr HF
	As	200	Fe	200	Se	200	
	Ba	100	Pb	200	Si*	500	
	Be	100	Li	200	Na*	810	
	Bi	200	Mg	200	S*	500	
	B	200	Mn	100	Sr	200	*Solution B H_20
	Cd	100	Mo	200	Tl	200	
	Ca	200	Ni	200	V	100	
	Cr	50	P	500			
	Co	100	Zn	100			
CCV-2	Sb	200	Sn	200	Ti	200	15% HCl
CCV-3	Au	100	Pd	100	Pt	100	2% HCl

These standards are sold in our standard 100, 250, and 500 mL sizes.

EPA Method 200.7 Calibration Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-200.7-1	Al	1000 µg/mL	Mg	1000 µg/mL	Ag*	500 µg/mL	2% HNO_3
	Ca	1000	Ni	500	Na	1000	*Solution B
	Cr	500	K	1000	Zn	500	2% HNO_3
ICP-200.7-2	Ba	100	Cu	100	Sr	1000	2% HNO_3
	Be	100	Fe	1000	V	100	
	Co	200	Mn	100			
ICP-200.7-4	Sb	1000	Mo	1000	Ti	1000	4% HNO_3 + Tr HF
ICP-200.7-5	Al	25	Cu	25	Se	25 µg/mL	2% HNO_3 + Tr HF
	Sb	25	Fe	25	Si	25	
	As	25	Pb	25	Ag	2.5	
	Ba	25	Li	25	Sr	25	
	Be	5	Mn	25	Tl	25	
	B	25	Hg	5	Sn	10	
	Cd	10	Mo	10	V	10	
	Cr	25	Ni	25	Zn	25	
	Co	10	P	50			
ICP-200.7-6	Al	20	Cu	20	K	100	2% HNO_3 + Tr HF
	Sb	20	Fe	20	Se	20	
	As	20	Pb	20	Si	100	
	Ba	20	Li	20	Ag	5	
	Be	20	Mg	20	Na	20	
	B	20	Mn	20	Sr	20	*Solution B
	Cd	20	Hg*	20	Tl	20	5% HNO_3
	Ca	20	Mo	20	Sn	20	
	Cr	20	Ni	20	V	20	
	Co	20	P	100	Zn	20	
ICP-200.7-8	Al	200	Co	50	Ni	50	2% HNO_3 + Tr HF
	Ba	50	Cr	50	Sn	50	
	Be	50	Cu	50	SiO_2	50	
	Cd	50	Fe	300	Ti	50	
	Ca	50	Mn	50	Tl	50	
	Ce	50	Mo	50	V	50	

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP Multielement Standards

Find this online @ highpuritystandards.com/icpms

Interference Check Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
INFCS-1	As	1000 µg/mL	Cu	300 µg/mL	Se	500 µg/mL	Co	300 µg/mL	4% HNO_3
	Ba	300	Pb	1000	Ag*	300	K	20,000	
	Be	100	Mn	200	Tl	1000			*Solution B
	Cd	300	Hg	50	V	300			
	Cr	300	Ni	300	Zn	300			
INFCS-4	Al	5000	Fe	5000	Ca	5000	Mg	5000	5% HNO_3
INFCS-5	K	5000	Na	5000					2% HCl
INFCS-6	Al	1200	Mg	3000	Fe	5000	Na	1000	4% HNO_3
	Ca	6000							

ICP Stock Solution

This stock solution is used to prepare working calibration standards and instrument performance check standards. The working calibration solutions are prepared from the stock solutions by making 100-, 20- and 10- fold dilutions. The working matrix is 1% HNO_3. To prepare an instrument check standard, the stock solution is diluted 40 fold in 1% HNO_3.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-SS	Al	100 µg/mL	Co	20 µg/mL	Si	500 µg/mL	Se	50	2% HNO_3 + Tr HF
	Sb	50	Cu	20	Ag	1.5	Ca	2000	
	As	25	Fe	100	Na	2000	K	150	
	Ba	20	Pb	25	Sr	100	Zn	100	
	Be	20	Mg	500	Tl	10	Cr	20	
	B	20	Mn	20	Sn	20			
	Cd	20	Ni	20	V	20			

We are constantly striving to bring you the best possible online shopping experience at **www.highpuritystandards.com**. If you have not checked it out yet, please give it a try, and let us know what you think. We value our customers and their input. If you have any recommendations on how we could improve, please visit our Contact Us page online or give us a call. We'd love to hear from you.

A shortcut to our contact page is www.highpuritystandards.com/contact

These standards are sold in our standard 100, 250, and 500 mL sizes.

Quality Control Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
QCS-1	Al	100 µg/mL	Ca	100 µg/mL	Mn	100 µg/mL	Si	100 µg/mL	4% HNO3 + Tr HF
	As	100	Cr	100	Mo	100	S *	100	
	Ba	100	Co	100	Ni	100	U	100	* Solution B
	Be	100	Fe	100	P	100	V	100	in H_2O
	B	100	Li	100	K	100	Y	500	
	Cd	100	Mg	100	Se	100	Zn	100	
QCS-2	Sb	100	Sn	100	Na	100	Y	500	5% HCl
QCS-3	Cu	100	Ag	100	Y	500	Pb	100	2% HNO_3
	Tl	100							
QCS-7	Al	100	B	100	Si	50	Na	100	2% HNO_3
	Ag	100	Ba	100	K	1000			
QCS-7-M	Al	100	B	100	Si	100	Na	100	2% HNO_3
	Ag	50	Ba	100	K	1000			
QCS-19	Sb	100	Cr	100	Mg	100	Tl	100	4% HNO_3 + Tr HF
	As	100	Co	100	Mn	100	Ti	100	
	Be	100	Cu	100	Mo	100	V	100	
	Cd	100	Fe	100	Ni	100	Zn	100	
	Ca	100	Pb	100	Se	100			
QCS-21	Sb	100	Co	100	Mn	100	Ti	100	4% HNO_3 + Tr HF
	As	100	Cu	100	Mo	100	V	100	
	Be	100	Fe	100	Ni	100	Zn	100	
	Cd	100	Pb	100	Se	100			
	Ca	100	Li	100	Sr	100			
	Cr	100	Mg	100	Tl	100			
QCS-26	Al	100	Cd	100	Mn	100	Si	50	4% HNO_3 + Tr HF
	Sb	100	Co	100	Mo	100	Tl	100	
	As	100	Cr	100	Na	100	Ti	100	
	B	100	Cu	100	Ni	100	V	100	
	Ba	100	Fe	100	Pb	100	Zn	100	
	Be	100	K	1000	Se	100			
	Ca	100	Mg	100	Ag	100			
QCS-27	Al	100	Cd	100	Mn	100	Na	100	4% HNO_3 + Tr HF
	Sb	100	Co	100	Mo	100	Sr	100	
	As	100	Cr	100	K	100	Tl	100	
	B	100	Cu	100	Ni	100	Ti	100	
	Ba	100	Fe	100	Se	100	V	100	
	Be	100	Pb	100	Si	100	Zn	100	
	Ca	100	Mg	100	Ag	100			

These standards are sold in our standard 100, 250, and 500 mL sizes.

Contract Laboratory Program

Find this online @ highpuritystandards.com/clp

CLP Calibration Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CLP-CAL-1	Al	2000 µg/mL	Cu	250 µg/mL	Ni	500 µg/mL	Co	500	4% HNO_3
	Ba	2000	Fe	1000	Na	5000	Cr	200	
	Be	50	K	5000	Ag*	250	Mn	500	
	Ca	5000	Mg	5000	V	500	Zn	500	*Solution B
CLP-CAL-2	Sb	1000							5% Tartaric Acid + 2% HNO_3
CLP-CAL-3	As	1000	Se	1000	Pb	1000	Cd	500	2% HNO_3
	Tl	1000							

CLP Check Verification Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CLP-CV-1	Al	1000 µg/mL	Cu	125 µg/mL	Ni	250 µg/mL			4% HNO_3
	Ba	1000	Fe	500	Ag	125			
	Be	25	K	2500	Na	2500			
	Ca	2500	Mg	2500	V	250			
	Cr	100	Mn	250	Zn	250			
	Co	250							
CLP-CV-2	Sb	500							2% HNO_3 + Tr HF
CLP-CV-3	As	500	Cd	250	Pb	500	Se	500	2% HNO_3
	Tl	500							

CLP Interference Check Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CLP-INF-1	Al	5000 µg/mL	Ca	5000 µg/mL	Fe	2000 µg/mL	Mg	5000 µg/mL	5% HNO_3

Any multielement standard in the HPS Catalog can be modified to meet your needs.
Call (843) 767-7900 to discuss your needs with our staff.

These standards are sold in our standard 100, 250, and 500 mL sizes.

Contract Laboratory Program

Find this online @ highpuritystandards.com/clp

CLP Spike Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CLP-SP-1	Al	2000 µg/mL	Co	500 µg/mL	Ni	500 µg/mL	Cr	200	4% HNO_3
	Ba	2000	Cu	250	Ag*	50	Mn	500	
	Be	50	Fe	1000	V	500	Zn	500	*Solution B
CLP-SP-2	Sb	500							5% Tartaric Acid + 2% HNO_3
CLP-SP-3	As	2000	Se	2000	Cd	50	Tl	2000	4% HNO_3
	Pb	500							

CLP Analyte Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ANALCS	Ba	50 µg/mL	Co	50 µg/mL	Ni	100 µg/mL	V	50 µg/mL	2% HNO_3
	Be	50	Cu	50	Ag	100	Pb	100	
	Cd	100	Cr	50	Mn	50	Zn	100	
ANALCS-R	Sb	60	Cu	50	Se	5			2% HNO_3 + Tr HF
	As	10	Co	50	Ag	20	Cr	50	
	Ba	50	Pb	5	Tl	10	Zn	100	
	Be	50	Mn	50	V	50	Ni	100	
	Cd	100							

CRDL Detection Limit Standard

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CRDL	Sb	120 µg/mL	Co	100 µg/mL	Se	10 µg/mL	Cr	20	2% HNO_3 + Tr HF
	As	20	Cu	50	Ag	20	Ni	80	
	Be	10	Pb	6	Tl	20	Zn	40	
	Cd	10	Mn	30	V	100			

Please visit us at www.highpuritystandards.com to see a complete listing of our multielement ICP products.

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP Single-Element Kits

ICP Starter Kits

Find this online @ highpuritystandards.com/icpsk

These kits are designed for ICP to provide the analyst with a modest supply of high-purity single-element spectrometric standard solutions. Individual kits are designed to meet the analyst's needs for a variety of environmental and industrial applications. **Each kit contains individual 100 or 250 mL bottles of the listed elements at 1000**. The complete kit, ICP-KIT-A-E, contains all 60 single-element solutions listed below.

Catalog No.	10 µg/mL									Matrix
ICP-KIT-A	Al	Be	Ca	Cu	Pb	Hg*	Se	Na	V	2% HNO_3
	As	Bi	Cr	In	Mg	Ni	Si**	Sr	Zn	*5% HNO_3
	Ba	Cd	Co	Fe	Mn	K	Ag	Tl		** $(NH_4)_2SiF_6$
ICP-KIT-B	Sb	Mo	Nb	Ta	Sn	Te	Ti	W	Zr	2-5% HNO_3 + Tr HF
	Hf									
ICP-KIT-C	B	P	S							H_2O
ICP-KIT-D	Au	Pd	Pt							2-5% HCl
ICP-KIT-E	Ce	Er	Gd	La	Nd	Sm	Tb	Yb		2% HNO_3
	Dy	Eu	Ho	Lu	Pr	Sc	Tm	Y		
ICP-KIT-A-E	**Complete ICP Starter Kit (Includes all of the above kits)**									

ICP-MS Starter Kits

Find this online @ highpuritystandards.com/icpmsk

These kits are designed for ICP-MS to provide the analyst with a modest supply of high-purity single-element spectrometric standard solutions. Individual kits are designed to meet the analyst's needs for a variety of environmental and industrial applications. **Each kit contains individual 100 mL bottles of the listed elements at 10**. The complete kit, ICP-MS-KIT-A-E, contains all 74 single-element solutions listed below

For a standard containing most of these elements as a multielement mix, please reference ICP-MS-68A on page 21.

Catalog No.	10 µg/mL									Matrix
ICP-MS-KIT-A	Al	Bi	Cs	Ga	Pb	Hg*	Re	Ag	Tl	2% HNO_3
	As	B	Cr	Ge	Li	Ni	Rb	Na	Th	*5% HNO_3
	Ba	Cd	Co	In	Mg	P	Se	Sr	U	**from $(NH_4)_2SiF_6$
	Be	Ca	Cu	Fe	Mn	K	Si**	S	V	
									Zn	
ICP-MS-KIT-B	Sb	Hf	Mo	Nb	Ta	Sn	Te	Ti	W	2% HNO_3 + Tr HF
									Zr	
ICP-MS-KIT-C	Au	Ir	Os	Pd	Pt	Rh	Ru			2% HCl
ICP-MS-KIT-D	Ce	Er	Gd	La	Nd	Sm	Tb	Yb		2% HNO_3
	Dy	Eu	Ho	Lu	Pr	Sc	Tm	Y		
ICP-MS-KIT-E	Br	Cl	F	I						H_2O
ICP-MS-KIT-A-E	**Complete ICP-MS Starter Kit (Includes all of the above kits)**									

Trace Metals on Filter Media for Industrial Hygiene and Ambient Air Analysis

High-Purity Standards offers a wide range of standards for trace metals on filter media. Custom standards of metals in acid matrices or in natural matrices such as soil, coal dust, etc. can be prepared. These standards can be deposited on mixed cellulose esters, PTFE, glass, or quartz filters. Contact us for a quotation.

The following trace metals on mixed cellulose ester are designed to meet the QC requirements for Method 7300. The trace metals on PTFE are designed to meet the requirements of EPA IO methods. Additional blanks are available upon request.

Catalog No.	
QC-TMFM-A-G	Trace metals on mixed cellulose ester; 10 spiked filters + 5 blanks
QC-PTFE-A-G	Trace metals on PTFE; 5 spiked filters + 2 blanks

	A	B	C	D	E	F	G
Element µg / filter	µg / filter	µg / filter	µg / filter	µg / filter	µg / filter	µg / filter	µg / filter
Aluminum	- -	- -	- -	50	100	- -	- -
Arsenic	10	50	100	10	20	10	50
Barium	2.5	10	25	2.5	5	2.5	10
Beryllium	1	10	25	0.1	0.2	1	10
Cadmium	1	10	25	1	2	1	10
Chromium	2.5	10	25	2.5	5	2.5	10
Cobalt	2.5	10	25	2.5	5	2.5	10
Copper	2.5	25	50	2.5	5	2.5	25
Iron	2.5	25	50	2.5	5	2.5	25
Lead	2.5	25	50	2.5	5	2.5	25
Manganese	1	10	25	1	2	1	10
Nickel	2.5	10	25	2.5	5	2.5	10
Silver	1	5	10	1	2	1	5
Thallium	2.5	10	25	2.5	5	2.5	10
Uranium						2.5	5
Vanadium	2.5	10	25	2.5	5	2.5	10
Zinc	2.5	50	100	2.5	5	2.5	50

The following trace metals on quartz filters are designed to meet the QC requirements of EPA IO methods.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Media
QC-TOXM-B	Sb	10 µg	Cd	10 µg	Mn	10 µg	Be	10 µg	Quartz QM-A grade filter
	As	50	Cr	10	Ni	10	Pb	25	

The above items include dissolved metals on filters. High-Purity Standards offers a line of high-fired beryllium oxide solids on mixed cellulose ester filters. These products include two options for source material: industrial-grade, fine particle or the highly-characterized source of BeO, using NIST SRM® 1877. Concentrations range from 0.05 to 25 µg/filter.

Catalog No.		Catalog No.	
TMFM-BEO	High-fired BeO source; 3 spike filters/set	TMFM-BEO-BLANK	Blank filters for TMFM-BEO
TMFM-CBEO	NIST BeO source; 2 spiked filters/set	TMFM-CBEO-BLANK	Blank filters for TMEM-CBEO

ICP-MS Multielement Standards

Find this online @ highpuritystandards.com/icpmsms

ICP-MS Calibration Standards

The following solutions include elements chosen to calibrate the ICP-MS over the entire mass spectrum. These multielement standards are designed to assist the analyst in the verification of the mass range.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MSCS	Al	10 µg/mL	Cr	10 µg/mL	Mg	10 µg/mL	Sr	10 µg/mL	2% HNO_3 + Tr HF
	Sb	10	Cu	10	Mn	10	Tl	10	
	As	10	Co	10	Mo	10	Th	10	
	Ba	10	Eu	10	Ni	10	U	10	
	Be	10	Ho	10	Sc	10	V	10	
	B	10	La	10	Se	10	Yb	10	
	Cd	10	Pb	10	Ag	10	Zn	10	
	Ca	10	Li	10	Na	10			
ICP-MSCS-M	Al	10	Ca	10	Li	10	Na	10	2% HNO_3 + Tr HF
	Sb	10	Cr	10	Mg	10	Sr	10	
	As	10	Cu	10	Mn	10	Tl	10	
	Ba	10	Co	10	Mo	10	Th	10	
	Be	10	Eu	10	Ni	10	V	10	
	Bi	10	Ho	10	Fe	10	U	10	
	B	10	La	10	Se	10	Yb	10	
	Cd	10	Pb	10	Ag	10	Zn	10	

Interference Check Solutions

These solutions contain known concentrations of elements that will demonstrate the magnitude of interference and provide adequate tests for many corrections. (ICP-MS-ICS Solution AB includes all elements of A plus the additional ones listed.)

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MS-ICS									
Solution A	Al	500 mg/L	Mg	500 mg/L	K	500 mg/L	Cl	3600 mg/L	2% HNO_3 + Tr HF
	Ca	500	Na	500	S	500	Mo	10	
	Fe	500	P	500	C	1000	Ti	10	
Solution AB	Cr	0.10	Ni	0.20	Ag	0.10			2% HNO_3 + Tr HF
	As	0.10	Co	0.20	Mn	0.10	V	0.20	
	Cd	0.05	Cu	0.10	Se	0.10	Zn	0.10	
ICP-MS-ICS-2									
Solution A	Al	1000	Mg	1000	K	1000	Cl	20,000	5% HNO_3 + Tr HF
	Ca	3000	Na	2500	S	1000	Mo	20	
	Fe	2500	P	1000	C	2000	Ti	20	
Solution B									
	Cr	20	Ni	20	Ag	5	Zn	10	2% HNO_3
	As	10	Co	20	Mn	20	V	20	
	Cd	10	Cu	20	Se	10			

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP-MS Verification Standards

The following series of ICP-MS standards are used as concentration verification checks.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MS-B	Ce	10 µg/mL	Ho	10 µg/mL	Sm	10 µg/mL	Yb	10 µg/mL	2% HNO_3
	Dy	10	La	10	Sc	10	Y	10	
	Er	10	Lu	10	Tb	10			
	Eu	10	Nd	10	Th	10			
	Gd	10	Pr	10	Tm	10			
ICP-MS-C	Sb	10	Ir	10	Rh	10	Te	10	10% HCl
	Au	10	Pd	10	Ru	10			
	Hf	10	Pt	10	Sn	10			
ICP-MS-D	B	10	Nb	10	S	10	Ti	10	2% HNO_3 + Tr HF
	Ge	10	P	10	Si	10	W	10	
	Mo	10	Re	10	Ta	10	Zr	10	
ICP-MS-E	Ag	10	Co	10	Li	10	Se	10	2% HNO_3
	Al	10	Cr	10	Mg	10	Sr	10	
	As	10	Cs	10	Mn	10	Tl	10	
	Ba	10	Cu	10	Na	10	U	10	
	Be	10	Fe	10	Ni	10	V	10	
	Ca	10	Ga	10	Pb	10	Zn	10	
	Cd	10	K	10	Rb	10			

ICP-MS Method 6020

When the following solution is diluted 100-fold, the Contract Required Detection Limits (CRDL) of the elements approved for ICP-MS Method 6020 CLP-M are met.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MS-6020	Al	200 µg/L	Co	50 µg/L	K	5000 µg/L	Cr	10 µg/L	4% HNO_3 + Tr HF
	Sb	60	Cu	25	Se	5	Ca	5000	
	As	10	Fe	100	Ag	10	Ni	40	
	Ba	200	Pb	5	Na	5000	Zn	20	
	Be	5	Mg	5000	Tl	10			
	Cd	5	Mn	15	V	50			

These standards are sold in our standard 100, 250, and 500 mL sizes.

ICP-MS Multielement Standards

Find this online @ highpuritystandards.com/icpmsms

Tuning Solutions

The following solutions include elements chosen to calibrate the ICP-MS over the entire mass spectrum. These multielement standards are designed to assist the analyst in the verification of the mass range.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MS-TS-1	Li	10 µg/mL	Co	10 µg/mL	In	10 µg/mL	Tl	10 µg/mL	2% HNO_3
ICP-MS-TS-2	Li	10	Ce	10	Tl	10	Y	10	2% HNO_3
ICP-MS-TS-3	Be	10	Co	10	In	10	Pb	10	2% HNO_3
	Mg	10							
ICP-MS-TS-4	Al	10	Bi	10	In	10	Ni	10	2% HNO_3
	Ba	10	Ce	10	Pb	10	V	10	
	Be	10	Co	10	Mg	10	Y	10	
ICP-MS-TS-5	Bi	10	In	10	Sc	10	U	10	2% HNO_3
	Ho	10	6Li	10	Tb	10	Y	10	
ICP-MS-TS-6	Ba	10	Ce	10	In	10	Mg	10	2% HNO_3 + Tr HCl
	Be	10	Co	10	Pb	10	Rh	10	

EPA Method 200.8 Calibration Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-200.8-1	Al	10 µg/mL	Cr	10 µg/mL	Ni	10 µg/mL	V	10 µg/mL	2% HNO_3 + Tr HF
	Sb	10	Co	10	Se	10	Zn	10	
	As	10	Cu	10	Ag	10	Cd	10	
	Ba	10	Pb	10	Tl	10	Mo	10	
	Be	10	Mn	10	Th	10	U	10	
ICP-200.8-2	Al	10	Cr	10	Ni	10	V	10	2% HNO_3 + Tr HF
	Sb	10	Co	10	Se	50	Zn	10	
	As	10	Cu	10	Ag	10	Cd	10	
	Ba	10	Pb	10	Tl	10	Mo	10	
	Be	10	Mn	10	Th	10	U	10	
ICP-200.8-3	Al	20	Cr	20	Ni	20	V	20	2% HNO_3
	Sb*	20	Co	20	Se	100	Zn	20	
	As	20	Cu	20	Ag	20	Cd	20	*Solution B
	Ba	20	Pb	20	Tl	20	Mo *	20	2% HNO_3 + Tr HF
	Be	20	Mn	20	Th	20	U	20	

These standards are sold in our standard 100, 250, and 500 mL sizes.

68-Element Standard

These 3-standard kits were designed for use when screening for a large number of elements. They are offered at two concentrations: 10 µg/mL (68A) and 100 µg/mL (68B). They may be purchased as a kit or their individual standards may be purchased separately. Volumes of 100, 250 and 500 mL are stocked.

Solution	Element	Element	Element	Element	Element	Element	Element
Solution A	Al	As	Ba	Be	Bi	B	Ca
ICP-MS-68A in 2% HNO_3	Cd	Ce	Co	Cr	Cs	Cu	Dy
ICP-MS-68B in 4% HNO_3	Er	Eu	Ga	Gd	Ho	In	Fe
	La	Pb	Li	Lu	Mg	Mn	Nd
	Ni	P	K	Pr	Re	Rb	Sm
	Sc	Se	Na	Sr	Tb	Tl	Th
	Tm	U	V	Yb	Y	Zn	
Solution B	Sb	Ge	Hf	Mo	Nb	Si	Ag
ICP-MS-68A in 2% HNO_3 + Tr HF	Ta	Te	Sn	Ti	W	Zr	
ICP-MS-68B in 2% HNO_3 + Tr HF							
Solution C	Au	Ir	Os	Pd	Pt	Rh	Ru
ICP-MS-68A in 2% HNO_3 + Tr HCl							
ICP-MS-68B in 4% HNO_3 + 2% HCl							

ICP-MS Internal Standards

Below are two popular ICP-MS internal standard solutions. ICP-MS-IS-1 can be used with EPA Method 6020 and ICP-MS-IS-2 can be used with EPA Method 200.8.

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
ICP-MS-IS-1	Bi	10 µg/mL	^{6}Li	10 µg/mL	Rh	10 µg/mL	Tb	10 µg/mL	2% HNO_3 + Tr HCl
	Ho	10	Lu	10	Sc	10	Y	10	
	In	10							
ICP-MS-IS-2	Bi	100	Sc	100	Tb	100	Y	100	in 2% HNO_3
	In	100							

These standards are sold in our standard 100, 250, and 500 mL sizes.

Graphite Furnace Standards

Find this online @ highpuritystandards.com/gfs

Matrix Modifiers

HPS Matrix Modifiers are designed for use with Graphite Furnace Atomic Absorption (GFAAS). A matrix modifier is added to the sample to prevent analyte loss during the ashing step by converting the analyte to a less volatile form.

Catalog No.	Description
MM-9001	0.1% $NH_4H_2PO_4$ in 0.05% HNO_3
MM-9002	1% $NH_4H_2PO_4$ in 0.05% HNO_3
MM-9003	10% $NH_4H_2PO_4$ in 0.05% HNO_3
MM-9004	20% $NH_4H_2PO_4$ in 0.05% HNO_3
MM-9010	0.1% $Mg(NO_3)_2$ in 1% HNO_3
MM-9011	1% $Mg(NO_3)_2$ in 1% HNO_3
MM-9012	5% $Mg(NO_3)_2$ in 1% HNO_3
MM-9020	0.1% Pd in 10% HNO_3 + Tr HCl
MM-9023	0.5% Pd in 10% HNO_3 + Tr HCl
MM-9021	1% Pd in 10% HNO_3 + Tr HCl
MM-9022	2% Pd in 10% HNO_3 + Tr HCl
MM-9030	0.1% $Ni(NO_3)_2$ in 1% HNO_3

Catalog No.	Description
MM-9031	1% $Ni(NO_3)_2$ in 1% HNO_3
MM-9032	5% $Ni(NO_3)_2$ in 1% HNO_3
MM-9100	1000 µg Pd/mL - 600 µg $Mg(NO_3)_2$/mL in 10% HNO_3 + Tr HCl
MM-9040	0.1% NH_4NO_3 in H_2O
MM-9041	1% NH_4NO_3 in H_2O
MM-9042	5% NH_4NO_3 in H_2O
MM-9101	1500 µg Pd/mL - 1000 µg $Mg(NO_3)_2$/mL in 10% HNO_3 + Tr HCl
MM-9102	750 µg Pd/mL - 500 µg $Mg(NO_3)_2$/mL in 10%HNO_3 + Tr HCl
MM-9110	10,000 µg $NH_4H_2PO_4$/mL - 500 µg $Mg(NO_3)_2$/mL in 1% HNO_3

Flame AAS Standards

Find this online @ highpuritystandards.com/faas

Ionization Buffers

Ionization Buffers are used to increase the free electron population in flame emission or absorption and thereby suppress ionization interference effects of many ions in high temperature flames such as nitrous oxide - acetylene. While the alkali metals are known to be ionized at various degrees, many metals including aluminum and silicon are ionized to an appreciable extent in a nitrous oxide - acetylene flame. Ionization buffers are always recommended with the nitrous oxide - acetylene flame. It is of interest to note that the ionization potential of lanthanum (5.6 eV) is very close to that of lithium (5.39 eV). Therefore, lanthanum acts as an ionization buffer as well as a releasing agent for the alkaline earth metals, silicon, and aluminum. The cesium ionization buffer is recommended by the manufacturers of the ICP and AAS instrumentation.

Catalog No.	Description
IB-CS-B1	1% Cesium in 1% HNO_3
IB-CS-B5	5% Cesium in 1% HNO_3
IB-K-A5	5% Potassium in 1% HCl
IB-K-B5	5% Potassium in 1% HNO_3
IB-LA-B5	5% Lanthanum in 1% HNO_3*
IB-LA-A1	1% Lanthanum in 1% HCl*
IB-LA-A5	5% Lanthanum in 1% HCl*
***Also used as releasing agents in flame AAS**	

Single-Element Standards

The standards listed below are for determination of wear metals in oils and lubricants. The standards below can also be ordered in parafin 20 Base Oil, 75 Base Oil, Soybean Oil, and Xylene. Blank oil standards are available as well.

Catalog No.	Element	Concentration	Weight
ALOMS	Aluminum	1000 µg/g	100 grams
SBOMS	Antimony	1000	100
ASOMS	Arsenic	50	100
BAOMS	Barium	1000	100
BEOMS	Beryllium	1000	100
BIOMS	Bismuth	1000	100
BBOMS	Boron	1000	100
CDOMS	Cadmium	1000	100
CAOMS	Calcium	1000	100
CROMS	Chromium	1000	100
COOMS	Cobalt	1000	100
CUOMS	Copper	1000	100
INOMS	Indium	1000	100
FEOMS	Iron	1000	100
PBOMS	Lead	1000	100
LIOMS	Lithium	1000	100
MGOMS	Magnesium	1000	100
MNOMS	Manganese	1000	100
HGOMS	Mercury	50	100
MOOMS	Molybdenum	1000	100
NIOMS	Nickel	1000	100
PPOMS	Phosphorus	1000	100
KKOMS	Potassium	1000	100
SEOMS	Selenium	50	100
SIOMS	Silicon	1000	100
AGOMS	Silver	1000	100
NAOMS	Sodium	1000	100
SNOMS	Tin	1000	100
TIOMS	Titanium	1000	100
WWOMS	Tungsten	1000	100
VVOMS	Vanadium	1000	100
ZNOMS	Zinc	1000	100
BMOMS	Base Mineral Oil		500 mL
OMS-12	Ag, Al, Cr, Cu, Fe, Mg, Na, Ni, Pb, Si, Sn, Ti all elements at 200 µg/g	Mineral Oil	100 g 200 g
OMS-21	Ag, Al, B, Ba, Ca, Cd, Cr, Cu, Fe, Mg, Mn, Mo, Na, Ni, P, Pb, Si, Sn, Ti, V, Zn all elements at 200 µg/g	Mineral Oil	100 g 200 g

Single Component IC Standards

The following standards are prepared from high-purity salts in 18-megaohm water except where noted otherwise and packaged in high-density polyethylene bottles. Standards are certified accurate for a period of 18 months from the date of shipment, except where noted otherwise.

Component	Source	Concentration	Catalog No.	Concentration	Catalog No.
Acetate	Na Acetate	100 µg/mL	**IC-AC**	1000 µg/mL	**IC-AC-M**
‡ Ammonium	NH_4Cl	100	**IC-NH**	1000	**IC-NH-M**
Bromide	NaBr	100	**IC-BR**	1000	**IC-BR-M**
Bromide	NaBr	10,000	**IC-BR-10M**		
Bromate	$NaBrO_3$	100	**IC-BRO3**	1000	**IC-BRO3-M**
Calcium	$CaCl_2$	100	**IC-CA**	1000	**IC-CA-M**
Chloride	NaCl	100	**IC-CL**	1000	**IC-CL-M**
Chloride	NaCl	10,000	**IC-CL-10M**		
*Chlorite	$NaClO_2$	100	**IC-CLO2**	1000	**IC-CLO2-M**
Chlorate	$NaClO_3$	100	**IC-CLO3**	1000	**IC-CLO3-M**
‡ Perchlorate	$NaClO_4$	100	**IC-CLO4**	1000	**IC-CLO4-M**
‡ ƒ Cyanide	KCN	100	**IC-CN**	1000	**IC-CN-M**
Fluoride	NaF	100	**IC-FF**	1000	**IC-FF-M**
Fluoride	NaF	10,000	**IC-FF-10M**		
† Formate	Na Formate	100	**IC-FM**	1000	**IC-FM-M**
Iodide	NaI	100	**IC-II**	1000	**IC-II-M**
‡ Lactate	Na Lactate	100	**IC-LAC**	1000	**IC-LAC-M**
Magnesium	$MgCl_2$	100	**IC-MG**	1000	**IC-MG-M**
Nitrate	$NaNO_3$	100	**IC-NO**	1000	**IC-NO-M**
Nitrate	$NaNO_3$	10,000	**IC-NO-10M**		
‡ Nitrite	$NaNO_2$	100	**IC-N**	1000	**IC-N-M**
‡ Nitrogen	$NaNO_2$	100	**IC-NO2**	1000	**IC-NO2**
Nitrogen	$NaNO_3$	100	**IC-NO3**	1000	**IC-NO3**
‡ Nitrogen	NH_4Cl	100	**IC-NT**	1000	**IC-NT-M**
‡ Oxalate	Na Oxalate	100	**IC-OX**	1000	**IC-OX-M**
Phosphate	$NH_4H_2PO_4$	100	**IC-PP**	1000	**IC-PP-M**
Phosphate	$NH_4H_2PO_4$	10,000	**IC-PP-10M**		
Phosphate	KH_2PO_4	100	**IC-KPP**	1000	**IC-KPP-M**
Phosphorus	$NH_4H_2PO_4$	100	**IC-P**	1000	**IC-P-M**
Phosphorus	KH_2PO_4	100	**IC-KP**	1000	**IC-KP-M**
Potassium	KCl	100	**IC-K**	1000	**IC-K-M**
‡ Propionate	Na Propionate	100	**IC-PRO**	1000	**IC-PRO-M**
Sodium	NaCl	100	**IC-NA**	1000	**IC-NA-M**
Sulfate	Na_2SO_4	100	**IC-SS**	1000	**IC-SS-M**
Sulfate	Na_2SO_4	10,000	**IC-SS-10M**		
Sulfur	Na_2SO_4	100	**IC-SR**	1000	**IC-SR-M**

* Exp Date: 3 Months † Exp Date: 6 Months ‡ Exp Date: 12 Months ƒ Matrix is 0.5% KOH

These standards are sold in our standard 100, 250, and 500 mL sizes.

Multielement IC Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
IC-1	Nitrate Bromide	100 µg/mL 100	Nitrite* Chloride	100 µg/mL 100	Phosphate Sulfate	100 µg/mL 100	Fluoride	100 µg/mL	H_2O *Solution B
IC-2	Nitrate Bromide	1000 1000	Nitrite* Chloride	1000 1000	Phosphate Sulfate	1000 1000	Fluoride	1000	H_2O *Solution B
IC-4	Ammonium Sodium	100 100	Calcium	100	Magnesium	100	Potassium	100	H_2O *Solution B

Bio IC Calibration Standards

This kit is a set of 6 solutions in water. BIO-IC-CAL is designed to establish the calibration curve of varying concentrations plus a quality control check to meet ASTM D7328. It is available in 100 or 250mL sizes.

Catalog No.	Solution	Components	Concentration	Solution	Components	Concentration
BIO-IC-CAL	A	Cl, SO_4	0.5 µg/mL	D	Cl, SO_4	5 µg/mL
	B	Cl, SO_4	1	E	Cl, SO_4	10
	C	Cl, SO_4	3	Check Solution	Cl, SO_4	3

Need technical assistance? Call us for help with all your laboratory questions.

These standards are sold in our standard 100, 250, and 500 mL sizes.

Trace Metals in Drinking Water Standards

Catalog No.	Element	Conc.	Element	Conc.	Element	Conc.	Element	Conc.	Matrix
CRM-TMDW	Al	120µg/L	Cr	20µg/L	Mo	100µg/L	Te	3 µg/L	2% HNO_3 + Tr HF
	Sb	10	Co	25	Ni	60	Tl	10	
	As	80	Cu	20	K	2500	V	30	
	Ba	50	Fe	100	Rb	10	U	10	
	Be	20	Pb	40	Se	10	Zn	70	
	Bi	10	Li	20	Ag	2			
	Cd	10	Mg	9000	Na	6000			
	Ca	35,000	Mn	40	Sr	250			
CRM-TMDW-A	Al	125	Ca	31,000	Mg	8000	Na	2300	2% HNO_3 + Tr HF
	Sb	55	Cr	20	Mn	40	Sr	300	
	As	55	Co	25	Mo	110	Tl	10	
	Ba	500	Cu	20	Ni	60	V	35	
	Be	15	Fe	90	K	2500	Zn	75	
	B	150	Pb	20	Se	11			
	Cd	10	Li	15	Ag	2			
CRM-TMDW-B	Al	125	Ca	31,000	Mg	8000	Na	22,000	2% HNO_3 + Tr HF
	Sb	55	Cr	20	Mn	40	Sr	300	
	As	10	Co	25	Mo	110	Tl	10	
	Ba	500	Cu	20	Ni	60	V	35	
	Be	15	Fe	90	K	2500	Zn	75	
	B	150	Pb	20	Se	11			
	Cd	10	Li	15	Ag	2			
Primary Drinking Water Metals									
DWPS	As	100	Cd	50	Pb	100	Se	50	2% HNO_3
	Ba	50	Cr	100	Hg*	20	Ag	10	*5% HNO_3
Secondary Drinking Water Metals									
DWSS	Cu	50	Fe	100	Mn	50	Zn	50	2% HNO_3

Simulated Rainwater

The following Simulated Rainwater standards are available in 250 mL, packaged as 5 x 50 mL bottles. The concentrations shown are the targeted values for each level.

Catalog No.	SR-1	SR-2
pH, 25°C	4.3	3.6
Specific Conductance (µS/cm, 25°C)	26	130
Components	**mg/L**	**mg/L**
Fluoride	0.05	0.10
Chloride	0.25	1
Nitrate	0.50	7
Sulfate	2.5	11
Sodium	0.20	0.40
Potassium	0.05	0.10
Ammonium	0.10	1
Calcium	0.01	0.05
Magnesium	0.02	0.05

These standards are sold in our standard 100, 250, and 500 mL sizes.

Certified Wastewater - Trace Metals Solutions

HPS is offering a series of certified reference solutions which simulate the concentrations found of a variety of materials. These solutions, which are directly traceable to NIST, may be used in laboratory performance evaluation, quality control, and method development. All of the following solutions are ideally suited for AAS, ICP, and ICP-MS.

Listed below are the concentrations that will be found when each 10 mL sample is diluted to **one liter**.

Catalog No.	CWW-TM-A	CWW-TM-B	CWW-TM-C	CWW-TM-D	CWW-TM-E	CWW-TM-F	CWW-TM-G	CWW-TM-H
Matrix	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL	10% HNO_3 + Tr HF µg/mL
Elements								
Aluminum	0.050	0.200	0.500	1	0.025	0.025	1	0.100
Antimony	0.010	0.050	0.150	0.250	0.005	0.250	0.005	0.200
Arsenic	0.010	0.050	0.150	0.250	0.005	0.005	0.250	0.100
Barium	0.050	0.200	0.500	1	0.025	1	0.025	0.100
Beryllium	0.010	0.050	0.150	0.250	0.005	0.005	0.250	0.020
Boron	0.050	0.200	0.500	1	0.025	1	0.025	0.250
Cadmium	0.010	0.050	0.150	0.250	0.025	0.005	0.250	0.100
Chromium	0.050	0.200	0.500	1	0.025	1	0.025	0.500
Cobalt	0.050	0.200	0.500	1	0.025	0.025	1	0.500
Copper	0.050	0.200	0.500	1	0.025	1	0.025	0.500
Iron	0.050	0.200	0.500	1	0.025	0.025	1	0.250
Lead	0.050	0.200	0.500	1	0.025	1	0.025	0.500
Manganese	0.050	0.200	0.500	1	0.025	0.025	1	0.100
Mercury*	0.001	0.005	0.010	0.02	0.001	0.020	0.005	0.0010
Molybdenum	0.050	0.200	0.500	1	0.025	0.025	1	0.100
Nickel	0.050	0.200	0.500	1	0.025	1	0.250	0.500
Selenium	0.010	0.050	0.150	0.250	0.005	0.005	0.250	0.050
Silver	0.010	0.050	0.150	0.250	0.005	0.250	0.005	0.020
Strontium	0.050	0.200	0.500	1	0.025	0.025	1	0.100
Thallium	0.010	0.050	0.150	0.250	0.005	0.025	0.005	0.250
Vanadium	0.050	0.200	0.500	1	0.025	0.025	1	0.500
Zinc	0.050	0.200	0.500	1	0.025	1	0.025	0.500
Volume	10 mL	10 mL	10 mL	10 mL	10 mL	10 mL	10 mL	10 mL

***The concentration of Mercury cannot be guaranteed for any extended period of time due to the nature of the element.**

Any of our wastewater standards can be modified to meet your needs. Call (843) 767-7900 to discuss your needs with our staff.

These standards are sold in our standard 100, 250, and 500 mL sizes.

Soil and Biological Solutions

A sampling of our most popular simulated solutions. Simulations of natural solids are based upon dissolution of 1 gram of a natural material in acid and diluted to 100 mL.

	Sea Water	River Sediment Solution B	Estuarian Sediment Solution	Soil Solution A	Orchard Leaves Solution
Catalog No.	**CRM-SW**	**CRM-RS-B**	**CRM-ES**	**CRM-SOIL-A**	**CRM-OL**
Matrix	2% HNO_3 mg/kg	4% HNO_3 µg/mL	4% HNO_3 µg/mL	4% HNO_3 µg/mL	4% HNO_3 µg/mL
Elements					
Aluminum	0.5	600	700	500	3
Antimony	- -	0.04	0.004	0.03	- -
Arsenic	0.02	0.20	0.10	0.2	0.1
Barium	0.05	4	- -	5	0.5
Beryllium	- -	- -	0.02	- -	- -
Boron	5	- -	- -	- -	- -
Bromide	65	- -	- -	- -	0.1
Cadmium	(0.0001)	0.03	(0.0004)	0.003	0.001
Calcium	400	300	80	350	200
Carbon	30	- -	- -	- -	- -
Chloride	19,000	- -	- -	- -	7
Chromium	(0.0003)	15	0.80	- -	0.03
Cobalt	- -	0.15	0.10	- -	0.002
Copper	0.01	1	0.20	0.30	0.1
Iodide	0.05				
Iron	0.02	400	350	200	3.0
Lead	0.004	2.0	0.30	0.40	0.5
Lithium	0.1				- -
Magnesium	1,250	120	100	70	60
Manganese	0.01	6	4.0	0.10	1
Nickel	(0.0001)	0.50	0.30	0.30	0.01
Phosphorus	0.1	10	5.0	10	20
Potassium	380	200	150	200	150
Rubidium	0.2	- -	- -	- -	0.1
Selenium	0.004	0.01	0.05	0.01	0.0008
Silicon	4	3000.0	3000	3000	5
Sodium	10,500	50	200	70	1
Strontium	12	- -	- -	- -	- -
Sulfur	900	- -	- -	- -	20
Thallium	- -	0.01	- -	- -	- -
Thorium	- -	0.10	0.10	0.10	- -
Uranium	(0.0015)	0.03	- -	0.01	- -
Vanadium	(0.0003)	1	1	0.10	0.005
Zinc	0.005	5	1.5	1	25

Note: Values in parentheses are for information purposes only.

Solid CRM List

The following is a sampling of Certified Reference Materials (CRM) in solid form currently available. At least two different analytical techniques were used to certify these CRMs for major, minor and trace elements after total digestion. Data for additional digestion techniques, such as EPA-3050 digestion procedure, are included for most.

The soil samples are dried and crushed, coarse particles are removed, and only particles that a sieve opening of 150 µm (No 100) are collected, blended, and bottled. Samples from each lot are checked for homogeneity, and if found homogeneous, the digestion procedures are performed and the analytes determined.

The material is intended for the calibration of instrumentation, the evaluation of analytical methods, and the quality control of the analytical measurements.

Catalog No.	Matrix	Level*	Certified For	Weight/grams
CRM-DF-A	Dog Food	A	Metals, Carbon, Sulfur, Nitrogen	50
CRM-CM-A	Corn Meal	A	Metals, Carbon, Sulfur, Nitrogen	50
CRM-COAL-A1	Coal	A	Metals, Sulfur	50
CRM-CSM-A	Cotton Seed Meal	A	Metals, Carbon, Sulfur, Nitrogen	50
CRM-LO-A	Loam	A	Metals, Carbon, Sulfur	50
CRM-LO-B	Loam	B	Metals, Carbon, Sulfur	50
CRM-LO-C	Loam	C	Metals	40
CRM-LO-D	Loam	D	Metals	40
CRM-LO-X	Highly Contaminated Loam	X	Metals, Carbon, Sulfur	40
CRM-MP-A	Milk Powder	A	Metals, Carbon, Sulfur, Nitrogen	40
CRM-MS-S	Marine Sediment	A	Metals, Carbon, Sulfur	50
CRM-PC-A	Paint Chips	A	0.1% Lead	40
CRM-PC-B	Paint Chips	B	0.5% Lead	40
CRM-PN-A	Pine Needles	A	Metals, Carbon, Sulfur, Nitrogen	30
CRM-S-D	Sludge	Domestic	Metals, Carbon, Sulfur	50
CRM-S-I	Sludge	Industrial	Metals, Carbon, Sulfur	50
CRM-SA-A	Sand	A	Metals, Carbon, Sulfur	50
CRM-SA-B	Sand	B	Metals, Carbon, Sulfur	50
CRM-SA-C	Sand	C	Metals, Sulfur	50
CRM-SBM-A	Soybean Meal	A	Metals, Carbon, Sulfur, Nitrogen	50
CRM-SG-A	Sugar	A	Metals, Carbon, Sulfur, Nitrogen	75
CRM-WF-S	Wheat Flour	A	Carbon, Sulfur, Nitrogen	40

*Level: A Pristine
B-D Elevated Concentrations of Priority Pollutants
X High Concentrations of Priority Pollutants