

## STANDARDS, REAGENTS & CERTIFIED REFERENCE MATERIALS

The **SCP SCIENCE** Chemical Manufacturing Division has been manufacturing and supplying Calibration Standards, Reagents and Certified Reference Materials for over 30 years. Our customers have come to trust our vast experience in these fields, made tangible by our ISO 17025, Guide 34 and ISO 9001 certifications.

This chapter contains our wide variety of product offerings, including Calibration Standards, QC Standards, Certified Reference Materials, as well as High Purity Chemicals and Reagents. Purchasing these products from **SCP SCIENCE** is headache-free, as our products are guaranteed to meet specification, supplied complete with Certificate of Analysis and MSDS, and securely packaged to arrive safely at your location.

- 138** Introduction
- 139** Single Element ICP-OES / ICP-MS Calibration Standards
  - 140 1,000 ppm
  - 142 10,000 ppm
  - 144 50,000 ppm
- 147** Multi-element ICP-OES / ICP-MS Standards
  - 148 EPA Calibration and QC Standards
  - 162 USP 232/233 & 2232 Calibration Standards
  - 163 Instrument Calibration Standards
  - 166 Custom Standards
  - 168 **PlasmaTEST**
- 170** High Purity Acids
  - 170 **PlasmaPURE Plus**
  - 172 **PlasmaPURE**
  - 172 Matrix Blanks
- 174** Matrix Reference Materials
  - 174 **EnviroMAT**
  - 185 **AgroMAT**
- 188** Performance Evaluation Standards
- 193** Ion Chromatography Standards
  - 193 Single Anion/Cation
  - 195 Multi Anion/Cation
  - 196 Eluents/Chelation solutions
- 198** Standards, Buffers and Reagents
  - 199 Acids and Bases
  - 202 pH Buffers
  - 203 Conductivity Standards
  - 204 BOD Standards and Reagents
  - 205 COD Standards and Reagents
  - 206 Ion Selective Electrode Buffers and Solutions
  - 207 High Purity Compounds

# WHAT STANDARDS DO I NEED? SO MANY TYPES TO CHOOSE FROM!

## STANDARDS FOR THE ANALYTICAL TESTING LABORATORY

### 1. CALIBRATION STANDARDS

#### CALIBRATING INSTRUMENTS TO GET THE MOST ACCURATE RESULTS

Calibration is a key aspect of any indirect measurement technique including ICP-OES and ICP-MS. To ensure precise analysis, several important factors to consider in the calibration process:

- Precision of the calibration standards (uncertainty)  
Eg. 1006 +/- 4 ppm
- Matching of acid matrix used in preparing calibration standards to the samples for analysis.  
Eg. When using 3% HNO<sub>3</sub> in calibration standards, be sure to have a similar amount of acid in the analysis samples.
- Matching of overall elemental matrix (element and concentration of calibration standards) to the samples for analysis  
Eg. a calibration curve with little or no sodium would not be useful for analyzing elements in seawater unless the samples were pre-treated to remove the sodium via a technique such as Solid Phase Extraction (see page 123).

**SCP SCIENCE** offers superior quality standards to master the above criteria, in the form of:

1. Single-element standards at 1K, 10K and 50K ppm for laboratories to prepare their own blends of standards.
2. Multi-element standards in commonly-used combinations and concentrations, directly based on EPA, USP or other methods. These can be used directly as calibration standards, or as QC standards, to verify the original calibration curve.
3. Custom-prepared standards to:
  - a. Save the end user valuable time by meeting specific calibration needs;
  - b. Removing additional sources of uncertainty in preparation;
  - c. Providing direct NIST traceability.

### INSTRUMENT AND TECHNICIAN VARIABILITY AND BIAS

Electronic, optical and mechanical components usually cause instruments to perform differently over time which can, in turn, lead to changes in sensitivity, resolution and repeatability. Add to that, the variability in technique and consistency from one technician to another, this complex set of variables can make it very difficult to predict the reliability of the results for a given sample.

Internal standards effectively provide a correction factor to compensate for changes in instrument performance by comparing the results for a given reference element. The ratio of analyte to reference will negate the variation in nebulizer uptake rate and other analytical anomalies. Simply choose an element that is not present in your sample matrix and add a constant quantity manually or via an **SCP SCIENCE** Mixing Kit, see page 111.

### 2. QUALITY CONTROL STANDARDS

QC standards are spot-checks of a known element or elements against a calibration curve, to determine if system variability and bias are within control and to identify problems at their onset to ensure reliability of data. Typically recommended frequencies for running QC-checks vary from 1-in-5 to 1-in-10 samples.

### 4. MATRIX REFERENCE MATERIALS

#### METHOD DEVELOPMENT AND VALIDATION

Whether validating currently accepted analytical methods, or developing a proprietary method from scratch, MRMs can play a critical role in the process. **SCP SCIENCE** MRMs are designed to closely imitate field-samples and are prepared in accordance with ISO Guides 31, 34 and 35, and therefore, can be used to validate every step from typical sample preparation through to final analysis. Comparing your laboratory's results to the round-robin certified consensus values, confidence intervals, and tolerance intervals, will provide a clear image of your laboratory's performance and method capabilities.

### 3. peCHECK STANDARDS

**peCHECK** standards are typically provided to the lab, often as blind samples, to provide objective performance evaluation, including the preparation of standards and calibration of the instrument.

## ICP-OES & ICP-MS STANDARDS

**PlasmaCAL** Calibration Standards are a full range of single and multi-element Calibration Standards for plasma spectroscopy. 70 Single Element Standards are available from stock; with a standard “unopened” shelf life of up to 24 months, and “opened” shelf life of 15 months. **PlasmaCAL** Standards are available in 1000 µg/ml, 10,000 µg/ml and 50,000 µg/ml concentrations in convenient sizes of 2 x 25 ml, 125 ml and 500 ml bottles. Additionally, unique Custom Standards can be prepared to meet specific laboratory requirements.



## SINGLE-ELEMENT STANDARDS

Features
Manufactured in accordance with ISO Guide 34 and certified ISO 17025
Dual expiry dates (up to 24 months unopened & 15 months opened) <ul style="list-style-type: none"> <li>• Longer shelf life for unopened bottles - stock with confidence</li> </ul>
Actual concentration typically within 0.5% of the nominal <ul style="list-style-type: none"> <li>• Certificate of Analysis providing NIST traceable concentration and uncertainty, in both wt./vol and wt./wt. formats, guaranteed for the shelf-life of the product.</li> </ul>
Available in 3 convenient formats to meet your needs: <ul style="list-style-type: none"> <li>• 2x 25 ml, perfect for dispensing precise amounts, avoiding cross-contamination, reducing waste and maximizing stability by maintaining a constant headspace.</li> <li>• 125 ml</li> <li>• 500 ml</li> </ul>

“The Best Quality at the Best Price” - is what defines **PlasmaCAL** Single Element Calibration Standards for ICP-OES and ICP-MS. **PlasmaCAL** Standards are directly traceable to National Institute of Standards and Technology (NIST) Series 3100 Standard Reference Materials.

## ICP-OES &amp; MS Standards

## SINGLE-ELEMENT CALIBRATION STANDARDS

## 1000 µg/ml

Element	Matrix	2x25 ml	125 ml	500 ml
Aluminum (Al)	HNO <sub>3</sub>	140-051-130	140-051-131	140-051-135
Aluminum (Al)	HCl	140-052-130	140-052-131	140-052-135
Antimony (Sb)	HNO <sub>3</sub> *	140-051-510	140-051-511	140-051-515
Arsenic (As)	HNO <sub>3</sub>	140-051-330	140-051-331	140-051-335
Barium (Ba)	HNO <sub>3</sub>	140-051-560	140-051-561	140-051-565
Beryllium (Be)	HNO <sub>3</sub>	140-051-040	140-051-041	140-051-045
Bismuth (Bi)	HNO <sub>3</sub>	140-051-830	140-051-831	140-051-835
Boron (B)	H <sub>2</sub> O	140-050-050	140-050-051	140-050-055
Cadmium (Cd)	HNO <sub>3</sub>	140-051-480	140-051-481	140-051-485
Calcium (Ca)	HNO <sub>3</sub>	140-051-200	140-051-201	140-051-205
Cerium (Ce)	HNO <sub>3</sub>	140-051-580	140-051-581	140-051-585
Cesium (Cs)	HNO <sub>3</sub>	140-051-550	140-051-551	140-051-555
Chromium (Cr III)	HNO <sub>3</sub>	140-051-240	140-051-241	140-051-245
Chromium (Cr III)	HCl	140-052-240	140-052-241	140-052-245
Chromium (Cr VI)	H <sub>2</sub> O	140-053-240	140-053-241	140-053-245
Cobalt (Co)	HNO <sub>3</sub>	140-051-270	140-051-271	140-051-275
Copper (Cu)	HNO <sub>3</sub>	140-051-290	140-051-291	140-051-295
Dysprosium (Dy)	HNO <sub>3</sub>	140-051-660	140-051-661	140-051-665
Erbium (Er)	HNO <sub>3</sub>	140-051-680	140-051-681	140-051-685
Europium (Eu)	HNO <sub>3</sub>	140-051-630	140-051-631	140-051-635
Gadolinium (Gd)	HNO <sub>3</sub>	140-051-640	140-051-641	140-051-645
Gallium (Ga)	HNO <sub>3</sub>	140-051-310	140-051-311	140-051-315
Germanium (Ge)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-050-320	140-050-321	140-050-325
Gold (Au)	HCl	140-052-790	140-052-791	140-052-795
Hafnium (Hf)	HCl	140-052-720	140-052-721	140-052-725
Holmium (Ho)	HNO <sub>3</sub>	140-051-670	140-051-671	140-051-675
Indium (In)	HNO <sub>3</sub>	140-051-490	140-051-491	140-051-495
Iridium (Ir)	HCl	140-052-770	140-052-771	140-052-775
Iron (Fe)	HNO <sub>3</sub>	140-051-260	140-051-261	140-051-265
Lanthanum (La)	HNO <sub>3</sub>	140-051-570	140-051-571	140-051-575
Lead (Pb)	HNO <sub>3</sub>	140-051-820	140-051-821	140-051-825
Lithium (Li)	HNO <sub>3</sub>	140-051-030	140-051-031	140-051-035
Lutetium (Lu)	HNO <sub>3</sub>	140-051-710	140-051-711	140-051-715
Magnesium (Mg)	HNO <sub>3</sub>	140-051-120	140-051-121	140-051-125
Manganese (Mn)	HNO <sub>3</sub>	140-051-250	140-051-251	140-051-255
Mercury (Hg)	HNO <sub>3</sub>	140-051-800	140-051-801	140-051-805
Molybdenum (Mo)	H <sub>2</sub> O	140-050-420	140-050-421	140-050-425
Neodymium (Nd)	HNO <sub>3</sub>	140-051-600	140-051-601	140-051-605
Nickel (Ni)	HNO <sub>3</sub>	140-051-280	140-051-281	140-051-285
Niobium (Nb)	HF	140-050-410	140-050-411	140-050-415

\*Traces of tartaric acid

## ICP-OES & MS Standards

### SINGLE-ELEMENT CALIBRATION STANDARDS

1000 µg/ml				
Element	Matrix	2x25 ml	125 ml	500 ml
Osmium (Os)	HCl	140-052-760	140-052-761	140-052-765
Palladium (Pd)	HCl	140-052-460	140-052-461	140-052-465
Phosphorus (P)	H <sub>2</sub> O	140-050-150	140-050-151	140-050-155
Platinum (Pt)	HCl	140-052-780	140-052-781	140-052-785
Potassium (K)	HNO <sub>3</sub>	140-051-190	140-051-191	140-051-195
Praseodymium (Pr)	HNO <sub>3</sub>	140-051-590	140-051-591	140-051-595
Rhenium (Re)	H <sub>2</sub> O	140-050-750	140-050-751	140-050-755
Rhodium (Rh)	HCl	140-052-450	140-052-451	140-052-455
Rubidium (Rb)	HNO <sub>3</sub>	140-051-370	140-051-371	140-051-375
Ruthenium (Ru)	HCl	140-052-440	140-052-441	140-052-445
Samarium (Sm)	HNO <sub>3</sub>	140-051-620	140-051-621	140-051-625
Scandium (Sc)	HNO <sub>3</sub>	140-051-210	140-051-211	140-051-215
Selenium (Se)	HNO <sub>3</sub>	140-051-340	140-051-341	140-051-345
Silicon (Si)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-050-140	140-050-141	140-050-145
Silver (Ag)	HNO <sub>3</sub>	140-051-470	140-051-471	140-051-475
Sodium (Na)	HNO <sub>3</sub>	140-051-110	140-051-111	140-051-115
Strontium (Sr)	HNO <sub>3</sub>	140-051-380	140-051-381	140-051-385
Sulfur (S) from S-(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> O	140-050-160	140-050-161	140-050-165
Sulfur (S) from S-CH <sub>3</sub> SO <sub>3</sub> H	H <sub>2</sub> O	140-059-160	140-059-161	140-059-165
Tantalum (Ta)	HF	140-050-730	140-050-731	140-050-735
Tellurium (Te)	HCl	140-052-520	140-052-521	140-052-525
Tellurium (Te)	HNO <sub>3</sub>	140-051-520	140-051-521	140-051-525
Terbium (Tb)	HNO <sub>3</sub>	140-051-650	140-051-651	140-051-655
Thallium (Tl)	HNO <sub>3</sub>	140-051-810	140-051-811	140-051-815
Thorium (Th)	HNO <sub>3</sub>	140-051-900	140-051-901	140-051-905
Thulium (Tm)	HNO <sub>3</sub>	140-051-690	140-051-691	140-051-695
Tin (Sn)	HCl	140-052-500	140-052-501	140-052-505
Tin (Sn)	HNO <sub>3</sub> /HF	140-054-500	140-054-501	140-054-505
Titanium (Ti)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-050-220	140-050-221	140-050-225
Tungsten (W)	H <sub>2</sub> O	140-050-740	140-050-741	140-050-745
Uranium (U)	HNO <sub>3</sub>	140-051-920	140-051-921	140-051-925
Vanadium (V)	HNO <sub>3</sub>	140-051-230	140-051-231	140-051-235
Ytterbium (Yb)	HNO <sub>3</sub>	140-051-700	140-051-701	140-051-705
Yttrium (Y)	HNO <sub>3</sub>	140-051-390	140-051-391	140-051-395
Zinc (Zn)	HNO <sub>3</sub>	140-051-300	140-051-301	140-051-305
Zirconium (Zr)	HNO <sub>3</sub>	140-051-400	140-051-401	140-051-405

## ICP-OES & MS Standards

### SINGLE-ELEMENT CALIBRATION STANDARDS

#### 10,000 µg/ml

Element	Matrix	2x25 ml	125 ml	500 ml
Aluminum (Al)	HNO <sub>3</sub>	140-061-130	140-061-131	140-061-135
Aluminum (Al)	HCl	140-062-130	140-062-131	140-062-135
Antimony (Sb)	HNO <sub>3</sub> *	140-061-510	140-061-511	140-061-515
Arsenic (As)	HNO <sub>3</sub>	140-061-330	140-061-331	140-061-335
Barium (Ba)	HNO <sub>3</sub>	140-061-560	140-061-561	140-061-565
Beryllium (Be)	HNO <sub>3</sub>	140-061-040	140-061-041	140-061-045
Bismuth (Bi)	HNO <sub>3</sub>	140-061-830	140-061-831	140-061-835
Boron (B)	H <sub>2</sub> O	140-060-050	140-060-051	140-060-055
Cadmium (Cd)	HNO <sub>3</sub>	140-061-480	140-061-481	140-061-485
Calcium (Ca)	HNO <sub>3</sub>	140-061-200	140-061-201	140-061-205
Cerium (Ce)	HNO <sub>3</sub>	140-061-580	140-061-581	140-061-585
Cesium (Cs)	HNO <sub>3</sub>	140-061-550	140-061-551	140-061-555
Chromium (Cr III)	HNO <sub>3</sub>	140-061-240	140-061-241	140-061-245
Chromium (Cr III)	HCl	140-062-240	140-062-241	140-062-245
Chromium (Cr VI)	H <sub>2</sub> O	140-063-240	140-062-241	140-062-245
Cobalt (Co)	HNO <sub>3</sub>	140-061-270	140-061-271	140-061-275
Copper (Cu)	HNO <sub>3</sub>	140-061-290	140-061-291	140-061-295
Dysprosium (Dy)	HNO <sub>3</sub>	140-061-660	140-061-661	140-061-665
Erbium (Er)	HNO <sub>3</sub>	140-061-680	140-061-681	140-061-685
Europium (Eu)	HNO <sub>3</sub>	140-061-630	140-061-631	140-061-635
Gadolinium (Gd)	HNO <sub>3</sub>	140-061-640	140-061-641	140-061-645
Gallium (Ga)	HNO <sub>3</sub>	140-061-310	140-061-311	140-061-315
Germanium (Ge)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-060-320	140-060-321	140-060-325
Gold (Au)	HCl	140-062-790	140-062-791	140-062-795
Hafnium (Hf)	HCl	140-062-720	140-062-721	140-062-725
Holmium (Ho)	HNO <sub>3</sub>	140-061-670	140-061-671	140-061-675
Indium (In)	HNO <sub>3</sub>	140-061-490	140-061-491	140-061-495
Iridium (Ir)	HCl	140-062-770	140-062-771	140-062-775
Iron (Fe)	HNO <sub>3</sub>	140-061-260	140-061-261	140-061-265
Lanthanum (La)	HNO <sub>3</sub>	140-061-570	140-061-571	140-061-575
Lead (Pb)	HNO <sub>3</sub>	140-061-820	140-061-821	140-061-825
Lithium (Li)	HNO <sub>3</sub>	140-061-030	140-061-031	140-061-035
Lutetium (Lu)	HNO <sub>3</sub>	140-061-710	140-061-711	140-061-715
Magnesium (Mg)	HNO <sub>3</sub>	140-061-120	140-061-121	140-061-125
Manganese (Mn)	HNO <sub>3</sub>	140-061-250	140-061-251	140-061-255
Mercury (Hg)	HNO <sub>3</sub>	140-061-800	140-061-801	140-061-805
Molybdenum (Mo)	H <sub>2</sub> O	140-060-420	140-060-421	140-060-425
Neodymium (Nd)	HNO <sub>3</sub>	140-061-600	140-061-601	140-061-605
Nickel (Ni)	HNO <sub>3</sub>	140-061-280	140-061-281	140-061-285
Niobium (Nb)	HF	140-060-410	140-060-411	140-060-415
Palladium (Pd)	HCl	140-062-460	140-062-461	140-062-465

\*Traces of tartaric acid

## ICP-OES & MS Standards

### SINGLE-ELEMENT CALIBRATION STANDARDS

10,000 µg/ml				
Element	Matrix	2x25 ml	125 ml	500 ml
Phosphorus (P)	H <sub>2</sub> O	140-060-150	140-060-151	140-060-155
Potassium (K)	HNO <sub>3</sub>	140-061-190	140-061-191	140-061-195
Praseodymium (Pr)	HNO <sub>3</sub>	140-061-590	140-061-591	140-061-595
Rhenium (Re)	H <sub>2</sub> O	140-060-750	140-060-751	140-060-755
Rhodium (Rh)	HCl	140-062-450	140-062-451	140-062-455
Rubidium (Rb)	HNO <sub>3</sub>	140-061-370	140-061-371	140-061-375
Ruthenium (Ru)	HCl	140-062-440	140-062-441	140-062-445
Samarium (Sm)	HNO <sub>3</sub>	140-061-620	140-061-621	140-061-625
Scandium (Sc)	HNO <sub>3</sub>	140-061-210	140-061-211	140-061-215
Selenium (Se)	HNO <sub>3</sub>	140-061-340	140-061-341	140-061-345
Silicon (Si)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-060-140	140-060-141	140-060-145
Silver (Ag)	HNO <sub>3</sub>	140-061-470	140-061-471	140-061-475
Sodium (Na)	HNO <sub>3</sub>	140-061-110	140-061-111	140-061-115
Strontium (Sr)	HNO <sub>3</sub>	140-061-380	140-061-381	140-061-385
Sulfur (S-(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> )	H <sub>2</sub> O	140-060-160	140-060-161	140-060-165
Sulfur (S-CH <sub>3</sub> SO <sub>3</sub> H)	H <sub>2</sub> O	140-069-160	140-069-162	140-069-165
Tantalum (Ta)	HF	140-060-730	140-060-731	140-060-735
Tellurium (Te)	HCl	140-062-520	140-062-521	140-062-525
Terbium (Tb)	HNO <sub>3</sub>	140-061-650	140-061-651	140-061-655
Thallium (Tl)	HNO <sub>3</sub>	140-061-810	140-061-811	140-061-815
Thorium (Th)	HNO <sub>3</sub>	140-061-900	140-061-901	140-061-905
Thulium (Tm)	HNO <sub>3</sub>	140-061-690	140-061-691	140-061-695
Tin (Sn)	HCl	140-062-500	140-062-501	140-062-505
Tin (Sn)	HNO <sub>3</sub> /HF	140-064-500	140-064-501	140-064-505
Titanium (Ti)	H <sub>2</sub> O/tr. F <sup>-</sup>	140-060-220	140-060-221	140-060-225
Tungsten (W)	HNO <sub>3</sub> /HF	140-064-740	140-064-741	140-064-745
Uranium (U)	HNO <sub>3</sub>	140-061-920	140-061-921	140-061-925
Vanadium (V)	HNO <sub>3</sub>	140-061-230	140-061-231	140-061-235
Ytterbium (Yb)	HNO <sub>3</sub>	140-061-700	140-061-701	140-061-705
Yttrium (Y)	HNO <sub>3</sub>	140-061-390	140-061-391	140-061-395
Zinc (Zn)	HNO <sub>3</sub>	140-061-300	140-061-301	140-061-305
Zirconium (Zr)	HNO <sub>3</sub>	140-061-400	140-061-401	140-061-405

## ICP-OES & MS Standards

### SINGLE-ELEMENT CALIBRATION STANDARDS

#### 50,000 µg/ml

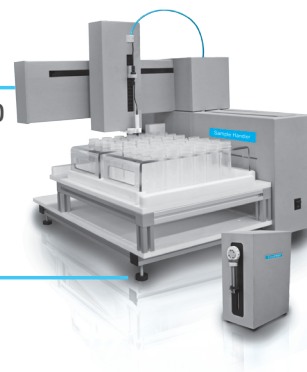
Element	Matrix	2x25 ml	125 ml	500 ml
Bismuth (Bi)	HNO <sub>3</sub>	140-041-830	140-041-831	140-041-835
Cadmium (Cd)	HNO <sub>3</sub>	140-041-480	140-041-481	140-041-485
Calcium (Ca)	HNO <sub>3</sub>	140-041-200	140-041-201	140-041-205
Cesium (Cs)	HNO <sub>3</sub>	140-041-550	140-041-551	140-041-555
Chromium (Cr)	HCl	140-041-240	140-041-241	140-041-245
Cobalt (Co)	HNO <sub>3</sub>	140-041-270	140-041-271	140-041-275
Copper (Cu)	HNO <sub>3</sub>	140-041-290	140-041-291	140-041-295
Gallium (Ga)	HNO <sub>3</sub>	140-041-310	140-041-311	140-041-315
Indium (In)	HNO <sub>3</sub>	140-041-490	140-041-491	140-041-495
Iron (Fe)	HNO <sub>3</sub>	140-041-260	140-041-261	140-041-265
Lead (Pb)	HNO <sub>3</sub>	140-041-820	140-041-821	140-041-825
Magnesium (Mg)	HNO <sub>3</sub>	140-041-120	140-041-121	140-041-125
Manganese (Mn)	HNO <sub>3</sub>	140-041-250	140-041-251	140-041-255
Nickel (Ni)	HNO <sub>3</sub>	140-041-280	140-041-281	140-041-285
Phosphorus (P)	H <sub>2</sub> O	140-040-150	140-040-151	140-040-155
Potassium (K)	HNO <sub>3</sub>	140-041-190	140-041-191	140-041-195
Selenium (Se)	HNO <sub>3</sub>	140-041-340	140-041-341	140-041-345
Silver (Ag)	HNO <sub>3</sub>	140-041-470	140-041-471	140-041-475
Sodium (Na)	HNO <sub>3</sub>	140-041-110	140-041-111	140-041-115
Strontium (Sr)	HNO <sub>3</sub>	140-041-380	140-041-381	140-041-385
Sulfur (S) S-(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> O	140-040-160	140-040-161	140-040-165
Zinc (Zn)	HNO <sub>3</sub>	140-041-300	140-041-301	140-041-305



SPECIALLY DESIGNED FOR ICP-OES/MS LABS TO AUTOMATE ALL TYPES OF LIQUID MANIPULATION - DISPENSING, ALIQUOTING, NORMALIZING, TRANSFERRING.

**SAVE MONEY AND INCREASE THROUGHPUT  
WITH UNATTENDED SAMPLE PREPARATION AUTOMATION**

SEE PAGE 56 FOR MORE DETAILS





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# Certificate of Analysis

# Mg

**1.0 DESCRIPTION:** *PlasmaCAL ICP/ICPMS Standard - Magnesium 1000 µg/ml*  
 Catalogue Number: 140-051-12x  
 Starting Material: Magnesium Metal 99.99+%  
 Lot Number: **S140708030**  
 Matrix: 4% HNO<sub>3</sub> (See Section 3 for actual matrix)  
 Expiration Date: **July 2016** (or 15 months after bottle is opened, whichever comes first)

**2.0 CERTIFIED VALUES AND ASSOCIATED UNCERTAINTY:**

Certified Concentration: **1003 µg/ml +/- 3 µg/ml**  
**980 µg/g +/- 3 µg/g**  
 Method of analysis: Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES)  
 Traceability: NIST Standard Reference Material 3131a Lot: **050302**

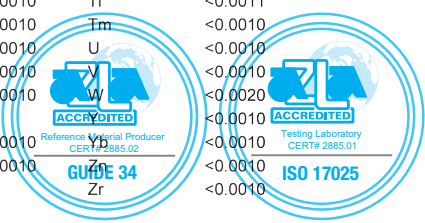
**Note:** The uncertainty of the certified value has been calculated from applicable uncertainty contributors ( $u_i$ ) including uncertainty established during characterization of the material ( $u_{char}$ ), the between bottle variation ( $u_{bb}$ ), short-term stability ( $u_{stb}$ ) and long-term stability ( $u_{lts}$ ) according to the model  $u_c = \sqrt{(u_{char})^2 + u_{bb}^2 + u_{stb}^2 + u_{lts}^2}$ . This combined uncertainty has been further multiplied by a coverage factor (k) of 2 to provide a 95% confidence interval.

**3.0 REFERENCE VALUES:**

Density: **1.024 g/ml @ 21.0°C**  
 Actual Matrix: **4.0% (v/v) HNO<sub>3</sub>**

Trace Metal Impurities as tested by ICP-MS:

Element	Conc. (ppm)	Element	Conc. (ppm)	Element	Conc. (ppm)	Element	Conc. (ppm)
Ag	<0.0010	Fe	<b>0.0224</b>	Nd	<0.0010	Sn	<0.0010
Al	<b>0.0192</b>	Ga	<0.0010	Ni	<0.0010	Sr	<0.0025
As	<0.0010	Gd	<0.0010	Os	*	Ta	<0.0010
Au	<0.0010	Ge	<0.0010	P	<0.0026	Tb	<0.0010
B	<0.0015	Hf	<0.0010	Pb	<0.0010	Te	<0.0010
Ba	<0.0010	Hg	*	Pd	<0.0010	Th	<0.0010
Be	<0.0010	Ho	<0.0010	Pr	<0.0010	Ti	<0.0012
Bi	<0.0010	In	<0.0010	Pt	<0.0010	Tl	<0.0011
Ca	<b>0.0766</b>	Ir	<0.0010	Rb	<0.0010	Tm	<0.0010
Cd	<0.0010	K	<0.0024	Re	<0.0010	U	<0.0010
Ce	<0.0010	La	*	Rh	<0.0010	V	<0.0010
Co	<0.0010	Li	<0.0010	Ru	<0.0010	W	<0.0020
Cr	<0.0010	Lu	<0.0010	S	*	Xe	<0.0010
Cs	<0.0010	Mg	N/A	Sb	<0.0010	Yb	<0.0010
Cu	<b>0.0034</b>	Mn	<b>0.0437</b>	Sc	<0.0010	Zr	<0.0010
Dy	<0.0010	Mo	<0.0010	Se	*		
Er	<0.0010	Na	<b>0.0457</b>	Si	*		
Eu	<0.0010	Nb	<0.0010	Sm	<0.0010		



**4.0 APPROVAL AND DATE OF CERTIFICATION:**  
 Certification Approval: Daniel Boisvert, Chemist  
 Certification Date: July 15, 2014

*Daniel Boisvert*

# ICP-OES & MS Standards

## STANDARDS REQUEST FORM

### CONTACT INFORMATION

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

Company: \_\_\_\_\_ Title: \_\_\_\_\_

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

City: \_\_\_\_\_ Province/State: \_\_\_\_\_ PC/Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail: \_\_\_\_\_

		2x25 ml	125 ml	500 ml	1000 µg/ml	10 000 µg/ml	50 000 µg/ml			2x25 ml	125 ml	500 ml	1000 µg/ml	10 000 µg/ml	50 000 µg/ml			2x25 ml	125 ml	500 ml	1000 µg/ml	10 000 µg/ml	50 000 µg/ml		
Aluminum (HNO <sub>3</sub> )	Al	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Holmium	Ho	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Ruthenium	Ru	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aluminum (HCl)	Al	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Indium	In	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Samarium	Sm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antimony	Sb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Iridium	Ir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Scandium	Sc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arsenic	As	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Iron	Fe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Selenium	Se	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Barium	Ba	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lanthanum	La	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Silicon	Si	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beryllium	Be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lead	Pb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Silver	Ag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bismuth	Bi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lithium	Li	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Silicon	Si	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boron	B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Lutetium	Lu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Sodium	Na	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cadmium	Cd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Magnesium	Mg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Strontium	Sr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calcium	Ca	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Manganese	Mn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Sulfur	S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cerium	Ce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Mercury	Hg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Tantalum	Ta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cesium	Cs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Molybdenum	Mo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Tellurium	Te	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chromium (HNO <sub>3</sub> )	Cr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Neodymium	Nd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Terbium	Tb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chromium (HCl)	Cr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Nickel	Ni	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Thallium	Tl	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cobalt	Co	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Niobium	Nb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Thullium	Tm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Copper	Cu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Osmium	Os	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Thorium	Th	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dysprosium	Dy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Palladium	Pd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Tin	Sn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erbium	Er	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Phosphorus	P	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Titanium	Ti	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Europium	Eu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Platinum	Pt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Tungsten	W	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gadolinium	Gd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Potassium	K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Uranium	U	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gallium	Ga	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Praseodymium	Pr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Vanadium	V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Germanium	Ge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Rhenium	Re	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Yttrium	Y	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gold	Au	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Rhodium	Rh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Ytterbium	Yb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hafnium	Hf	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Rubidium	Rb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Zinc	Zn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
																		Zirconium	Zr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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## MULTI-ELEMENT STANDARDS

### STANDARDS FOR THE EPA LABORATORY

A collection of Calibration and QC Standards for use with your ICP-OES/ICP-MS instrument

**U.S. EPA Method 200.7** covers the determination of metals and some non-metals in water and wastes for regulatory compliance, by use of inductively coupled plasma optical emission spectroscopy (ICP-OES) in radial and/or axial viewing.

**U.S. EPA Method 200.8** covers the analysis of ground waters, surface waters, drinking waters, and wastewaters by inductively coupled plasma mass spectrometry (ICP-MS).

**U.S. EPA Method 6010c** covers the use of ICP-OES for the determination of 31 elements in ground waters, industrial and organic wastes, soils, sludges and sediments, in conjunction with the Toxicity Characteristic Leaching Procedure (TCLP) or the Extraction Procedure (EP).

#### Features

Designed specifically for EPA 200.7, 200.8, 6010 and Superfund CLP

- Save money and time in preparation

Available in 2 or 3 sizes (100 ml, 250 ml & 500 ml)

- Save by buying only what is required

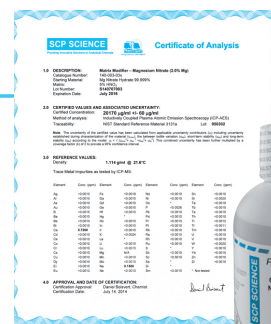
Complete Certificate of Analysis listing actual concentrations and traceability to NIST

- Complete documentation for audit purposes



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## CALIBRATION STANDARDS FOR EPA METHODS

## EPA 200.7 MIXED CALIBRATION STANDARDS

## STANDARD 1 SOLUTION A

Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Ag @ 50 µg/ml
	Ba @ 100 µg/ml
	B, Cd, Cu, Mn @ 200 µg/ml
	Sb, Se @ 500 µg/ml
	Ca @ 1000 µg/ml
Volume (ml)	Catalog No.
125	141-120-011
500	141-120-015

## STANDARD 1 SOLUTION B

Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	As @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-051-331
500	140-051-335



Volume (ml)	Catalog No.
125	140-120-011
500	140-120-015

## STANDARD 2

Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Sr @ 100 µg/ml
	Li @ 500 µg/ml
	Mo, Na @ 1000 µg/ml
	K @ 2000 µg/ml
Volume (ml)	Catalog No.
125	140-120-021
500	140-120-025

## STANDARD 3

Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Co, V @ 200 µg/ml
	P @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-120-031
500	140-120-035

## CALIBRATION STANDARDS FOR EPA METHODS

### EPA 200.7 MIXED CALIBRATION STANDARDS

STANDARD 4 SOLUTION A		STANDARD 4 SOLUTION B		STANDARD 4 SOLUTION C	
Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Hg @ 200 µg/ml	Matrix: 20% HCl Dilution: 1 to 100	Sn @ 400 µg/ml	Matrix: H <sub>2</sub> O Dilution: 1 to 100	Si @ 1000 µg/ml
	Cr, Zn @ 500 µg/ml				
	Al @ 1000 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	141-120-041	125	141-120-141	125	140-050-141
500	141-120-045	500	141-120-145	500	140-050-145



Volume (ml)	Catalog No.
125	140-120-041
500	140-120-045

STANDARD 5	
Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Be @ 100 µg/ml
	Ni @ 200 µg/ml
	Tl @ 500 µg/ml
	Fe, Mg, Pb @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-120-051
500	140-120-055



Volume (ml)	Catalog No.
125	140-120-061
500	140-120-065

## CALIBRATION STANDARDS FOR EPA METHODS

## MULTI-ELEMENT CALIBRATION STANDARDS

STANDARD 1		STANDARD 2		STANDARD 3	
Matrix: 5% HNO <sub>3</sub>	Be @ 50 µg/ml	Matrix: 5% HNO <sub>3</sub>	Ba, Co, Cu, V @ 100 µg/ml	Matrix: 5% HNO <sub>3</sub>	Mo @ 100 µg/ml
	Mn @ 100 µg/ml		Fe @ 1000 µg/ml		As @ 500 µg/ml
	Cd, Zn @ 150 µg/ml				
	Se @ 200 µg/ml				
	Pb @ 500 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-101-011	125	140-101-021	125	140-101-031
250	140-101-012	250	140-101-022	250	140-101-032
500	140-101-015	500	140-101-025	500	140-101-035

STANDARD 4		STANDARD 5		STANDARD 6	
Matrix: 5% HNO <sub>3</sub>	Sr @ 10 µg/ml	Matrix: 5% HNO <sub>3</sub>	Ag @ 50 µg/ml	Matrix: H <sub>2</sub> O	P @ 200 µg/ml
	Cr, Ni @ 20 µg/ml		Sb, Tl @ 200 µg/ml		
	Li @ 100 µg/ml				
	Al, Na @ 200 µg/ml				
	K @ 400 µg/ml		Mg @ 1000 µg/ml		
	Ca @ 1000 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-101-041	125	140-101-051	125	140-101-071
250	140-101-042	250	140-101-052	250	140-101-072
500	140-101-045	500	140-101-055	500	140-101-075



Volume (ml)	Catalog No.
125	140-101-061
250	140-101-062
500	140-101-065

## CALIBRATION STANDARDS FOR EPA METHODS

### CLP INSTRUMENT CALIBRATION STANDARDS

STANDARD 1		STANDARD 2		STANDARD 3	
Matrix: 5% HNO <sub>3</sub>	Ca, Mg, K, Na @ 2500 µg/ml	Matrix: 5% HNO <sub>3</sub>	Ag, Cr @ 100 µg/ml	Matrix: 5% HNO <sub>3</sub>	Be @ 50 µg/ml
			Mn @ 150 µg/ml		Cu @ 250 µg/ml
			Zn @ 200 µg/ml		Fe @ 1000 µg/ml
			Ni @ 400 µg/ml		Al, Ba @ 2000 µg/ml
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-114-011	125	140-114-021	125	140-114-031
500	140-114-015	500	140-114-025	500	140-114-035

STANDARD 4		STANDARD 5		STANDARD 6	
Matrix: 5% HNO <sub>3</sub>	Cd, Pb, Se @ 50 µg/ml	Matrix: 5% HNO <sub>3</sub>	Sb @ 600 µg/ml	Matrix: 2% HNO <sub>3</sub>	Hg @ 100 µg/ml
	As, Tl @ 100 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-114-041	125	140-114-051	125	140-114-061
500	140-114-045	500	140-114-055	500	140-114-065



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## CALIBRATION STANDARDS FOR EPA METHODS

### GROUNDWATER & WASTEWATER (Trace Metal) STANDARDS

TRACE METALS I		TRACE METALS II		TRACE METALS III	
Matrix: 5% HNO <sub>3</sub>	Hg @ 5 µg/ml	Matrix: 2% HNO <sub>3</sub>	Ag @ 10 µg/ml	Matrix: 2% HNO <sub>3</sub>	K, Mg @ 100 µg/ml
	Cd, Se @ 25 µg/ml				
	As, Be, Cr, Co, Cu, Fe, Mn, Ni, Pb, Zn @ 100 µg/ml				
	V @ 250 µg/ml				
	Al @ 500 µg/ml				
Sb, Tl @ 20 µg/ml	Ba, Ca, Mo, Na @ 500 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-106-011	125	140-106-021	125	140-106-031
250	140-106-012	250	140-106-022	250	140-106-032
500	140-106-015	500	140-106-025	500	140-106-035

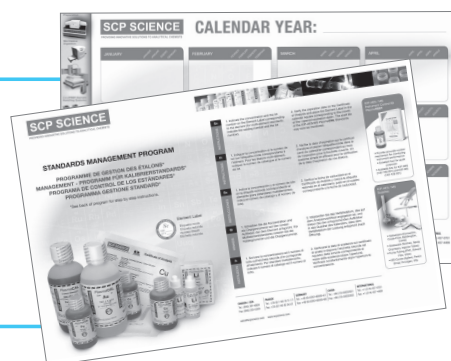


Volume (ml)	Catalog No.
125	140-106-041
250	140-106-042
500	140-106-045



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## CALIBRATION STANDARDS FOR EPA METHODS

### GROUNDWATER & WASTEWATER (Alternate Metal) STANDARDS

#### ALTERNATE METALS I

Matrix: 2% HNO <sub>3</sub>	Be, Sb, Tl @ 5 µg/ml
	Co, Cu, Mn, Ni, Zn @ 10 µg/ml
	Al, Fe, V @ 20 µg/ml
Volume (ml)	Catalog No.
125	140-107-011
250	140-107-012
500	140-107-015

#### ALTERNATE METALS II

Matrix: 2% HNO <sub>3</sub>	K, Mg @ 100 µg/ml
	Ca, Na @ 500 µg/ml
Volume (ml)	Catalog No.
125	140-107-021
250	140-107-022
500	140-107-025



Volume (ml)	Catalog No.
125	140-107-031
250	140-107-032
500	140-107-035

### TOXICITY CHARACTERISTIC LEACHATE PROCEDURE (TCLP) STANDARDS

#### TCLP STANDARD

Matrix: 5% HNO <sub>3</sub>	Cd, Se @ 5 µg/ml
	As, Cr, Pb, Ag @ 25 µg/ml
	Ba @ 500 µg/ml
Volume (ml)	Catalog No.
125	140-112-011
250	140-112-012
500	140-112-015

#### TCLP MERCURY STANDARD

Matrix: 2% HNO <sub>3</sub>	Hg @ 20 µg/ml
Volume (ml)	Catalog No.
125	140-112-041
250	140-112-042
500	140-112-045

## QUALITY CONTROL STANDARDS FOR EPA METHODS

### INITIAL CALIBRATION VERIFICATION I

STANDARD 1	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ag @ 20 µg/ml
	Be @ 40 µg/ml
	Cd @ 50 µg/ml
	Ba, Co, Cu, Fe, Pb, Mn, Ni, Ti, Zn @ 100 µg/ml
Volume (ml)	Catalog No.
125	140-115-011
500	140-115-015

STANDARD 2	
<b>Matrix: 5% HNO<sub>3</sub></b>	Al, As, Cr, Se, Sb, V @ 100 µg/ml
	Ca, Mg, K, Na @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-115-021
500	140-115-025

### INITIAL CALIBRATION VERIFICATION II

STANDARD 1	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ag @ 100 µg/ml
	Be @ 200 µg/ml
	Cd @ 250 µg/ml
	Ba, Co, Cu, Fe, Pb, Mn, Ni, Ti, Zn @ 500 µg/ml
Volume (ml)	Catalog No.
125	140-116-011
500	140-116-015

STANDARD 2 - SOLUTION A	
<b>Matrix: 5% HNO<sub>3</sub></b>	Al, As, Cr, Sb, Se, V @ 500 µg/ml
Volume (ml)	Catalog No.
125	140-116-021
500	140-116-025

STANDARD 2 - SOLUTION B	
<b>Matrix: 5% HNO<sub>3</sub></b>	Sb @ 500 µg/ml
Volume (ml)	Catalog No.
125	141-116-121
500	141-116-125

STANDARD 3	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ca, Mg, K, Na @ 2500 µg/ml
Volume (ml)	Catalog No.
125	140-114-011
500	140-114-015



Volume (ml)	Catalog No.
125	140-116-021
500	140-116-025

## SCP SCIENCE EXCLUSIVE QUALITY CONTROL STANDARDS

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### QUALITY CONTROL STANDARD 1 (QC 19)

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

As, Be, Ca, Cd, Co, Cr, Cu,  
Fe, Mg, Mn, Mo, Ni, Pb, @ 100 µg/ml  
Se, Sb, Ti, Tl, V, Zn

Volume (ml)	Catalog No.
125	140-102-011
250	140-102-012
500	140-102-015

### QUALITY CONTROL STANDARD 2 (QC 7)

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

Si @ 50 µg/ml  
Ag, Al, B, Ba, Na @ 100 µg/ml  
K @ 1000 µg/ml

Volume (ml)	Catalog No.
125	140-102-021
250	140-102-022
500	140-102-025



Volume (ml)	Catalog No.
125	140-102-031
250	140-102-032
500	140-102-035

### QUALITY CONTROL STANDARD 3 (QC 21)

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

As, Be, Ca, Cd, Co, Cr, Cu,  
Fe, Li, Mg, Mn, Mo, Ni, @ 100 µg/ml  
Pb, Sb, Se, Sr, Ti, Tl, V, Zn

Volume (ml)	Catalog No.
125	140-102-051
250	140-102-052
500	140-102-055

### QUALITY CONTROL STANDARD 4 (QC 26)

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

Si @ 50 µg/ml  
Al, Ag, As, B, Ba, Be, Ca, Cd,  
Co, Cr, Cu, Fe, Mg, Mn, Mo, @ 100 µg/ml  
Na, Ni, Pb, Sb, Se, Ti, Tl, V, Zn  
K @ 1000 µg/ml

Volume (ml)	Catalog No.
125	140-102-041
250	140-102-042
500	140-102-045

## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

## ICP-MS VERIFICATION STANDARDS

## STANDARD 1 SOLUTION A

**Matrix: 5% HNO<sub>3</sub>** Al, Ag, As, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, Li, Mg, Mn, Na, Ni, Pb, Se, Sr, Tl, V, Zn @ 10 µg/ml

Volume (ml)	Catalog No.
125	141-110-011
250	141-110-012
500	141-110-015

## STANDARD 1 SOLUTION B

**Matrix: 10% HNO<sub>3</sub>** Hg @ 10 µg/ml

Volume (ml)	Catalog No.
125	141-110-111
250	141-110-112
500	141-110-115

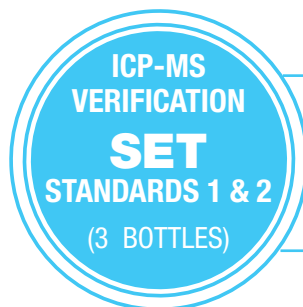


Volume (ml)	Catalog No.
125	140-110-011
250	140-110-012
500	140-110-015

## STANDARD 2

**Matrix: 1% HF** B, Mo, S, Si, Tl, W @ 10 µg/ml

Volume (ml)	Catalog No.
125	140-110-021
250	140-110-022
500	140-110-025



Volume (ml)	Catalog No.
125	140-110-031
250	140-110-032
500	140-110-035

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## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

## ICP-MS INTERNAL STANDARDS

Element	Concentration (µg/ml)	Matrix	Catalog No.		
			125 ml	250 ml	500 ml
Bismuth (Bi)	100	HNO <sub>3</sub>	140-111-021	140-111-022	140-111-025
Holmium (Ho)	100	HNO <sub>3</sub>	140-111-041	140-111-042	140-111-045
Indium (In)	100	HNO <sub>3</sub>	140-111-051	140-111-052	140-111-055
Rhodium (Rh)	100	HCl	140-111-061	140-111-062	140-111-065
Scandium (Sc)	100	HNO <sub>3</sub>	140-111-011	140-111-012	140-111-015
Terbium (Tb)	100	HNO <sub>3</sub>	140-111-071	140-111-072	140-111-075
Yttrium (Y)	100	HNO <sub>3</sub>	140-111-031	140-111-032	140-111-035

## PLASMA &amp; TUNING SOLUTIONS

PLASMA	
<b>Matrix: 5% HNO<sub>3</sub> Dilution: 1 to 10</b>	As, Pb, Se, Tl @ 100 µg/ml
Volume (ml)	Catalog No.
125	140-121-011
500	140-121-015

TUNING	
<b>Matrix: 5% HNO<sub>3</sub> Dilution: 1 to 100</b>	Cu, Pb @ 100 µg/ml
Volume (ml)	Catalog No.
125	140-122-011
500	140-122-015



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## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

### LABORATORY PERFORMANCE CHECK SOLUTION

SOLUTION A	
Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Ag @ 50 µg/ml
	Al, As, B, Ba, Be, Ca, Cd, Co, Cr @ 200 µg/ml
Volume (ml)	Catalog No.
125	141-123-011
500	141-123-015

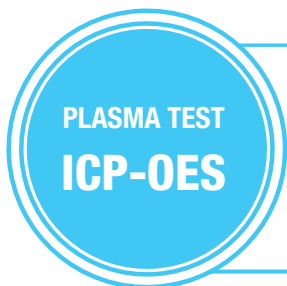
SOLUTION B	
Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Cu, Fe, Hg, Li, Mg, Mn, Mo, Na, Ni @ 200 µg/ml
	K @ 1000 µg/ml
Volume (ml)	Catalog No.
125	141-123-021
500	141-123-025

SOLUTION C	
Matrix: 5% HNO <sub>3</sub> Dilution: 1 to 100	Pb, Sb, Se, Sr, Tl, V, Zn @ 200 µg/ml
	P, Si @ 1000 µg/ml
Volume (ml)	Catalog No.
125	141-123-031
500	141-123-035

SOLUTION D	
Matrix: 20% HCl Dilution: 1 to 100	Sn @ 200 µg/ml
Volume (ml)	Catalog No.
125	141-123-041
500	141-123-045



Volume (ml)	Catalog No.
125	140-123-011
500	140-123-015



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## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

### CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

#### SUPERFUND CLP ICP-MS

<b>Matrix: 5% HNO<sub>3</sub></b>	Ag, As, Be, Cd, Co, Mn, Ni, Pb, Ti, V	@ 10 µg/ml
	Cr, Cu, Sb, Zn	@ 20 µg/ml
	Se	@ 50 µg/ml
	Ba	@ 100 µg/ml
Volume (ml)	Catalog No.	
125	140-117-021	
500	140-117-025	

#### SUPERFUND CLP ICP-OES

<b>Matrix: 5% HNO<sub>3</sub></b>	Be, Cd	@ 5 µg/ml
	As, Cr, Pb	@ 10 µg/ml
	Mn	@ 15 µg/ml
	Cu, Ti	@ 25 µg/ml
	Se	@ 35 µg/ml
	Ni	@ 40 µg/ml
	Co, V	@ 50 µg/ml
	Sb, Zn	@ 60 µg/ml
	Fe	@ 100 µg/ml
	Al, Ba	@ 200 µg/ml
Ca, K, Mg	@ 5000 µg/ml	
Volume (ml)	Catalog No.	
125	140-117-031	
500	140-117-035	

### CONTRACT REQUIRED DETECTION LIMITS (CRDL)

<b>Matrix: 5% HNO<sub>3</sub></b>	Pb	@ 6 µg/ml
	Be, Cd, Se	@ 10 µg/ml
	Ag, As, Ti, Cr	@ 20 µg/ml
	Mn	@ 30 µg/ml
	Zn	@ 40 µg/ml
	Cu	@ 50 µg/ml
	Ni	@ 80 µg/ml
	Co, V	@ 100 µg/ml
	Sb	@ 120 µg/ml
Volume (ml)	Catalog No.	
125	140-117-011	
500	140-117-015	

<b>Matrix: 10% HNO<sub>3</sub></b>	Be, Cd	@ 5 µg/ml
	Ag, Cr, Pb	@ 10 µg/ml
	As, Mn	@ 15 µg/ml
	Cu, Ti	@ 25 µg/ml
	Se	@ 35 µg/ml
	Ni	@ 40 µg/ml
	Co, Li, Sr, V	@ 50 µg/ml
	Zn	@ 60 µg/ml
	Fe	@ 100 µg/ml
	Al, Ba	@ 200 µg/ml
Ca, K, Mg, Na	@ 5000 µg/ml	
Volume (ml)	Catalog No.	
125	140-117-041	
500	140-117-045	

## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

## INTERFERENCE CHECKS

## INTERFERENTS A

<b>Matrix: 5% HNO<sub>3</sub></b>	Fe @ 1000 µg/ml
	Al, Ca, Mg @ 2500 µg/ml

Volume (ml)	Catalog No.
125	140-118-011
500	140-118-015

## INTERFERENTS B

<b>Matrix: 5% HNO<sub>3</sub></b>	Ba, Be, Co, Cr,	@ 50 µg/ml
	Cu, Mn, V	
	Ag, Cd, Ni, Pb, Zn	@ 100 µg/ml

Volume (ml)	Catalog No.
125	140-118-021
500	140-118-025

## ALTERNATE INTERFERENTS A

<b>Matrix: 5% HNO<sub>3</sub></b>	Cr, Cu, Mn, Ni, Ti, V @ 1000 µg/ml
-----------------------------------	------------------------------------

Volume (ml)	Catalog No.
125	140-118-031
500	140-118-035

## ALTERNATE INTERFERENTS B

<b>Matrix: 5% HNO<sub>3</sub></b>	Ca, Fe, Mg, Si	@ 10 µg/ml
	Al, As, B, Mo,	@ 100 µg/ml
	Na, Sb, Se, Tl	

Volume (ml)	Catalog No.
125	140-118-041
500	140-118-045

## INTERFERENCE STANDARDS

## STANDARD 1

<b>Matrix: 5% HNO<sub>3</sub></b>	Hg @ 5 µg/ml	
	Be @ 10 µg/ml	
	Mn @ 20 µg/ml	
	Ag, Ba, Cr,	@ 30 µg/ml
	Cd, Co, Cu,	
	Ni, V, Zn	
	Se @ 50 µg/ml	
As, Pb, Tl @ 100 µg/ml		
K @ 2000 µg/ml		

Volume (ml)	Catalog No.
125	140-104-011
250	140-104-012
500	140-104-015

## STANDARD 4

<b>Matrix: 5% HNO<sub>3</sub></b>	Al @ 400 µg/ml
	Mg @ 1000 µg/ml
	Ca, Fe @ 2000 µg/ml

Volume (ml)	Catalog No.
125	140-104-041
250	140-104-042
500	140-104-045

## STANDARD 5

<b>Matrix: 4 % HNO<sub>3</sub></b>	Na @ 5000 µg/ml
------------------------------------	-----------------

Volume (ml)	Catalog No.
125	140-104-051
250	140-104-052
500	140-104-055



## INSTRUMENT AND PERFORMANCE STANDARDS FOR EPA METHODS

### SPECTRAL INTERFERENCE CHECKS

SIC I		SIC II		SIC III	
<b>Matrix: H<sub>2</sub>O</b> <b>Dilution: 1 to 10</b>	Mo @ 500 µg/ml	<b>Matrix: 5% HNO<sub>3</sub></b> <b>Dilution: 1 to 10</b>	Co @ 100 µg/ml	<b>Matrix: 5% HNO<sub>3</sub></b> <b>Dilution: 1 to 10</b>	Ni @ 200 µg/ml
			Cr, Mn, V @ 200 µg/ml		Al @ 300 µg/ml
	Cu @ 400 µg/ml		Fe @ 1500 µg/ml		
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-124-011	125	140-124-021	125	140-124-031
500	140-124-015	500	140-124-025	500	140-124-035

### SPIKE SAMPLE ANALYSIS

STANDARD 1		STANDARD 2A (WATER)		STANDARD 2B (WATER)	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ag, Be, Cd @ 5 µg/ml	<b>Matrix: 5% HNO<sub>3</sub></b>	Ag, Be @ 50 µg/ml	<b>Matrix: 5% HNO<sub>3</sub></b>	Sb @ 500 µg/ml
	Cr @ 20 µg/ml		Cr @ 200 µg/ml		
	Cu @ 25 µg/ml		Cu @ 250 µg/ml		
	Co, Mn, Ni, Pb, Sb, V @ 50 µg/ml		Co, Mn, Ni, V, Zn @ 500 µg/ml		
	Zn @ 55 µg/ml		Fe @ 1000 µg/ml		
	Fe @ 100 µg/ml		Al, Ba @ 2000 µg/ml		
	Al, As, Ba, Se, Tl @ 200 µg/ml				
Volume (ml)	Catalog No.	Volume (ml)	Catalog No.	Volume (ml)	Catalog No.
125	140-119-011	125	140-119-021	125	140-119-031
500	140-119-015	500	140-119-025	500	140-119-035

### STANDARD 3 (SOIL)

<b>Matrix: 5% HNO<sub>3</sub></b>	Ag, Be, Cd @ 10 µg/ml
	Cr @ 40 µg/ml
	Cu @ 50 µg/ml
	Co, Mn, Ni, Pb, Sb, V, Zn @ 100 µg/ml
	As, Ba, Se, Tl @ 400 µg/ml
Volume (ml)	Catalog No.
125	140-119-051
500	140-119-055

## United States Pharmacopeia

### USP 232/233 & 2232

Replacing USP chapter 231 in the United States Pharmacopeia - National Formulary, USP 232, 233 and 2232 now govern the permissible dosage limits for elemental impurities. Drug and Dietary Supplement manufacturers will be required to monitor these elements in the future by ICP-OES or ICP-MS.

**SCP SCIENCE** offers the following NIST-traceable Standards which were derived from the actual limitations included in USP232/233 & 2232. In the case where particular needs may differ, CUSTOM Standards are available.

### USP 232 ELEMENTAL IMPURITIES

#### STANDARD I - PARENTERAL DAILY DOSE

<b>Matrix: 5% HNO<sub>3</sub></b>	As, Hg @ 1.5 ppm
	Cd @ 2.5 ppm
	Pb @ 5 ppm
	Mo, V @ 10 ppm
	Ni @ 50 ppm
	Cu @ 100 ppm
Volume (ml)	Catalog No.
125	140-131-031

#### STANDARD I - ORAL DAILY DOSE

<b>Matrix: 5% HNO<sub>3</sub></b>	As @ 1.5 ppm
	Pb @ 5 ppm
	Hg @ 15 ppm
	Cd @ 25 ppm
	Mo, V @ 100 ppm
	Ni @ 500 ppm
Cu @ 1000 ppm	
Volume (ml)	Catalog No.
125	140-131-041

#### STANDARD II - PARENTERAL DAILY DOSE

<b>Matrix: 10% HCl</b>	Ir, Os, Pd, Pt, Rh, Ru @ 10 ppm
Volume (ml)	Catalog No.
125	140-131-051

#### STANDARD II - ORAL DAILY DOSE

<b>Matrix: 10% HCl</b>	Ir, Os, Pd, Pt, Rh, Ru @ 100 ppm
Volume (ml)	Catalog No.
125	140-131-021

### USP 2232 ELEMENTAL IMPURITIES

#### DIETARY SUPPLEMENTS STANDARD

<b>Matrix: 2% HNO<sub>3</sub></b>	Cd @ 0.5 ppm
	Pb @ 1 ppm
	As (inorganic), Hg (inorganic) @ 1.5 ppm
Volume (ml)	Catalog No.
125	140-131-061

## INSTRUMENT CALIBRATION STANDARDS AND TUNING SOLUTIONS

PlasmaQUAL S22	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ba, Ca, Li, Mg, Sr, Ti @ 10 µg/ml
	Al, Cd, Co, Cr, Cu, Fe, Mn, Na, Ni, Pb, V, Zn @ 100 µg/ml
	As, K, Se, Tl @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-102-061
250	140-102-062
500	140-102-065

INTERNAL STANDARD MIX 1 - SCP-IS7 (AGILENT® REF # 5183-4681)	
<b>Matrix: 2% HNO<sub>3</sub></b>	Bi, Ge, In, <sup>6</sup> Li, Sc, Tb, Y @ 10 µg/ml
Volume (ml)	Catalog No.
125	140-111-081
250	140-111-082
500	140-111-083

INITIAL CALIBRATION VERIFICATION STANDARD 3 (AGILENT® REF # 5183-4682)	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Mo, Mn, Ni, Pb, Sb, Se, Th, Tl, U, V, Zn @ 10 µg/ml
	Sr @ 100 µg/ml
	Ca, Fe, K, Mg, Na @ 1000 µg/ml
Volume (ml)	Catalog No.
125	140-115-031
250	140-115-032
500	140-115-033

REPROFILING SOLUTION FOR SPECTRO CIROS	
<b>Matrix: 5% HCl / 2 HNO<sub>3</sub></b>	Mg, Mn @ 5 µg/ml
	Fe, K, La, P, Sc, Ti @ 10 µg/ml
	S @ 50 µg/ml
Volume (ml)	Catalog No.
125	140-128-201
250	140-128-202
500	140-128-205

WAVECAL STANDARD I FOR PERKIN ELMER® 40, 400, 1000 and 2000	
<b>Matrix: 2% HNO<sub>3</sub></b>	As, La, Li, Mn, Mo, Na, Ni, Sc @ 20 µg/ml
	K, P, S @ 100 µg/ml
Volume (ml)	Catalog No.
125	140-128-111
250	140-128-112
500	140-128-115

WAVECAL STANDARD III FOR OPTIMA 3000 VISTA	
<b>Matrix: 2% HNO<sub>3</sub></b>	Ba, Ca @ 1 µg/ml
	La, Li, Mn, Na, Sr @ 10 µg/ml
	K 50ppm
Volume (ml)	Catalog No.
125	140-128-231
250	140-128-232
500	140-128-235

SCP-11-MS FOR THERMO & PE® ICP-MS	
<b>Matrix: 5% HNO<sub>3</sub></b>	Ba, Be, Ce, Co, In, K, Li, Mg, Pb, Rh, U @ 10 ppm
Volume (ml)	Catalog No.
2x25	140-130-330
125	140-130-331
500	140-130-335

TUNING SOLUTION FOR SPECTRO® GENESIS®/ARCOS® ICAL	
<b>Matrix: 2% HNO<sub>3</sub> / HCl</b>	Ni, Ce, P, Cu, Eu, Fe, Si, In, K, Ti, V, Y, Zr @ 10 µg/ml
	Na*, Sc, Mn, Mo @ 5 µg/ml
	Be, Sr, Li @ 2 µg/ml
	Ca @ 1 µg/ml
Volume (ml)	Catalog No.
125	140-128-301
250	140-128-302
500	140-128-305

## INSTRUMENT CALIBRATION STANDARDS AND TUNING SOLUTIONS

SCP SCIENCE

Certificate of Analysis

**1.0 DESCRIPTION :** Plasma CAL – Calibration solution SCP28AES  
 Catalogue Number : 140-130-30X  
 Lot Number : S150223005  
 Matrix: 5.0% HNO<sub>3</sub>  
 Expiration Date : May 2016

**2.0 CERTIFIED VALUES AND ASSOCIATED UNCERTAINTY:**  
 Method of Analysis: Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES)  
 Traceability: Applicable NIST Standard Reference Materials (see list below):

3101a Al 3102a Ca 3117a Eu 3125a Fe 3134 Mo 3142a Pr 3151 Ag 3159 Th 3167a Y	3102a Sb 3110 Ce 3118a Gd 3127a La 3135a Nd 3143 Re 3152a Na 3160a Tm 3165a Zn
3103a As 3111a Cs 3119a Ga 3126 Pb 3138 Ni 3144 Rh 3153a Sr 3161a Sn 3169 Zr	3104a Ba 3112a Cr 3120a Ge 3129a Li 3137 Nb 3145a Rb 3154 S 3162a Ti
3105a Be 3113 Co 3121 Au 3130a Lu 3139 Pd 3147a Sm 3155 Ta 3163 W	3106 Bi 3114 Cu 3122 Hf 3137a Mg 3139a P 3148a Sc 3156 Te 3164 U
3107 B 3115a Dy 3123a Ho 3132 Mn 3140 Pt 3149 Se 3157a Tl 3165 V	3108 Cd 3116a Er 3124a In 3133 Hg 3141a K 3150 Si 3158 Tl 3166a Yb

**Certified Concentrations:**

Ag 100.9 ± 0.8 µg/ml	Cu 100.8 ± 0.6 µg/ml	Se 100.6 ± 0.6 µg/ml
Al 101.2 ± 0.9 µg/ml	Fe 100.5 ± 0.6 µg/ml	Sr 100.4 ± 0.7 µg/ml
As 100.3 ± 0.7 µg/ml	K* 100.0 ± 1.0 µg/ml	Ti 101.1 ± 0.7 µg/ml
B 101.0 ± 0.8 µg/ml	Li 101.3 ± 1.0 µg/ml	Tl 100.0 ± 0.6 µg/ml
Ba 101.3 ± 0.8 µg/ml	Mg 100.4 ± 0.9 µg/ml	V 101.6 ± 0.9 µg/ml
Be 100.7 ± 0.8 µg/ml	Mn 100.9 ± 0.8 µg/ml	Zn 100.1 ± 0.7 µg/ml
Bi 100.5 ± 0.7 µg/ml	Mo 100.4 ± 0.8 µg/ml	
Ca 101.5 ± 0.7 µg/ml	Na* 100.0 ± 1.0 µg/ml	
Cd 100.2 ± 0.7 µg/ml	Ni 101.0 ± 0.7 µg/ml	
Co 100.2 ± 0.6 µg/ml	Pb 100.1 ± 0.6 µg/ml	
Cr 100.3 ± 0.7 µg/ml	Sb 100.4 ± 0.6 µg/ml	

\*Concentration value derived from v/v dilutions of certified, NIST-traceable starting materials  
 Note: The uncertainty of the certified value has been calculated from applicable uncertainty contributors (u) such as the SHM inherited uncertainty, weighing and dilution errors and instrument variability. The combined uncertainty (uc= √(u<sub>c</sub><sup>2</sup>)) has been multiplied by a coverage factor (k) of 2 to provide a 95% confidence interval.

**3.0 REFERENCE VALUES:**  
 Density: 1.031 g/ml @ 20.0 °C

**4.0 APPROVAL AND DATE OF CERTIFICATION:**  
 Certification Approval: Yaling Sui, Chemist  
 Certification Date: February 23, 2015

### SCP-12-OES FOR THERMO® IRIS TUNING SOLUTION

**Matrix: 5% HNO<sub>3</sub>** Ba @ 10 ppm  
 Al, As, Cd, Cu, K, Mn, Pb, S, Se, Ti, Zn @ 100 ppm

Volume (ml)	Catalog No.
125	140-130-311
500	140-130-315

### SCP-15-OES TUNING SOLUTION WITH Cu FOR AGILENT (VARIAN)

**Matrix: 5% HNO<sub>3</sub>** Al, As, Ba, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Se, Sr, Zn @ 50 ppm  
 K @ 500 ppm

Volume (ml)	Catalog No.
125	140-130-351
500	140-130-355

### SCP-33-MS FOR THERMO & PE® ICP-MS

**Matrix: 5% HNO<sub>3</sub>** Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, K, La, Li, Mg, Mn, Mo, Na, Ni, Pb, Rb, Sb, Se, Sn, Sr, Ti, Tl, U, V, Zn @ 10 ppm

Volume (ml)	Catalog No.
125	140-130-321
500	140-130-325

### SCP-28-OES FOR THERMO ICP-OES

**Matrix: 5% HNO<sub>3</sub>** Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sr, Ti, Tl, V, Zn @ 100 ppm

Volume (ml)	Catalog No.
125	140-130-301
500	140-130-305

## INSTRUMENT CALIBRATION STANDARDS AND TUNING SOLUTIONS

## PlasmaCAL

## PA TUNING SOLUTION 1 FOR AGILENT® 7500 SERIES

<b>Matrix: 5% HNO<sub>3</sub></b>	Al, Ba, Bi, Co, Cr, Cu, In, 6Li, Lu, Mn, Na, Sc, Sr, Th, Tl, U, V	@ 5 µg/ml
	Y, Yb @ 2.5 µg/ml	
	Mg, Ni, Pb @ 10 µg/ml	
	As, Be, Cd, Zn @ 20 µg/ml	
Volume (ml)	Catalog No.	
125	140-130-371	

## PA TUNING SOLUTION II FOR AGILENT® 7500

<b>Matrix: 1% HNO<sub>3</sub> 10% HCl</b>	Ir, Ti @ 5 µg/ml	
	Ge, Mo, Pd, Ru, Sb, Sn	@ 10 µg/ml
Volume (ml)	Catalog No.	
125	140-130-381	

## IQ/OQ CHECK SOLUTION FOR SPECTRO

<b>Matrix: 5% HNO<sub>3</sub></b>	Al, As, Ba, Ca, Cd, Cu, Fe, Li, Mg, Mn, Na, Sc, Sr, Ti, Zn, Zr	@ 250 µg/ml
	K @ 1000 µg/ml	
Volume (ml)	Catalog No.	
125	140-128-411	

## SCP14-OES TUNING SOLUTION

<b>Matrix: 5% HNO<sub>3</sub></b>	Al, As, Ba, Cd, Co, Cr, Mn, Mo, Ni, Pb, Se, Sr, Zn	@ 50 µg/ml
	K @ 500 µg/ml	
Volume (ml)	Catalog No.	
125	140-130-341	
500	140-130-345	

## OPTIMIZATION SOLUTION FOR SPECTRO

<b>Matrix: 5% HNO<sub>3</sub></b>	As, Mn, Pb @ 200 µg/ml
Volume (ml)	Catalog No.
125	140-128-401

## ISO 17294 TUNING SOLUTION A

<b>Matrix: 10% HNO<sub>3</sub></b>	Al, Ag, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, In, K, La, Li, Lu, Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Sm, Sr, Tb, Th, Tl, Tm, U, V, Y, Yb, Zn, Zr	@ 10 µg/ml
Volume (ml)	Catalog No.	
125	140-135-011	
500	140-135-015	

## ISO 17294 TUNING SOLUTION B

<b>Matrix: 10% HCl</b>	Au, Hf, Ir, Pd, Pt, Rh, Ru, Sn, Te	@ 10 µg/ml
Volume (ml)	Catalog No.	
125	140-135-021	
500	140-135-025	

## ISO 17294 Tuning Solution C

<b>Matrix: H<sub>2</sub>O / tr. HF</b>	B, Ge, Mo, Nb, P, Re, S, Si, Ta, Ti, W	@ 10 µg/ml
Volume (ml)	Catalog No.	
125	140-135-031	
500	140-135-035	

## CUSTOM ICP-OES / ICP-MS STANDARDS

**SCP SCIENCE** is a world leader in the supply of custom standards for ICP-OES and ICP-MS. Each standard is prepared at our A2LA ISO 17025 and Guide 34 approved facility, typically within 72 hours of ordering. Shipped to your door complete with Certificate of Analysis detailing NIST traceable concentrations in both weight/weight and weight/volume units of measure. Density is also supplied for your convenience.

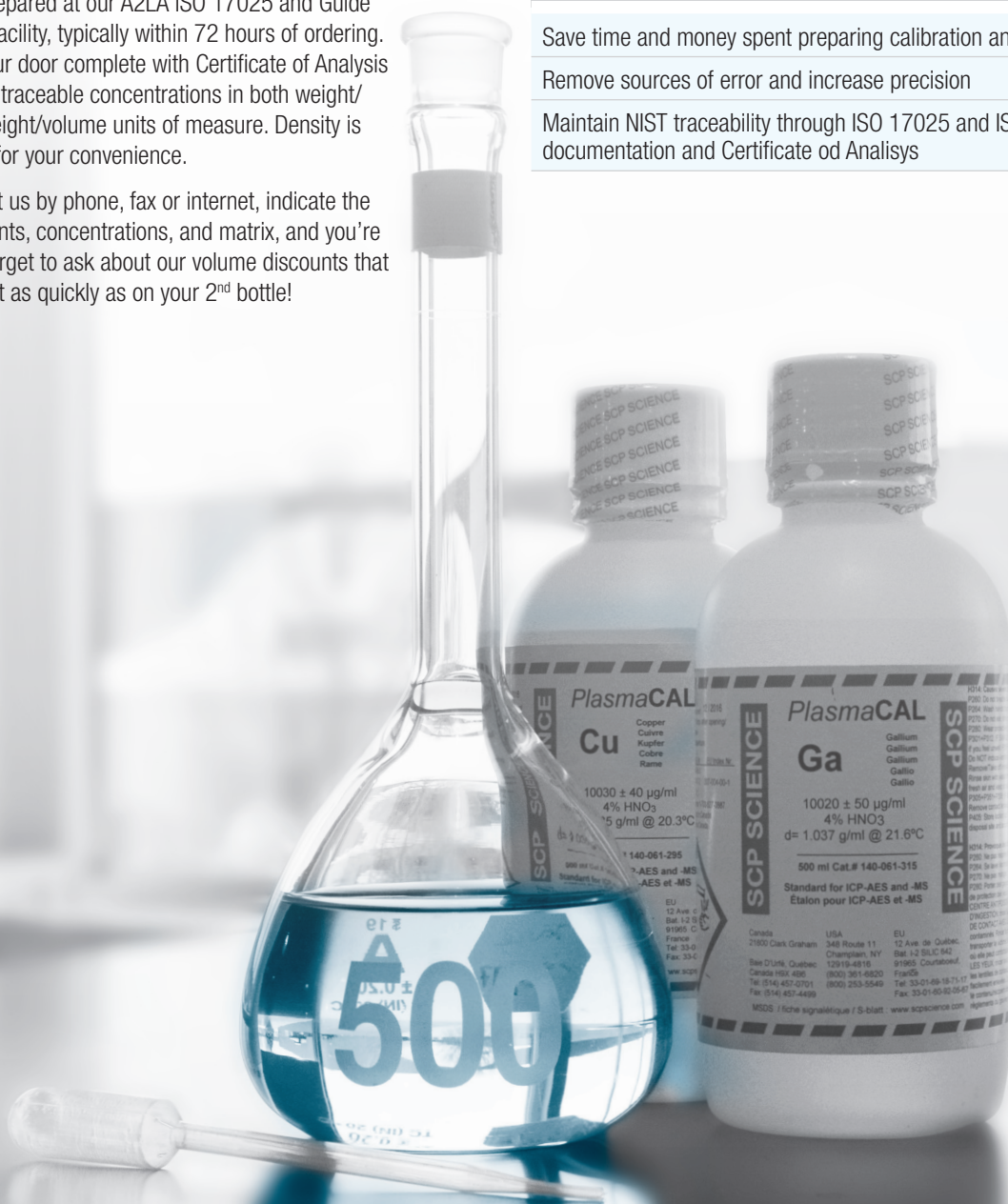
Simply contact us by phone, fax or internet, indicate the desired elements, concentrations, and matrix, and you're done! Don't forget to ask about our volume discounts that can take effect as quickly as on your 2<sup>nd</sup> bottle!

### Features

Save time and money spent preparing calibration and QC Standards

Remove sources of error and increase precision

Maintain NIST traceability through ISO 17025 and ISO Guide 34 documentation and Certificate of Analysis



## CUSTOM ICP-OES / ICP-MS STANDARDS

### CONTACT INFORMATION

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

Company: \_\_\_\_\_ Title: \_\_\_\_\_

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

City: \_\_\_\_\_ Province/State: \_\_\_\_\_ PC/Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Please indicate the element, volume and concentration required

Element	Symbol	Concentration	Element	Symbol	Concentration	Element	Symbol	Concentration
Aluminum	Al	_____	Holmium	Ho	_____	Ruthenium	Ru	_____
Antimony	Sb	_____	Indium	In	_____	Samarium	Sm	_____
Arsenic	As	_____	Iridium	Ir	_____	Scandium	Sc	_____
Barium	Ba	_____	Iron	Fe	_____	Selenium	Se	_____
Beryllium	Be	_____	Lanthanum	La	_____	Silicon	Si	_____
Bismuth	Bi	_____	Lead	Pb	_____	Silver	Ag	_____
Boron	B	_____	Lithium	Li	_____	Strontium	Sr	_____
Cadmium	Cd	_____	<sup>6</sup> Lithium	<sup>6</sup> Li	_____	Sulfur	S	_____
Calcium	Ca	_____	Magnesium	Mg	_____	Tantalum	Ta	_____
Carbon	C	_____	Manganese	Mn	_____	Tellurium	Te	_____
Cerium	Ce	_____	Mercury	Hg	_____	Terbium	Tb	_____
Cesium	Cs	_____	Molybdenum	Mo	_____	Thallium	Tl	_____
Chlorine	Cl	_____	Neodymium	Nd	_____	Thulium	Tm	_____
Chromium	Cr	_____	Nickel	Ni	_____	Thorium	Th	_____
Cobalt	Co	_____	Niobium	Nb	_____	Tin	Sn	_____
Copper	Cu	_____	Osmium	Os	_____	Titanium	Ti	_____
Dysprosium	Dy	_____	Palladium	Pd	_____	Tungsten	W	_____
Erbium	Er	_____	Phosphorus	P	_____	Uranium	U	_____
Europium	Eu	_____	Platinum	Pt	_____	Vanadium	V	_____
Gadolinium	Gd	_____	Potassium	K	_____	Yttrium	Y	_____
Gallium	Ga	_____	Praseodymium	Pr	_____	Ytterbium	Yb	_____
Germanium	Ge	_____	Rhenium	Re	_____	Zinc	Zn	_____
Gold	Au	_____	Rhodium	Rh	_____	Zirconium	Zr	_____
Hafnium	Hf	_____	Rubidium	Rb	_____			

**Matrix Required**

\_\_\_\_\_

**Custom Name**

\_\_\_\_\_

**Bottle Size & Quantity**

2x25 ml     250 ml    1 L

125 ml     500 ml    Bottles x \_\_\_\_\_

## INSTRUMENT CONTROL KITS

### PlasmaTEST ICP-OES

The **PlasmaTEST** ICP-OES kit was developed based on the extensive instrument behavioral research performed in the laboratories of Dr. Jean-Michel Mermet of the University in Lyon, France. The kit contains the necessary solutions and documentation required to continually monitor multiple parameters for one or more ICP spectrometers. A comprehensive logbook provides a full description for each test procedure, data tables and charts for recording of results, and criteria for interpretation of results. Replacement solutions are available separately.



#### Parameters Tested

Warm-up time
· Optimum analysis scheduling
Long-term stability
· Minimize frequency of re-standardization
Resolution
· Minimize spectral interferences
Plasma Robustness
· Monitor sensitivity to different matrices
Signal-to-Noise Ratio
· Optimize detection limits
Repeatability
· Monitor stability
Raw Count
· Monitor intensity stability

#### Description

#### Catalog No.

<b>PlasmaTEST</b> Kit for ICP-OES (English)	140-128-001
<b>PlasmaTEST</b> Kit for ICP-OES (French)	140-128-011

#### REORDERING INFORMATION

RQC-1 Solution	140-128-002
RQC-2 Solution	140-128-003
Follow-Up Solution	140-128-004
Log Book (English)	140-128-005
Log Book (French)	140-128-015



## INSTRUMENT CONTROL KITS

### PlasmaTEST ICP-MS

The **PlasmaTEST** ICP-MS Kit ensures maximum operation efficiency for your ICP-MS Spectrometer. The Kit includes testing schedules, control charts, and all required solutions.

#### Parameters Tested

##### Isotopic Ratio

- Ensures accuracy of concentration measurements when using Isotope Dilution Method

##### Resolution

- Minimize mass number interferences

##### Oxide & Double Charged Ion Ratios

- Control the oxide level to minimize mass number interferences

##### Sensitivity & Stability

- Verify the repeatability of the instrument

##### Mass Accuracy & Stability

- Evaluation of the accuracy of the analysis

#### Features

##### “Cool” Plasma & Dynamic Reaction Cell (DRC) Performance

- Verify the Isobaric Spectral Overlaps

##### Short & Long Term Stability

- Evaluate of the precision of the analysis

##### Cross Calibration

- Verify the calibration of the pulse & analog detectors

##### Mass Abundance

- Verify the ability of the instrument to measure different isotopes

##### Detector “Cut-Off”

- Detect potential problems at low concentrations

Description	Catalog No.
<b>PlasmaTEST</b> for ICP-MS Kit (English)	140-128-021
<b>PlasmaTEST</b> for ICP-MS Kit (French)	140-128-031
REORDERING INFORMATION	
Ratio Solution	140-128-022
Stability Solution	140-128-023
Stability (Brine)	140-128-024
Verification Solution	140-128-025
Plasma Solution	140-128-026
Log Book (English)	140-128-027
Log Book (French)	140-128-037



## HIGH PURITY ACIDS



SCP SCIENCE offers two grades of high purity acids, **PlasmaPURE** and **PlasmaPURE Plus**. These acids are manufactured for use in all aspects of trace elemental analysis, including sample preparation, calibration and working standard preparation, and matrix blank preparation. Supplied with a detailed Certificate of Analysis listing over 60 elements, our acids are the way to avoid elemental contamination of your samples.

**PlasmaPURE Plus** Grade acids are manufactured with *extremely low* trace metal impurities; in most cases less than 0.01 ppb, and packaged in pre-leached Teflon bottles for ultra-low level analysis by ICP-OES or ICP-MS below 1 ppb.

**PlasmaPURE** Grade Acids are manufactured with trace metal impurities of less than 1 ppb and are intended for ICP-OES, GFAA and flame AA applications above 1 ppb.

Pre-prepared **Matrix Blanks** derived from **PlasmaPURE** trace metal grade acids and 18 megaohm water are also available. Ready-to-use and perfect for use when preparing calibration curves.

## PlasmaPURE Plus ACIDS

**PlasmaPURE Plus** acids are intended for use in semiconductor, nuclear, clinical, pharmaceutical, geochemical analysis, and wherever the highest purity acids are required. Used for sample and standards preparation for ICP-OES and ICP-MS spectroscopy, where quantification below 1 ppb is commonly required.

### Features

Complete with a Certificate of Analysis with lot number, expiry date, & maximum specification for over 60 analytes

- Complete documentation for audit purposes

Packaged in Class 10 clean room conditions

- Supplied in preleached Teflon bottles for optimum quality

Available in sizes from 250 ml to 2 liters

- Flexibility: Buy only what is required or save money with larger volumes

Description	Assay	Molecular Weight	Catalog No.			
			250 ml	500 ml	1L	2L
Acetic Acid	>99% CH <sub>3</sub> COOH	60.05	250-036-101	250-036-103	250-036-105	---
Ammonia Solution	20-22% NH <sub>3</sub>	17.03	250-036-107	250-036-109	250-036-111	---
Hydrochloric Acid	32-35% HCl	36.46	250-036-113	250-036-115	250-036-117	250-036-119
Hydrofluoric Acid	47-51% HF	20.01	250-036-121	250-036-123	250-036-125	250-036-127
Hydrogen Peroxide	30%	---	---	250-036-145	---	---
Nitric Acid	67-70% HNO <sub>3</sub>	63.01	250-036-129	250-036-131	250-036-133	250-036-135
Sulphuric Acid	93-98% H <sub>2</sub> SO <sub>4</sub>	98.08	250-036-137	250-036-139	250-036-141	250-036-143

**SCP SCIENCE**

Providing Innovative Solutions to Analytical Chemists

# Certificate of Analysis

**PlasmaPURE Plus**

**Hydrofluoric Acid (47 - 51% HF)**

Catalogue Number: 250-036-121 / 250-036-123 /  
250-036-125 / 250-036-127  
Lot Number: **SCA5086590**  
Assay (HF w/w): **49%**  
Expiry Date: **March 2018**

Opened Bottle Expiry Information  
15 months after opening, up to unopened expiration date  
Date bottle opened \_\_\_\_\_

Analyte	Maximum Specification	Actual Value (in ppt)	Analyte	Maximum Specification	Actual Value (in ppt)
Aluminum (Al)	20 ppt	< 5	Neodymium (Nd)	1 ppt	< 0.01
Antimony (Sb)	20 ppt	< 0.02	Nickel (Ni)	20 ppt	< 1
Arsenic (As)	50 ppt	< 20	Niobium (Nb)	10 ppt	< 0.05
Barium (Ba)	10 ppt	< 0.05	Palladium (Pd)	20 ppt	< 0.1
Beryllium (Be)	10 ppt	< 0.01	Platinum (Pt)	20 ppt	< 0.1
Bismuth (Bi)	10 ppt	< 0.02	Potassium (K)	10 ppt	< 2
Boron (B)	100 ppt	< 10	Praseodymium (Pr)	1 ppt	< 0.01
Cadmium (Cd)	10 ppt	< 0.01	Rhenium (Re)	10 ppt	< 0.01
Calcium (Ca)	10 ppt	< 10	Rhodium (Rh)	20 ppt	< 0.01
Cerium (Ce)	10 ppt	< 0.01	Rubidium (Rb)	20 ppt	< 0.01
Cesium (Cs)	10 ppt	< 0.01	Ruthenium (Ru)	20 ppt	< 0.01
Chromium (Cr)	10 ppt	< 0.5	Samarium (Sm)	1 ppt	< 0.01
Cobalt (Co)	10 ppt	< 0.1	Scandium (Sc)	10 ppt	< 0.01
Copper (Cu)	10 ppt	< 1	Selenium (Se)	Information Only	< 5
Dysprosium (Dy)	1 ppt	< 0.01	Silver (Ag)	10 ppt	< 0.5
Erbium (Er)	1 ppt	< 0.01	Sodium (Na)	10 ppt	< 2
Europium (Eu)	1 ppt	< 0.01	Strontium (Sr)	10 ppt	< 0.05
Gadolinium (Gd)	1 ppt	< 0.01	Tantalum (Ta)	Information Only	< 0.01
Gallium (Ga)	10 ppt	< 0.01	Tellurium (Te)	1 ppt	< 0.02
Germanium (Ge)	10 ppt	< 0.01	Terbium (Tb)	1 ppt	< 0.01
Gold (Au)	20 ppt	< 1	Thallium (Tl)	10 ppt	< 0.01
Hafnium (Hf)	10 ppt	< 0.01	Thorium (Th)	1 ppt	< 0.01
Holmium (Ho)	1 ppt	< 0.01	Thulium (Tm)	1 ppt	< 0.01
Indium (In)	1 ppt	< 0.01	Tin (Sn)	20 ppt	< 0.1
Iron (Fe)	10 ppt	< 5	Titanium (Ti)	20 ppt	< 5
Lanthanum (La)	10 ppt	< 0.01	Tungsten (W)	20 ppt	< 20
Lead (Pb)	10 ppt	< 0.05	Uranium (U)	1 ppt	< 0.01
Lithium (Li)	10 ppt	< 0.01	Vanadium (V)	10 ppt	< 0.01
Lutetium (Lu)	1 ppt	< 0.01	Ytterbium (Yb)	1 ppt	< 0.01
Magnesium (Mg)	10 ppt	< 1	Yttrium (Y)	1 ppt	< 0.01
Manganese (Mn)	10 ppt	< 0.05	Zinc (Zn)	10 ppt	< 1
Mercury (Hg)	50 ppt	< 20	Zirconium (Zr)	10 ppt	< 0.5
Molybdenum (Mo)	10 ppt	< 0.5			

Analyte	Maximum Specification	Actual Value (in ppb)
Total Sulphur (S)	100 ppb	< 50

Certified by: Daniel Boisvert  
Daniel Boisvert, Chemist

Certification Date: **March 24, 2015**

To maintain product integrity and reduce the risk of trace metal contamination: the inner pack of plastic bags and bottle should be opened under CLASS 100 particle conditions to maintain the integrity of the product. The use of safety apparel, as well as eye protection, plastic gloves, hair net and a clean room suit is also advised. The Material Safety Data Sheet and this Certificate of Analysis are available on our web site. **SCP SCIENCE** is ISO 9001:2008 registered and ISO 17025 accredited (Également disponible en français).

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[www.scpscience.com](http://www.scpscience.com)

## High Purity Acids

### PlasmaPURE ACIDS

**PlasmaPURE** acids are manufactured with individual trace metal concentrations guaranteed to be equal to or less than 1 ppb. Used for environmental and industrial applications in ICP-OES and AA spectroscopy.

#### Features

Complete with a Certificate of Analysis with lot number, expiry date, & maximum specification for over 60 analytes.

- Complete documentation for audit purposes

Refined for low trace metals analysis

2 expiry dates (up to 3 years unopened and 15 months opened)

- Long shelf life for unopened bottles

Description	Assay	Molecular Weight	Catalog No.	
			500 ml	2.5 L
Acetic Acid	---	---	---	250-038-201
Hydrochloric Acid	34-37% HCL	36.46	250-038-151	250-038-155
Hydrofluoric Acid	47-51% HF	20.01	250-038-161	---
Nitric Acid	67-70% HNO <sub>3</sub>	63.01	250-038-171	250-038-175
Sulphuric Acid	93-98% H <sub>2</sub> SO <sub>4</sub>	98.08	250-038-181	250-038-185

## ICP-OES and ICP-MS

### MATRIX BLANKS

Save time and money with **SCP SCIENCE** prepared, impurity-tested matrix blanks!

Matrix	Catalog No.					
	100 ml	250 ml	500 ml	5 L	10 L	20 L
H <sub>2</sub> O	140-113-031	140-113-032	140-113-035	140-113-037	---	---
HNO <sub>3</sub> 5% V/V	140-113-011	140-113-012	140-113-015	140-113-018	140-113-017	140-113-019
HCl 5% V/V	140-113-021	140-113-022	140-113-025	140-113-027	---	---

OTHER CONCENTRATIONS AVAILABLE.

Certificate of Analysis  
PlasmaPURE ACIDS

**SCP SCIENCE**

Providing Innovative Solutions to Analytical Chemists

PlasmaPURE

**Certificate of Analysis**

Sulphuric Acid (93 - 98% H<sub>2</sub>SO<sub>4</sub>)

Catalogue Number: 250-038-181 / 250-038-185

Lot Number: **SCA4168405**  
Assay (H<sub>2</sub>SO<sub>4</sub> w/w): **94%**  
Colour (APHA): **< 7 (Specification: Max 10)**  
Expiry Date: **May 2017**

*Opened Bottle Expiry Information*  
15 months after opening, up to unopened expiration date  
Date bottle opened \_\_\_\_\_

Analyte	Maximum Specification	Actual Value (in ppb)	Analyte	Maximum Specification	Actual Value (in ppb)
Aluminum (Al)	1 ppb	< 0.5	Molybdenum (Mo)	0.5 ppb	< 0.1
Antimony (Sb)	1 ppb	< 0.1	Neodymium (Nd)	0.1 ppb	< 0.1
Arsenic (As)	0.5 ppb	< 0.5	Nickel (Ni)	0.5 ppb	< 0.1
Barium (Ba)	0.1 ppb	< 0.1	Niobium (Nb)	0.1 ppb	< 0.1
Beryllium (Be)	0.1 ppb	< 0.1	Palladium (Pd)	Information Only	< 0.5
Bismuth (Bi)	0.1 ppb	< 0.1	Platinum (Pt)	Information Only	< 0.5
Cadmium (Cd)	0.5 ppb	< 0.1	Potassium (K)	1 ppb	< 0.5
Calcium (Ca)	1 ppb	< 0.5	Praseodymium (Pr)	0.1 ppb	< 0.1
Cerium (Ce)	0.1 ppb	< 0.1	Rhodium (Rh)	0.5 ppb	< 0.5
Cesium (Cs)	0.1 ppb	< 0.1	Rubidium (Rb)	0.5 ppb	< 0.5
Chromium (Cr)	0.5 ppb	< 0.1	Samarium (Sm)	0.1 ppb	< 0.1
Cobalt (Co)	0.5 ppb	< 0.1	Scandium (Sc)	0.1 ppb	< 0.1
Copper (Cu)	0.5 ppb	< 0.1	Selenium (Se)	10 ppb	< 5
Dysprosium (Dy)	0.1 ppb	< 0.1	Silver (Ag)	1 ppb	< 0.1
Erbium (Er)	0.1 ppb	< 0.1	Sodium (Na)	1 ppb	< 0.5
Europium (Eu)	0.1 ppb	< 0.1	Strontium (Sr)	0.5 ppb	< 0.1
Gadolinium (Gd)	0.1 ppb	< 0.1	Tantalum (Ta)	Information Only	< 0.5
Gallium (Ga)	0.1 ppb	< 0.1	Tellurium (Te)	0.1 ppb	< 0.1
Germanium (Ge)	1 ppb	< 0.1	Terbium (Tb)	0.1 ppb	< 0.1
Gold (Au)	0.5 ppb	< 0.5	Thallium (Tl)	0.1 ppb	< 0.1
Hafnium (Hf)	0.1 ppb	< 0.1	Thorium (Th)	0.1 ppb	< 0.1
Holmium (Ho)	0.1 ppb	< 0.1	Thulium (Tm)	0.1 ppb	< 0.1
Indium (In)	0.1 ppb	< 0.1	Tin (Sn)	1 ppb	< 0.1
Iron (Fe)	1 ppb	< 0.5	Titanium (Ti)	1 ppb	< 0.5
Lanthanum (La)	0.1 ppb	< 0.1	Tungsten (W)	0.5 ppb	< 0.5
Lead (Pb)	0.1 ppb	< 0.1	Uranium (U)	0.1 ppb	< 0.1
Lithium (Li)	0.5 ppb	< 0.1	Vanadium (V)	0.5 ppb	< 0.1
Lutetium (Lu)	0.1 ppb	< 0.1	Ytterbium (Yb)	0.1 ppb	< 0.1
Magnesium (Mg)	1 ppb	< 0.5	Yttrium (Y)	0.1 ppb	< 0.1
Manganese (Mn)	0.5 ppb	< 0.1	Zinc (Zn)	1 ppb	< 0.2
Mercury (Hg)	0.1 ppb	< 0.02	Zirconium (Zr)	0.5 ppb	< 0.1

Analyte	Maximum Specification	Actual Value (in ppm)	Analyte	Maximum Specification	Actual Value (in ppm)
Chloride (Cl)	0.7 ppm	< 0.1	Nitrate (NO <sub>3</sub> <sup>-</sup> )	0.2 ppm	< 0.2
Total Phosphorus (P)	0.05 ppm	< 0.05	Substances reducing permanganate (KMnO <sub>4</sub> )	20 ppm	< 20

Certified by: *Daniel Boisvert*  
Daniel Boisvert, Chemist

Certification Date: **May 12, 2014**

To maintain product integrity and reduce the risk of trace metal contamination: the inner pack of plastic bags and bottle should be opened under CLASS 100 particle conditions to maintain the integrity of the product. The use of safety apparel, as well as eye protection, plastic gloves, hair net and a clean room suit is also advised. The Material Safety Data Sheet and this Certificate of Analysis are available on our web site. SCP SCIENCE is ISO 9001:2008 registered and ISO 17025 accredited (Également disponible en français).

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## MATRIX REFERENCE MATERIALS

**EnviroMAT™** and **AgroMAT™** Matrix Reference Materials are an invaluable component of any laboratory quality control program. This is because **SCP SCIENCE** CRMs are designed to imitate typical field samples, and as such, each aspect of a laboratory's analytical method can be evaluated.

Prepared using real world-materials, these products are certified via Round Robin, which provides not only realistic, method-dependent, un-biased consensus values, but also very useful confidence and tolerance intervals. The result is a Certificate of Analysis that will permit objective evaluation whether developing new methods or measuring your laboratory's overall performance.



<i>EnviroMAT</i> Standards	Quantity	Catalog No.
Soil, Contaminated SS-1	100 g	140-025-001
Soil Contaminated SS-2	100 g	140-025-002
Sludge, Sewage	50 g	140-025-011
Water, Drinking, Low Level, Concentrate	250 ml	140-025-031
Water, Drinking, High Level, concentrate	250 ml	140-025-032
Water, Ground, Low Level, Concentrate	250 ml	140-025-034
Water, Ground, High Level, Concentrate	250 ml	140-025-035
Water, Waste, Low Level, Concentrate	250 ml	140-025-037
Water, Waste, High Level, Concentrate	250 ml	140-025-038
Oil, Used	125 ml	140-025-041
Lead in Paint, Level 1	20 g	140-025-200
Lead in Paint, Level 2	20 g	140-025-201
Lead and Cadmium in Paint	20 g	140-025-205

<i>AgroMAT</i> Standards	Symbol	Quantity	Catalog No.
Soil, Clay	AG-1	175 g	140-025-101
Soil, Sandy	AG-2	175 g	140-025-102
Compost	CP-1	100 g	140-025-111

### Features

Each MRM is prepared in accordance with ISO Guide 34 and certified through a round robin study, focusing on specific methods of analysis.

- Independent verification from multiple laboratories

Includes Certificate of Analysis, prepared in accordance with ISO Guides 31 and 35, providing Consensus values and Confidence and Tolerance Intervals for each method used in the certification.

- Complete documentation for audit purposes

Economically priced, **SCP SCIENCE** MRMs pay for themselves by exposing and helping to correct analytical deficiencies.

- Confirmation of strong performance = peace of mind

## Matrix Reference Materials

EnviroMAT™

## CONTAMINATED SOIL (SS-1)

Element	EPA-3050A Digestion Values			TOTAL Digestion Values		
	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Ag	0.88	0.85 – 0.91	0.72 – 1.04	(3.4)	-----	-----
Al	12 163	11 753 – 12 572	9 579 – 14 746	40,106	36,686 - 43,526	22,672 - 57,540
As	20.7	19.7 – 21.8	14.0 – 27.5	17	13 - 21	1 - 33
B	26.9	18.5 – 35.2	0.0 – 77.8	-----	-----	-----
Ba	464	448 – 480	359 – 569	401	356 - 446	169 - 633
Be	0.48	0.43 – 0.53	0.22 – 0.74	(1.2)	-----	-----
Ca	50 265	49 052 – 51 478	42 222 – 53 308	137,664	124,276 - 151,052	69,413 - 205,915
Cd	3.2	3.0 – 3.5	1.8 – 4.7	35	32 - 38	23 - 47
Ce	(40.1)	----	----	(36)	-----	-----
Co	12.9	12.5 – 13.4	10.2 – 15.7	32	30 - 34	22 - 42
Cr	103	97.9 – 109	66.6 – 140	110	97 - 123	47 - 173
Cu	403	393 – 413	334 – 472	720	691 - 749	576 - 864
Fe	72 000	69 728 – 74 273	57 212 – 86 789	29,161	27,360 - 30,962	19,980 - 38,342
Hg	0.41	0.39 – 0.43	0.29 – 0.53	(0.25)	-----	-----
K	2232	2082 – 2382	1257 – 3208	14,495	13,185 - 15,805	7815 - 21,175
Li	14.3	12.9 – 15.8	6.4 – 22.3	(17)	-----	-----
Mg	9690	9459 – 9920	8141 – 11 239	9710	8925 - 10,495	5709 - 13,711
Mn	737	718 – 756	605 – 869	557	534 - 580	441 - 673
Mo	6.8	6.5 – 7.2	4.7 – 9.0	(8)	-----	-----
Na	650	587 – 714	235 – 1066	9528	8363 - 10,693	3877 - 15,179
Ni	59.2	57.9 – 60.5	50.4 – 68.0	239	215 - 263	123 - 355
P	1552	1518 – 1586	1329 – 1775	1188	1116 - 1260	857 - 1519
Pb	764	749 – 779	665 – 863	253	227 - 279	123 - 383
S	1916	1776 – 2057	1045 – 2787	(7994)	-----	-----
Sb	5.5	4.4 – 6.6	0.0 – 12.0	(1.7)	-----	-----
Se	0.78	0.64 – 0.92	0.02 – 1.54	(1.8)	-----	-----
Sn	340	324 – 357	245 – 436	(4.3)	-----	-----
Sr	114	113 - 116	106 – 122	332	308 - 356	211 - 453
Ti	530	473 – 587	195 – 865	1969	1782 - 2156	1015 - 2923
Tl	(0.19)	----	----	(0.9)	-----	-----
U	(0.76)	----	----	(21)	-----	-----
V	27.2	25.9 – 28.6	18.8 – 35.7	42	39 - 45	27 - 57
Y	-----	-----	-----	(16)	-----	-----
Zn	1114	1078 – 1151	860 – 1369	7290	6813 - 7767	4857 - 9723

## Matrix Reference Materials

EnviroMAT™

## CONTAMINATED SOIL (SS-2)

Element	EPA-3050A Digestion Values			TOTAL Digestion Values		
	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Ag	(1.3)	-----	-----	(3)	-----	-----
Al	13 265	12 114 - 14 416	6743 - 19 787	44 853	37 791 - 51 915	8005 - 81 701
As	75	65 - 85	25 - 125	78	62 - 94	5 - 151
B	(12)	-----	-----	-----	-----	-----
Ba	215	202 - 228	149 - 281	650	594 - 706	380 - 920
Be	(0.7)	-----	-----	(4)	-----	-----
Ca	112 861	107 989 - 117 733	87 443 - 138 279	118 738	106 798 - 130 678	56 442 - 181 034
Cd	(2)	-----	-----	(2)	-----	-----
Ce	(71)	-----	-----	(79)	-----	-----
Co	12	11 - 13	9 - 15	14	13 - 15	7 - 21
Cr	34	30 - 38	14 - 54	58	51 - 65	21 - 95
Cu	191	182 - 200	139 - 243	198	189 - 207	155 - 241
Fe	21 046	19 597 - 22 495	12 831 - 29 261	29 070	27 262 - 30 878	19 638 - 38 502
Hg	(0.28)	-----	-----	(0.34)	-----	-----
K	3418	3066 - 3770	1500 - 5336	18 119	16 349 - 19 889	9096 - 27 142
Li	14	12 - 16	5 - 23	(20)	-----	-----
Mg	11 065	10 459 - 11 671	7628 - 14 502	14 225	12 995 - 15 455	7953 - 20 497
Mn	457	433 - 481	324 - 590	577	545 - 609	409 - 745
Mo	(4)	-----	-----	(4)	-----	-----
Na	558	456 - 660	-----	12 539	11 362 - 13 716	6830 - 18 248
Ni	54	50 - 58	33 - 75	59	55 - 63	42 - 76
P	752	734 - 770	671 - 833	814	744 - 884	483 - 1145
Pb	126	116 - 136	68 - 184	148	130 - 166	63 - 233
S	(2193)	-----	-----	(2254)	-----	-----
Sb	(0.8)	-----	-----	(6)	-----	-----
Se	(0.8)	-----	-----	(1)	-----	-----
Sr	214	202 - 226	156 - 272	(6)	-----	-----
Ti	850	742 - 958	298 - 1402	382	351 - 413	226 - 538
Tl	(0.3)	-----	-----	2893	2664 - 3122	1753 - 4033
U	(1.3)	-----	-----	(0.6)	-----	-----
V	34	31 - 37	17 - 51	(2)	-----	-----
Y	(12)	-----	-----	59	54 - 64	36 - 82
Zn	467	444 - 490	337 - 597	(21)	-----	-----
Zn	509	479 - 539	362 - 656	509	479 - 539	362 - 656

Description	Quantity	Catalog No.
EnviroMAT Contaminated Soil SS-1	100 g	140-025-001
EnviroMAT Contaminated Soil SS-2	100 g	140-025-002



Matrix Reference Materials

EnviroMAT™

SEWAGE SLUDGE - BE-1

Element	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Ag	2.24	2.19 – 2.29	1.83 – 2.65
Al	34 860	34 004 – 35 716	26 517 – 43 203
As	4.31	4.13 – 4.48	2.63 – 5.99
B	12.6	11.8 – 13.3	7.04 – 18.1
Ba	329	319 – 338	238 – 420
Be	0.327	0.312 – 0.341	0.206 – 0.447
Ca	35 970	35 175 – 36 765	27 891 – 44 050
Cd	0.878	0.810 – 0.946	0.191 – 1.56
Co	6.21	6.09 – 6.34	5.05 – 7.38
Cr	58.0	55.7 – 60.2	34.6 – 81.4
Cu	300	294 – 306	233 – 367
Fe	18 143	17 692 – 18 593	13 626 – 22 660
Hg	0.680	0.646 – 0.714	0.404 – 0.956
K	3376	3281 – 3472	2428 – 4325
Li	7.59	7.06 – 8.12	4.28 – 10.9
Mg	7202	7071 – 7332	5877 – 8526
Mn	551	514 – 561	450 – 652

Element	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Mo	4.93	4.74 – 5.11	3.03 – 6.83
Na	817	790 – 844	565 – 1069
Ni	25.1	24.3 – 25.8	17.7 – 32.5
P	23 911	23 506 – 24 315	20 083 – 27 738
Pb	26.7	25.8 – 27.6	17.8 – 35.5
S	8201	7984 – 8418	6419 – 9983
Sb	1.71	1.50 – 1.92	0.00 – 3.56
Se	2.87	2.66 – 3.07	0.935 – 4.80
Sn	12.4	11.2 – 13.6	1.35 – 23.4
Sr	221	216 – 227	174 – 269
Ti	315	280 – 350	10.4 – 620
U	3.48	3.39 – 3.57	2.75 – 4.20
V	27.8	27.2 – 28.3	22.9 – 32.7
Zn	466	458 – 475	378 – 555
Y	(12)	-----	-----
Zn	467	444 - 490	337 - 597

Description	Quantity	Catalog No.
Sewage Sludge BE-1	50 g	140-025-011



## Matrix Reference Materials

EnviroMAT™

## WASTE WATER

LOW (EU-L)				HIGH (EU-H)			
Element	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)	Element	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)
Al	0.0628	0.0610 – 0.0647	0.0478 – 0.0778	Al	0.418	0.411 – 0.426	0.357 – 0.479
As	0.0840	0.0823 – 0.0847	0.0732 – 0.0938	As	0.779	0.771 – 0.787	0.711 – 0.848
B	0.117	0.115 – 0.119	0.096 – 0.138	B	0.705	0.695 – 0.716	0.612 – 0.799
Ba	0.124	0.121 – 0.126	0.103 – 0.145	Ba	1.07	1.06 – 1.08	0.952 – 1.19
Be	0.0123	0.0121 – 0.0124	0.0108 – 0.0137	Be	0.460	0.452 – 0.468	0.389 – 0.531
Ca	2.09	2.04 – 2.13	1.72 – 2.45	Ca	41.3	40.8 – 41.7	37.4 – 45.1
Cd	0.0228	0.0223 – 0.0233	0.0186 – 0.0270	Cd	0.265	0.262 – 0.268	0.237 – 0.292
Co	0.0825	0.0818 – 0.0833	0.0762 – 0.0888	Co	0.499	0.491 – 0.506	0.434 – 0.564
Cr	0.0626	0.0611 – 0.0641	0.0487 – 0.0766	Cr	0.395	0.390 – 0.401	0.347 – 0.444
Cu	0.106	0.104 – 0.108	0.0871 – 0.125	Cu	0.741	0.733 – 0.749	0.667 – 0.815
Fe	0.0580	0.0571 – 0.0589	0.0504 – 0.0657	Fe	0.577	0.570 – 0.583	0.521 – 0.633
K	2.07	2.02 – 2.12	1.68 – 2.47	K	44.7	44.2 – 45.2	40.3 – 49.0
Mg	0.938	0.916 – 0.961	0.753 – 1.124	Mg	25.3	25.1 – 25.6	23.2 – 27.4
Mn	0.122	0.120 – 0.124	0.107 – 0.138	Mn	0.452	0.447 – 0.457	0.409 – 0.495
Mo	0.0397	0.0389 – 0.0405	0.0327 – 0.0467	Mo	0.718	0.704 – 0.732	0.593 – 0.843
Na	5.22	5.13 – 5.31	4.48 – 5.95	Na	46.3	45.7 – 47.0	40.9 – 51.7
Ni	0.0834	0.0823 – 0.0846	0.0731 – 0.0938	Ni	0.739	0.732 – 0.746	0.678 – 0.800
P	0.990	0.975 – 1.004	0.874 – 1.105	P	10.5	10.3 – 10.8	8.94 – 12.2
Pb	0.0418	0.0412 – 0.0424	0.0361 – 0.0475	Pb	0.612	0.603 – 0.621	0.529 – 0.695
Sb	0.0184	0.0177 – 0.0191	0.0128 – 0.0240	Sb	0.523	0.512 – 0.535	0.430 – 0.616
Se	0.0279	0.0264 – 0.0295	0.0137 – 0.0422	Se	0.135	0.133 – 0.137	0.117 – 0.153
Sr	0.140	0.135 – 0.144	0.102 – 0.177	Sr	0.914	0.901 – 0.927	0.819 – 1.009
Tl	0.0837	0.0821 – 0.0852	0.0723 – 0.0951	Tl	0.394	0.384 – 0.405	0.314 – 0.475
U	0.102	0.100 – 0.105	0.0897 – 0.115	U	0.0989	0.0961 – 0.102	0.0813 – 0.117
V	0.0495	0.0488 – 0.0503	0.0434 – 0.0557	V	0.816	0.807 – 0.825	0.745 – 0.888
Zn	0.0305	0.0284 – 0.0325	0.0125 – 0.0484	Zn	0.871	0.855 – 0.887	0.731 – 1.011

Description	Quantity	Catalog No.
EnviroMAT Waste Water Low	250 ml	140-025-037
EnviroMAT Waste Water High	250 ml	140-025-038

## Matrix Reference Materials

EnviroMAT™

## GROUND WATER

Element	LOW (ES-L)			HIGH (EU-H)		
	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)
Al	0.0383	0.0345 – 0.0422	0.0187 – 0.0580	0.209	0.194 – 0.224	0.121 – 0.297
As	0.00412	0.00344 – 0.00479	0.000574 – 0.00766	0.404	0.391 – 0.417	0.328 – 0.481
B	(0.024)	-----	-----	1.61	1.56 – 1.67	1.32 – 1.91
Ba	0.0202	0.0196 – 0.0208	0.0169 – 0.0235	3.12	3.03 – 3.21	2.59 – 3.64
Be	0.0196	0.0192 – 0.0200	0.0171 – 0.0221	0.197	0.190 – 0.201	0.157 – 0.237
Ca	0.153	0.129 – 0.177	0.0256 – 0.281	6.50	6.24 – 6.75	4.96 – 8.03
Cd	0.00399	0.00361 – 0.00436	0.00200 – 0.00598	0.200	0.194 – 0.205	0.166 – 0.233
Co	0.0200	0.0195 – 0.0205	0.0170 – 0.0230	0.119	0.114 – 0.125	0.090 – 0.149
Cr	0.00819	0.00758 – 0.00880	0.00494 – 0.0114	0.401	0.388 – 0.414	0.325 – 0.478
Cu	0.00936	0.00787 – 0.0108	0.00129 – 0.0174	0.781	0.761 – 0.801	0.658 – 0.903
Fe	0.0104	0.00671 – 0.0141	0.000 – 0.0284	1.17	1.12 – 1.22	0.86 – 1.48
K	0.0903	0.0641 – 0.116	0.000 – 0.221	2.84	2.71 – 2.97	2.09 – 3.59
Li	0.0191	0.0178 – 0.0203	0.0133 – 0.0249	0.096	0.088 – 0.105	0.058 – 0.135
Mg	0.0752	0.0695 – 0.0809	0.0447 – 0.106	6.11	5.91 – 6.30	4.94 – 7.27
Mn	0.0399	0.0388 – 0.0410	0.0333 – 0.0466	0.318	0.310 – 0.327	0.268 – 0.369
Mo	0.00410	0.00342 – 0.00479	0.000543 – 0.00767	0.387	0.375 – 0.398	0.321 – 0.452
Na	0.413	0.378 – 0.448	0.228 – 0.599	17.4	16.6 – 18.3	12.5 – 22.3
Ni	0.00416	0.00386 – 0.00447	0.00261 – 0.00572	0.789	0.754 – 0.824	0.587 – 0.992
P	(0.006)	-----	-----	0.448	0.420 – 0.476	0.306 – 0.590
Pb	(0.001)	-----	-----	0.102	0.097 – 0.107	0.073 – 0.132
Sb	0.00226	0.00187 – 0.00264	0.000546 – 0.00397	0.040	0.038 – 0.042	0.030 – 0.051
Se	(0.003)	-----	-----	0.030	0.028 – 0.031	0.021 – 0.038
Sr	0.0511	0.0451 – 0.0572	0.0197 – 0.0826	0.979	0.968 – 0.991	0.919 – 1.040
Tl	0.0275	0.0260 – 0.0289	0.0202 – 0.0347	0.035	0.032 – 0.039	0.020 – 0.051
U	(0.019)	-----	-----	(0.244)	0	0
V	0.00456	0.00407 – 0.00505	0.00208 – 0.00704	0.798	0.780 – 0.816	0.693 – 0.903
Zn	0.0105	0.00817 – 0.0128	0.000 – 0.0230	0.800	0.764 – 0.836	0.577 – 1.023

Description	Quantity	Catalog No.
EnviroMAT Ground Water Low	250 ml	140-025-034
EnviroMAT Ground Water High	250 ml	140-025-035

## Matrix Reference Materials

EnviroMAT™

## DRINKING WATER

LOW (EP-L)				HIGH (EP-H)			
Element	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)	Element	Consensus Value (mg/L)	Confidence Interval (mg/L)	Tolerance Interval (mg/L)
Al	0.100	0.0985 – 0.1015	0.0899 – 0.1101	Al	0.296	0.288 – 0.304	0.244 – 0.348
As	0.0106	0.0103 – 0.0109	0.00878 – 0.0124	As	0.122	0.120 – 0.125	0.104 – 0.140
B	0.0790	0.0767 – 0.0814	0.0634 – 0.0947	B	3.40	3.32 – 3.48	2.89 – 3.91
Ba	0.00791	0.00779 – 0.00804	0.00712 – 0.00870	Ba	0.777	0.759 – 0.795	0.665 – 0.889
Be	0.00198	0.00196 – 0.00200	0.00186 – 0.00210	Be	0.0488	0.0480 – 0.0497	0.0438 – 0.0539
Ca	0.482	0.464 – 0.500	0.365 – 0.599	Ca	10.18	10.01 – 10.35	9.09 – 11.27
Cd	0.00197	0.00193 – 0.00200	0.00174 – 0.00219	Cd	0.0490	0.0480 – 0.0500	0.0426 – 0.0554
Co	0.00975	0.00957 – 0.00994	0.00853 – 0.0110	Co	0.0366	0.0359 – 0.0372	0.0325 – 0.0406
Cr	0.0127	0.0126 – 0.0129	0.0117 – 0.0137	Cr	0.242	0.237 – 0.247	0.209 – 0.276
Cu	0.0156	0.0153 – 0.0159	0.0136 – 0.0176	Cu	0.487	0.474 – 0.500	0.403 – 0.571
Fe	0.0279	0.0272 – 0.0285	0.0241 – 0.0316	Fe	0.469	0.464 – 0.474	0.437 – 0.501
Hg	---	---	---	Hg	4.56	4.34 – 4.78	3.42 – 5.70
K	0.404	0.397 – 0.410	0.362 – 0.446	K	5.93	5.84 – 6.01	5.41 – 6.44
Li	---	---	---	Li	0.390	0.381 – 0.400	0.338 – 0.442
Mg	0.0458	0.0451 – 0.0466	0.0415 – 0.0501	Mg	3.31	3.24 – 3.38	2.87 – 3.75
Mn	0.00585	0.00576 – 0.00594	0.00527 – 0.00643	Mn	0.109	0.107 – 0.112	0.0945 – 0.124
Mo	0.0226	0.0222 – 0.0230	0.0198 – 0.0253	Mo	0.197	0.193 – 0.201	0.171 – 0.223
Na	0.229	0.223 – 0.235	0.190 – 0.268	Na	7.64	7.42 – 7.87	6.16 – 9.13
Ni	0.0199	0.0196 – 0.0202	0.0179 – 0.0219	Ni	0.242	0.237 – 0.247	0.209 – 0.276
P	(0.0174)	---	---	P	0.233	0.225 – 0.241	0.184 – 0.282
Pb	0.00400	0.00394 – 0.00406	0.00365 – 0.00435	Pb	0.193	0.189 – 0.198	0.165 – 0.222
Sb	0.0119	0.0117 – 0.0121	0.0106 – 0.0132	Sb	0.0505	0.0489 – 0.0521	0.0407 – 0.0603
Se	0.0585	0.0567 – 0.0595	0.0522 – 0.0649	Se	0.115	0.113 – 0.117	0.102 – 0.128
Sr	0.141	0.139 – 0.143	0.131 – 0.151	Sr	0.363	0.357 – 0.370	0.328 – 0.399
Tl	0.00625	0.00610 – 0.00640	0.00539 – 0.00711	Tl	0.0794	0.0761 – 0.0826	0.0609 – 0.0979
U	---	---	---	U	0.0192	0.0184 – 0.0199	0.0150 – 0.0234
V	0.0136	0.0135 – 0.0138	0.0125 – 0.0147	V	0.376	0.370 – 0.383	0.337 – 0.415
Zn	0.0425	0.0420 – 0.0431	0.0389 – 0.0462	Zn	2.42	2.38 – 2.46	2.18 – 2.66

Description	Quantity	Catalog No.
EnviroMAT Drinking Water Low	250 ml	140-025-031
EnviroMAT Drinking Water High	250 ml	140-025-032

## Matrix Reference Materials

EnviroMAT™

### USED OIL

Element	HU-1				Description	Quantity	Catalog No.
	Consensus Value (mg/kg)	Uncertainty +/- (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)			
Ag	17.4	4.0	15.5 – 19.4	4.33 – 30.6	Used Oil HU-1	125 ml	140-025-041
Al	28.9	2.1	27.8 – 29.9	20.7 – 37.0			
B	26.7	5.1	24.2 – 29.2	7.55 – 45.9			
Ba	18.7	1.3	18.0 – 19.4	13.5 – 23.9			
Ca	62.7	6.1	59.7 – 65.8	39.9 – 85.6			
Cd	19.5	1.5	18.7 – 20.2	14.2 – 24.8			
Cr	18.0	1.3	17.3 – 18.7	12.8 – 23.1			
Cu	4182	360	4002 – 4362	2932 – 5431			
Fe	94.5	6.9	91.1 – 98.0	68.6 – 120			
K	26.7	3.6	24.9 – 28.5	16.3 – 37.1			
Mg	18.6	1.5	17.8 – 19.3	12.9 – 24.3			
Mn	19.9	1.4	19.3 – 20.6	14.6 – 25.2			
Mo	18.0	1.0	17.5 – 18.6	14.0 – 22.1			
Na	35.1	6.1	32.0 – 38.2	12.3 – 57.9			
Ni	64.0	6.8	60.6 – 67.4	38.8 – 89.3			
P	(48)	-----	-----	-----			
Pb	25.1	3.2	23.5 – 26.7	12.5 – 37.6			
Si	21.3	1.9	20.4 – 22.2	14.5 – 28.2			
Sn	510	71	474 – 546	269 – 751			
Ti	16.8	1.6	16.0 – 17.6	10.5 – 23.0			
V	17.1	1.5	16.4 – 17.9	11.4 – 22.9			
Zn	58.5	4.2	56.5 – 60.6	44.0 – 73.1			

### LEAD AND CADMIUM IN PAINT

LEAD AND CADMIUM IN PAINT			
Element	Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Cd	219.4	215.9 – 222.8	189.2 – 249.5
Pb	224.2	220.0 – 228.5	187.1 – 261.3

Description	Quantity	Catalog No.
Lead in Paint Level 1	20 g	140-025-200
Lead in Paint Level 2	20 g	140-025-201
Cadmium and Lead in Paint	20 g	140-025-205

LEAD IN PAINT LEVEL 1		
Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
94.3	92.1 – 96.1	70.3 – 118.3
219.4	215.9 – 222.8	189.2 – 249.5
224.2	220.0 – 228.5	187.1 – 261.3

LEAD IN PAINT LEVEL 2		
Consensus Value (mg/kg)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
287.4	282.5 – 292.3	233.2 – 341.7

# Certificate of Analysis

**Catalogue Number:** 140-025-002  
**Description:** Matrix Reference Material  
*EnviroMAT Contaminated Soil (SS-2-2)*  
**Lot Number:** S150827031  
**Date of Initial Certification:** October 30<sup>th</sup>, 2015  
**Date of Last Verification:** N/A  
**Expiration date:** 2 years after shipping date

Elements	Unit	Consensus Value	Uncertainty +/-	Confidence Interval	Tolerance Interval
Ag	mg/kg	3.9	0.2	3.6 - 4.1	1.8 - 6.0
Al	mg/kg	9548	294	9254 - 9842	7060 - 12 036
As	mg/kg	3.36	0.17	3.18 - 3.53	1.77 - 4.94
B	mg/kg	8.5	0.4	8.1 - 9.0	5.9 - 11.1
Ba	mg/kg	100	2	98 - 102	80 - 119
Be	mg/kg	0.34	0.01	0.33 - 0.36	0.25 - 0.44
Ca	mg/kg	31 082	563	30 519 - 31 645	26 317 - 35 847
Cd	mg/kg	0.91	0.03	0.88 - 0.94	0.65 - 1.17
Ce	mg/kg	----	----	----	----
Co	mg/kg	6.9	0.3	6.6 - 7.2	4.0 - 9.8
Cr	mg/kg	92.6	4.1	88.4 - 96.7	54.2 - 131
Cu	mg/kg	120	2	118 - 122	99 - 141
Fe	mg/kg	23 083	597	22 486 - 23 680	17 888 - 28 278
Hg	mg/kg	0.059	0.004	0.055 - 0.063	0.034 - 0.084
K	mg/kg	1671	87	1584 - 1758	907 - 2435
Li	mg/kg	9.5	0.6	8.8 - 10.1	5.9 - 13.1
Mg	mg/kg	5132	158	4975 - 5290	3798 - 6467
Mn	mg/kg	252	7	245 - 258	191 - 313
Mo	mg/kg	1.03	0.04	0.99 - 1.07	0.69 - 1.38
Na	mg/kg	797	37	760 - 833	486 - 1107
Ni	mg/kg	25.1	0.6	24.5 - 25.6	19.6 - 30.6
P	mg/kg	752	18	735 - 770	614 - 891
Pb	mg/kg	244	5	239 - 250	192 - 297
S	mg/kg	550	25	525 - 574	395 - 705
Sb	mg/kg	3.5	0.4	3.1 - 3.8	0.5 - 6.4
Se	mg/kg	0.49	0.10	0.39 - 0.58	0 - 1.04
Sn	mg/kg	10.6	0.4	10.1 - 11.0	7.1 - 14.1
Sr	mg/kg	80	2	77 - 82	60 - 99
Tl	mg/kg	0.084	0.006	0.078 - 0.089	0.054 - 0.114
U	mg/kg	0.52	0.02	0.50 - 0.54	0.40 - 0.64
V	mg/kg	30.0	0.7	29.2 - 30.7	23.7 - 36.3
Y	mg/kg	----	----	----	----
Zn	mg/kg	281	7	274 - 288	220 - 342

Date of shipment: \_\_\_\_\_

**Organization responsible for the certification:**

**SCP SCIENCE**  
21800 Clark Graham  
Baie d'Urfé, QC, Canada  
H9X 4B6

Phone: (514) 457-0701  
Fax: (514) 457-4499  
Web: [www.scpscience.com](http://www.scpscience.com)  
e-mail: [sales@scpscience.com](mailto:sales@scpscience.com)

Certified by:   
Daniel Boisvert, Chemist

Person responsible for initial certification: Daniel Boisvert, Chemist

Please note that the Material Safety Data Sheet and this Certificate of Analysis are available on our web site.  
(Ce certificat est également disponible en français)

**Description:**

The Matrix Reference Material SS-2 is a Type C naturally contaminated soil (not spiked or fortified) with a particle size of -200 mesh. It is designed to be used for quality control verification or methods development for the analysis of soil by ICP, ICP/MS, GFAA or AA Spectroscopy techniques. Not intended for calibration.

**Stability:**

This certification is valid for 2 years from the shipping date provided the material is kept sealed and stored under normal laboratory conditions and used according to good laboratory practices. Shipping date will be stamped on container at time of shipping. **SCP SCIENCE** will monitor the stability of representative samples every two years and if any changes occur that invalidate this certification, **SCP SCIENCE** will notify purchasers.

**Instructions for use:**

The material must be dried at 105°C for two hours before use. Before weighing, mix the material by shaking the container to avoid segregation in the bottle. In order to have a representative sample, the minimum use quantity must be 250 mg to conform to previous homogeneity testing. Calculate results on a dry weight basis.

**Preparation method:**

The initial sample has been dried and sieved through a 0.5 inch sieve. The "fines" portion has been further crushed and sieved with 80% of the material passing through a 200 mesh screen. This portion has been re-pulverized and sieved through a 200 mesh sieve to obtain 100% less than 200 mesh. The final material has then been packaged in 100 g containers and tested for homogeneity.

The homogeneity of the material has undergone third party verification by Particle Size Analysis (Microtrac) and by metals oxides analysis using an X-ray fluorescence spectrometer. The method used for the determination of the homogeneity of the material is based on ISO Guide 35.

**Certification and Calculation Methods:**

The Certification Method is based on an inter-laboratory Study (or round-robin study) analysis involving 15 international laboratories (Canada, USA and Europe). Each laboratory was asked to supply analysis data for two samples in duplicate for a specific list of parameters. Not all the laboratories supplied data for the different parameters. Certified values are based on an average of 49 values per parameter (68 values being the highest and 21 values being the lowest). Values in brackets are not certified as less than 12 values were received. They are provided for information only.

Most of participating labs employed an extraction method based on EPA-3050B. HNO<sub>3</sub>, HNO<sub>3</sub>/HCl or HNO<sub>3</sub>/HCl/H<sub>2</sub>O<sub>2</sub> digestion method was used. Hot water extraction method is not applicable to determine Boron. ICP-MS, ICP-AES and AFS (Hg only) were used for quantification by most of inter-laboratory Study participating laboratories.

The outliers were removed using the Interquartile range rule and by data comparison after confirmation that there was neither a connection between outliers and the methods used for analysis nor between the outliers and the nature of the sample.

The Confidence Interval has been calculated using the 95% Confidence Level (equivalent to 2σ) using the following formula:

$$\bar{x} \pm \frac{ts}{\sqrt{n}}$$

where

- n: number of data
- s: Standard Deviation of the Average
- t: factor for Student Test
- x: Reference Value

The Confidence Interval should be used for routine quality control.

The Tolerance Interval has been calculated using again a 95% probability with a 95% inclusion of the population. The following formula was used:

$$\bar{x} \pm ks$$

where

- k: factor for two-sided Tolerance Limits
- s: Standard Deviation of the Average
- x: Reference Value

The Tolerance Interval is an indication of the lowest possible value and the highest possible value based on the complete set of data, exclusive of outliers, used to calculate the Certified Value.

The following table is a guideline on how to interpret the results:

Results within Confidence Interval	Method working properly
Results outside Confidence Interval but within Tolerance Interval	Method needs improvement
Results outside Tolerance Interval	Method not working properly

**References:**

ISO Guide 30: Terms and definitions used in connection with reference materials  
 ISO Guide 31: Contents of certificates of reference materials  
 ISO Guide 35: Certification of reference materials--General and statistical principles  
 Standard Reference Materials-Handbook for SRM Users - John K. Taylor  
 Quality Assurance of Chemical Measurements - John K. Taylor  
 EPA 3050B - Acid Digestion of Sediments, Sludge and Soils (December 1996)



## Matrix Reference Materials

AgroMAT™

Parameters	Units	Consensus Value	Confidence Interval	Tolerance Interval	Description	Quantity	Catalog No.
Fe–Total	mg/kg	25 547	24 526 – 26 568	16 458 – 34 637	Compost CP-1	100 g	140-025-111
Hg–Total	mg/kg	0.142	0.126 – 0.158	0.027 – 0.257			
K–Total	mg/kg	2373	2252 - 2495	1360 – 3387			
Mg–Total	mg/kg	1720	1656 - 1785	1166 – 2275			
Mn–Total	mg/kg	710	696 - 725	583 – 838			
Mo–Total	mg/kg	1.21	1.13 – 1.29	0.645 – 1.78			
Na–Total	mg/kg	(908)	----	----			
Ni–Total	mg/kg	11.1	10.6 – 11.7	6.42 – 15.9			
P–Total	mg/kg	6711	6511 - 6910	5060 – 8361			
Pb–Total	mg/kg	15.6	14.9 – 16.2	10.1 – 21.1			
S–Total	mg/kg	3215	3080 - 3350	2296 – 4134			
Se–Total	mg/kg	0.899	0.813 – 0.984	0.390 – 1.408			
Zn–Total	mg/kg	248	242 - 254	196 - 300			
pH	-----	7.00	6.94 – 7.05	6.49 – 7.50			
Organic Matter	%	63.4	61.2 – 65.7	44.7 – 82.2			
NO <sub>3</sub> -N	mg/kg	35.9	31.7 – 40.1	8.21 – 63.6			
N–Total	%	2.25	2.19 – 2.32	1.79 – 2.72			
H <sub>2</sub> O	%	6.28	5.87 – 6.69	3.16 – 9.41			
C/N Ratio	-----	17.1	16.3 – 17.9	11.3 – 22.9			
Al–Total	mg/kg	4579	4262 - 4896	1909 – 7249			
As–Total	mg/kg	2.24	2.12 – 2.36	1.46 – 3.02			
Ca–Total	mg/kg	18 530	18 100 – 18 960	15 189 – 21 870			
Cd–Total	mg/kg	0.719	0.663 – 0.774	0.313 – 1.124			
Co–Total	mg/kg	3.00	2.84 – 3.17	1.78 – 4.22			
Cr–Total	mg/kg	16.1	15.0 – 17.1	7.66 – 24.5			
Cu–Total	mg/kg	76.2	73.5 – 78.9	51.7 – 100.7			



## Matrix Reference Materials

AgroMAT™

## CLAY SOIL AG-1

Parameter	Extraction Method	Units	Consensus Interval	Confidence Interval	Tolerance Interval
Phosphorus	Mehlich III	ppm	8.37	7.26 – 9.48	1.62 – 15.1
	Olsen	ppm	33.1	28.8 – 37.4	8.66 – 57.5
Potassium	Ammonium Acetate pH 7	ppm	337	307 - 367	149 – 524
	Mehlich III	ppm	387	370 - 404	276 – 498
Calcium	Ammonium Acetate pH 7	ppm	2030	1943 - 2117	1528 – 2532
	Mehlich III	ppm	2170	2084 - 2255	1620 – 2719
Magnesium	Ammonium Acetate pH 7	ppm	214	197 - 230	111 – 316
	Mehlich III	ppm	285	274 - 295	217 – 352
Sodium	Ammonium Acetate pH 7	ppm	71.3	67.4 – 75.1	47.9 – 94.6
	Mehlich III	ppm	80.2	74.1 – 86.3	46.6 – 114
Zinc	DTPA	ppm	0.67	0.58 – 0.76	0.19 – 1.16
	Mehlich III	ppm	2.38	2.28 – 2.48	1.73 – 3.02
Manganese	DTPA	ppm	41.7	38.9 – 44.5	27.2 – 56.3
	Mehlich III	ppm	238	223 - 253	138 – 338
Copper	DTPA	ppm	1.26	1.19 – 1.34	0.87 – 1.66
	Mehlich III	ppm	0.61	0.52 – 0.70	0.061 – 1.16
Iron	DTPA	ppm	102	95.9 - 109	67.0 – 138
	Mehlich III	ppm	584	541 - 628	297 – 871
Boron	Hot Water	ppm	0.50	0.40 – 0.60	0 – 1.07
	Mehlich III	ppm	0.76	0.63 – 0.88	0.050 – 1.46
Sulfur	Mehlich III	ppm	19.7	18.7 – 20.6	14.1 – 25.2
Aluminum	Mehlich III	ppm	1519	1451 - 1586	1123 – 1914
pH	1 :1 (Soil:Water)	-----	7.04	7.00 – 7.08	6.81 – 7.28
	1 :2 (Soil:Water)	-----	7.16	7.10 – 7.21	6.82 – 7.49
	Saturated Paste	-----	6.94	6.84 – 7.05	6.44 – 7.45
	Buffer SMP	-----	7.19	7.06 – 7.32	6.51 – 7.86
Organic Matter	LOI	%	3.74	3.49 – 3.98	1.92 – 5.55
	Walkley Black	%	2.21	2.02 – 2.40	1.18 – 3.24
Nitrogen as Nitrate	KCl	ppm	9.75	9.34 – 10.2	7.01 – 12.5
Soluble Salts	1 :1 Soil :Water	uS/cm	(287)	----	----
	1 :2 Soil :Water	uS/cm	197	184 - 211	113 – 282
	Saturated Paste	uS/cm	(597)	----	----

## Description

## Quantity

## Catalog No.

Clay Soil AG-1

175 g

140-025-101

## Matrix Reference Materials

AgroMAT™

## SANDY SOIL AG-2

Parameter	Extraction Method	Units	Consensus Interval	Confidence Interval	Tolerance Interval
Phosphorus	Bray 1	ppm	(47.3)		
	Mehlich III	ppm	89.9	85.8-94.0	64.3-115.5
	Olsen	ppm	45.6	41.1-50.2	20.8-75.5
Potassium	Ammonium Acetate pH 7	ppm	364	341-387	224-504
	Mehlich III	ppm	398	380-416	286-511
Calcium	Ammonium Acetate pH 7	ppm	1370	1305-1435	995-1746
	Mehlich III	ppm	1484	1426-1543	1110-1859
Magnesium	Ammonium Acetate pH 7	ppm	134	124-144	72.9-195
	Mehlich III	ppm	186	178-194	133-238
Sodium	Ammonium Acetate pH 7	ppm	35.4	32.8-38.0	19.7-51.2
	Mehlich III	ppm	37.8	35.2-40.4	23.5-52.1
Zinc	DTPA	ppm	0.79	0.73-0.85	0.47-1.11
	Mehlich III	ppm	2.84	2.72-2.95	2.12-3.55
Manganese	DTPA	ppm	16.8	14.5-19.1	4.17-29.5
	Mehlich III	ppm	156	147-164	103-209
Copper	DTPA	ppm	1.26	1.17-1.35	0.791-1.72
	Mehlich III	ppm	1.25	1.17-1.35	0.791-1.72
Iron	DTPA	ppm	64.4	57.0-71.9	23.6-105
	Mehlich III	ppm	700	660-740	437-963
Boron	Hot Water	ppm	0.39	0.28-0.49	0-0.95
	Mehlich III	ppm	0.45	0.39-0.51	0.16-0.74
Sulfur	Mehlich III	ppm	15.2	14.6-15.8	11.9-18.5
Aluminum	Mehlich III	ppm	1354	1322-1387	1168-1541
pH	1 :1 (Soil:Water)	----	6.89	6.86-6.93	6.67-7.12
	1 :2 (Soil:Water)	----	7.02	6.98-7.07	6.76-7.29
	Saturated Paste	----	6.85	6.74-6.96	6.33-7.37
	Buffer SMP	----	7.06	6.95-7.17	6.53-7.59
Organic Matter	LOI	%	3.77	3.57-3.97	2.26-5.27
	Walkley Black	%	2.79	2.63-2.94	1.96-3.61
Nitrogen as Nitrate	KCl	ppm	27.3	26.6-28.0	22.3-32.3
Soluble Salts	1 :1 Soil:Water	uS/cm	(334)	----	----
	1 :2 Soil:Water	uS/cm	199	188-211	121-277
	Saturated Paste	uS/cm	(551)	----	----

Description	Quantity	Catalog No.
Sandy Soil AG-2	175 g	140-025-102

## Performance Evaluation Standards peCHECK

Designed for routine performance evaluation and control charting, **SCP SCIENCE peCHECK** products are a cost effective means of monitoring technician and equipment variability and bias. These standards are available for minerals, nutrients, and solids in water / wastewater matrices and are certified through a comprehensive round-robin study providing independent verification from multiple laboratories.



### Features

20 ml vials. No pipetting necessary. Just dilute to volume. Each standard dilutes to 1 L

- Eliminate a source of potential error, save time with single stop preparation

Includes Certificate of Analysis, prepared in accordance with ISO Guides 31 and 35, providing Consensus values and Confidence and Tolerance intervals for each method used in the certification.

- Complete documentation for audit purposes

Prepared in large batches

- Same lot number available time after time allows for effective control charting

## SOLIDS

Parameter	Units	LEVEL 1		LEVEL 2		LEVEL 3	
		Consensus Value	Confidence Interval	Consensus Value	Confidence Interval	Consensus Value	Confidence Interval
Suspended Solids	mg/L	238	235 - 242	380	374 - 385	1928	1895 - 1961
Dissolved Solids	mg/L	33.0	18.7 - 47.3	44.8	21.3 - 68.3	46.0	25.3 - 66.8
Total Solids	mg/L	254	242 - 267	400	380 - 419	1970	1942 - 1999

Description	Quantity	Catalog No.
Level 1 Solids	20 ml	140-702-101
Level 2 Solids	20 ml	140-702-102
Level 3 Solids	20 ml	140-702-103

## Performance Evaluation Standards

peCHECK

### NUTRIENTS

Parameter	Units	LEVEL 1		LEVEL 2		LEVEL 3	
		Consensus Value	Confidence Interval	Consensus Value	Confidence Interval	Consensus Value	Confidence Interval
Ammonia (as N)	mg/L	0.97	0.91 - 1.03	8.59	7.98 - 9.21	14.7	14.2 - 15.2
Nitrate (as N)	mg/L	1.40	1.34 - 1.45	13.3	12.9 - 13.7	26.5	25.6 - 27.3
O-Phosphate (as P)	mg/L	0.74	0.69 - 0.80	4.42	4.17 - 4.66	9.33	9.11 - 9.55
Total Kjeldahl Nitrogen	tmg/L	1.04	0.93 - 1.16	20.2	19.2 - 21.2	45.3	42.8 - 47.8
Total Phosphorus (as P)	mg/L	0.79	0.74 - 0.84	4.64	4.31 - 4.98	9.76	8.75 - 10.77

Description	Quantity	Catalog No.
Level 1 Nutrients	20 ml	140-701-101
Level 2 Nutrients	20 ml	140-701-102
Level 3 Nutrients	20 ml	140-701-103

### MINERALS

Parameter	Units	LEVEL 1		LEVEL 2		LEVEL 3	
		Consensus Value	Confidence Interval	Consensus Value	Confidence Interval	Consensus Value	Confidence Interval
Conductivity	µS	188	183 - 193	1980	1915-2044	5803	5603-6002
Total Hardness (CaCO <sub>3</sub> )	mg/L	11.6	11.3 - 12.0	221	215-227	531	520-542
Total Dissolved Solids	mg/L	102	91 - 112	998	949-1048	3051	2990-3111
Calcium (Ca)	mg/L	2.62	2.50 - 2.75	62.0	59.3-64.6	136	132-140
Potassium (K)	mg/L	8.77	8.46 - 9.08	164	155-172	466	434-497
Magnesium (Mg)	mg/L	1.22	1.16 - 1.27	15.3	14.8-15.8	45.4	44.9-46.0
Sodium (Na)	mg/L	18.1	17.4 - 18.7	90.9	88.2-93.6	342	331-353
Chloride (Cl)	mg/L	19.7	19.1 - 20.2	95.7	92.2-99.1	430	420-441
Fluoride (F)	mg/L	0.50	0.48 - 0.53	4.20	4.03-4.37	12.3	11.8-12.9
Sulfate (SO <sub>4</sub> )	mg/L	8.41	7.90 - 8.92	150	144-156	397	384-411

Description	Quantity	Catalog No.
Level 1 Minerals	20 ml	140-704-101
Level 2 Minerals	20 ml	140-704-102
Level 3 Minerals	20 ml	140-704-103

# Certificate of Analysis

**Catalogue Number:** 140-702-103  
**Description:** Certified Performance Evaluation Standard  
*pe*CHECK SOLIDS, level 3 (PS3-1)  
**Lot Number:** SC1018923  
**Date of Initial Certification:** January 16, 2001  
**Date of Last Verification:** November 18, 2014

## Consensus Values:

Parameter	Unit	Consensus Value	Confidence Interval	Tolerance Interval
Suspended Solids	mg/l	1928	1895 – 1961	1719 – 2136
Dissolved Solids	mg/l	46.0	25.3 – 66.8	0 – 164
Total Solids	mg/l	1970	1942 - 1999	1791 - 2149

Notes: The direct calculation method was used for certifying the dissolved solids parameter.



Certified by:

*Daniel Boisvert*

Daniel Boisvert, Chemist

Date of shipment: \_\_\_\_\_

**Organization responsible for the certification:**

**SCP SCIENCE**  
21800 Clark Graham  
Baie d'Urfé, QC, Canada  
H9X 4B6

Phone: (514) 457-0701  
Fax: (514) 457-4499  
Web: [www.scpscience.com](http://www.scpscience.com)  
e-mail: [sales@scpscience.com](mailto:sales@scpscience.com)

Person responsible for initial certification: Jean-François Dufour, Chemist

Please note that the Material Safety Data Sheet and this Certificate of Analysis are available on our web site.  
(Ce certificat est également disponible en français)

**Description:**

*pe***CHECK SOLIDS** level 3 is a concentrated performance evaluation standard for drinking and waste water analysis. This standard was designed specifically for periodic quality control verification, and methods development for water analyses of the listed parameters.

**Manufacturing:**

This product was manufactured according to an ISO 9001 certified quality system and the guidelines set forth by Guide 34.

**Stability:**

This certification is valid for 2 years from the shipping date provided the material is kept sealed, stored under normal laboratory conditions and used according to good laboratory practices. Shipping date will be stamped on container at time of shipping. **SCP SCIENCE** will monitor the stability of representative samples every two years and if any changes occur that invalidate this certification, **SCP SCIENCE** will notify purchasers.

**Instructions for use:**

1. DO NOT Shake bottle before use;
2. Put 800ml of deionized water into a 1-liter volumetric flask;
3. Open bottle carefully and transfer all contents into the volumetric flask;
4. Ensure that all the standard is added to the flask by carefully rinsing the bottle AND the cap three times with deionized make-up water;
5. Dilute to the mark with deionized water, and mix;
6. Test as soon as possible for the listed parameters. Make sure to mix for at least 30 seconds just before sampling.

### Certification and Calculation Methods:

The Certification Method is based on a round-robin analysis involving 28 International laboratories. Each laboratory was asked to supply analysis data in duplicate for a specific list of parameters. Not all the laboratories supplied data for the different parameters. Certified Values are based on an average of 22 values per parameter (25 values being the highest and 18 values being the lowest).

The outliers were removed using the Dixon Test after confirmation that there was neither a connection between outliers and the methods used for analysis nor between the outliers and the nature of the sample.

The Confidence Interval has been calculated using the 95% Confidence Level (equivalent to  $2\sigma$ ) using the following formula:

$$x \pm \frac{ts}{\sqrt{n}}$$

where

- n: Number of data
- s: Standard Deviation of the Average
- t: Factor for Student Test
- x: Consensus value

The Tolerance Interval has been calculated using again a 95% probability with a 95% inclusion of the population. The following formula was used:

$$x \pm ks$$

where

- k: Factor for two-sided Tolerance Limits
- s: Standard Deviation of the Average
- x: Consensus value

The Tolerance Interval is an indication of the lowest possible value and the highest possible value based on the complete set of data, exclusive of outliers, used to calculate the Certified Value.

The following table is a guideline on how to interpret the results:

Results within Confidence Interval	Method working properly
Results consistently outside Confidence Interval but within Tolerance Interval	Method needs improvement
Results outside Tolerance Interval	Method not working properly

### References:

ISO Guide 30: Terms and definitions used in connection with reference materials;  
 ISO Guide 31: Reference materials – Contents of certificates and labels;  
 ISO Guide 34: General requirements for the competence of reference material producers;  
 ISO Guide 35: Certification of reference materials - General and statistical principles;  
 Quality Assurance of Chemical Measurements - John K. Taylor.



## Ion Chromatography Standards

### AccuSPEC

Ion Chromatography is a vital component of inorganic analysis. **SCP SCIENCE** manufactures and stocks single-element and multi-element Calibration Standards, as well as offering an excellent Custom-Standards program. All of our IC Standards are manufactured in accordance with **ISO Guide 34**, are supplied with a **ISO 17025**-compliant Certificate of Analysis, and can be used for calibration, QC checks or performance evaluation purposes.

#### Features

- 2 expiry dates (up to 24 months unopened & 15 months opened)
  - Longer shelf life for unopened bottles - stock with confidence.
- Actual concentration typically within 1% of the nominal
  - Certificate of Analysis providing NIST traceability, concentration and uncertainty, in wt./vol., guaranteed for the shelf-life of the product.
- Available in 2 convenient formats to meet your needs:
  - 125 ml
  - 500 ml

### SINGLE ANION CHROMATOGRAPHY STANDARDS

Anion Standard	Symbol	Matrix	1000 µg/ml		10 000 µg/ml	
			125 ml	500 ml	125 ml	500 ml
Acetate	CH <sub>3</sub> COO <sup>-</sup>	H <sub>2</sub> O	250-220-100	250-220-101	250-221-100	250-221-101
Ammonia-Nitrogen	NH <sub>3</sub> <sup>-</sup> as N	H <sub>2</sub> O	250-220-115	250-220-116	250-221-115	250-221-116
Bromate	BrO <sub>3</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-220	250-220-221	250-221-220	250-221-221
Bromide	Br <sup>-</sup>	H <sub>2</sub> O	250-220-235	250-220-236	250-221-235	250-221-236
Butyrate	C <sub>4</sub> H <sub>7</sub> O <sub>2</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-790	250-220-791	---	---
Chlorate	ClO <sub>3</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-355	250-220-356	250-221-350	250-221-351
Chloride	Cl <sup>-</sup>	H <sub>2</sub> O	250-220-370	250-220-371	250-221-370	250-221-371
Chromate	CrO <sub>4</sub> <sup>2-</sup>	H <sub>2</sub> O	250-220-720	250-220-721	---	---
Fluoride	F <sup>-</sup>	H <sub>2</sub> O	250-220-400	250-220-401	250-221-400	250-221-401
Formate	HCOO <sup>-</sup>	H <sub>2</sub> O	250-220-415	250-220-416	250-221-410	250-221-411
Iodide	I <sup>-</sup>	H <sub>2</sub> O	250-220-730	250-220-731	250-221-730	250-221-731
Molybdate	MoO <sub>4</sub> <sup>2-</sup>	H <sub>2</sub> O	250-220-780	250-220-781	---	---
Nitrate	NO <sub>3</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-505	250-220-506	250-221-505	250-221-506
Nitrate-Nitrogen	NO <sub>3</sub> <sup>-</sup> as N	H <sub>2</sub> O	250-220-520	250-220-521	250-221-520	250-221-521
Nitrite	NO <sub>2</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-535	250-220-536	250-221-535	250-221-536
Nitrite-Nitrogen	NO <sub>2</sub> <sup>-</sup> as N	H <sub>2</sub> O	250-220-550	250-220-551	250-221-550	250-221-551
Oxalate	C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>	H <sub>2</sub> O	250-220-565	250-220-566	250-221-560	250-221-561
Perchlorate	ClO <sub>4</sub> <sup>-</sup>	H <sub>2</sub> O	250-220-580	250-220-581	250-221-580	250-221-581
Phosphate	PO <sub>4</sub> <sup>3-</sup>	H <sub>2</sub> O	250-220-595	250-220-596	250-221-595	250-221-596
Phosphate-Phosphorus	PO <sub>4</sub> <sup>3-</sup> as P	H <sub>2</sub> O	250-220-610	250-220-611	250-221-610	250-221-611
Propionate	CH <sub>3</sub> CH <sub>2</sub> COO <sup>-</sup>	H <sub>2</sub> O	250-220-740	250-220-741	250-221-740	250-221-741
Sulfate	SO <sub>4</sub> <sup>2-</sup>	H <sub>2</sub> O	250-220-700	250-220-701	250-221-700	250-221-701
Sulfate-Sulfur	SO <sub>4</sub> <sup>2-</sup> as S	H <sub>2</sub> O	250-220-715	250-220-716	250-221-710	250-221-711

**SCP SCIENCE**

Providing Innovative Solutions to Analytical Chemists

**Certificate of Analysis****Cl<sup>-</sup>**

**1.0 DESCRIPTION:** **AccuSPEC – IC Standard – Chloride 1000 µg/ml**  
Catalogue Number: 250-220-37x  
Starting Material: Sodium Chloride, ACS  
Lot Number: **S141030011**  
Expiration Date: **August 2016**  
(or 12 months after bottle is opened, whichever comes first)

**2.0 CERTIFIED VALUES AND ASSOCIATED UNCERTAINTY:**  
Certified Value: **1005 ± 10 µg/ml**  
Method of analysis: Ion Chromatography Assay  
Traceability: NIST Standard Reference Materials: 3182  
Lot: 060925

**Note:** The uncertainty of the certified value has been calculated from applicable uncertainty contributors ( $u_i$ ) including uncertainty established during characterization of the material ( $u_{char}$ ), the between bottle variation ( $u_{bb}$ ), short-term stability ( $u_{sts}$ ) and long-term stability ( $u_{lts}$ ) according to the model  $u_c = \sqrt{(u_{char})^2 + u_{bb}^2 + u_{sts}^2 + u_{lts}^2}$ . This combined uncertainty has been further multiplied by a coverage factor ( $k$ ) of 2 to provide a 95% confidence interval.

**3.0 REFERENCE VALUES:**  
Density: **1.000 g/ml @ 20.2°C**

**4.0 APPROVAL AND DATE OF CERTIFICATION:**  
Certification Approval: Yaling Sui, Chemist  
Certification Date: November 05, 2014

*Yaling Sui*

## Ion Chromatography Standards

### AccuSPEC

### SINGLE CATION CHROMATOGRAPHY STANDARDS

Cation Standard	Symbol	Matrix	1000 µg/ml		10 000 µg/ml	
			125 ml	500 ml	125 ml	500 ml
Ammonium	NH <sub>4</sub> <sup>+</sup>	H <sub>2</sub> O	250-220-130	250-220-131	250-221-130	250-221-131
Barium	Ba <sup>2+</sup>	H <sub>2</sub> O	250-220-175	250-220-176	250-221-175	250-221-176
Calcium	Ca <sup>2+</sup>	H <sub>2</sub> O	250-220-250	250-220-251	250-221-250	250-221-251
Lithium	Li <sup>+</sup>	H <sub>2</sub> O	250-220-445	250-220-446	250-221-445	250-221-446
Magnesium	Mg <sup>2+</sup>	H <sub>2</sub> O	250-220-460	250-220-461	250-221-460	250-221-461
Manganese	Mn <sup>2+</sup>	H <sub>2</sub> O	250-220-760	250-220-761	---	---
Nickel	Ni <sup>2+</sup>	H <sub>2</sub> O	250-220-750	250-220-751	---	---
Potassium	K <sup>+</sup>	H <sub>2</sub> O	250-220-625	250-220-626	250-221-625	250-221-626
Sodium	Na <sup>+</sup>	H <sub>2</sub> O	250-220-640	250-220-641	250-221-640	250-221-641
Strontium	Sr <sup>2+</sup>	H <sub>2</sub> O	250-220-685	250-220-686	250-221-685	250-221-686
Zinc	Zn <sup>2+</sup>	H <sub>2</sub> O	250-220-770	250-220-771	---	---

### MULTI-ION STANDARDS

#### Multi-ion Standard 1

<b>Matrix: H<sub>2</sub>O</b>	F <sup>-</sup> @ 20 µg/ml
	Cl <sup>-</sup> @ 30 µg/ml
	NO <sub>3</sub> <sup>-</sup> @ 100 µg/ml
	PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> @ 150 µg/ml
Volume (ml)	Catalog No.
125	140-315-001
500	140-315-005

#### Multi-ion Standard 2

<b>Matrix: H<sub>2</sub>O with stabilizer</b>	Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> @ 10 µg/ml
Volume (ml)	Catalog No.
125	140-315-031
500	140-315-035

#### Multi-ion Standard 3

<b>Matrix: H<sub>2</sub>O with stabilizer</b>	Br <sup>-</sup> , Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> @ 100 µg/ml
Volume (ml)	Catalog No.
125	250-225-011
500	250-225-015

#### Multi-ion Standard 4

<b>Matrix: H<sub>2</sub>O with stabilizer</b>	Br <sup>-</sup> , Cl <sup>-</sup> , F <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , SO <sub>4</sub> <sup>2-</sup> @ 1000 µg/ml
Volume (ml)	Catalog No.
125	250-225-201
500	250-225-205

## Ion Chromatography Standards

### AccuSPEC

#### ELUENT SOLUTIONS

Eluent Solutions	Symbol	Concentration	100 ml	500 ml	1 L
Bicarbonate/Sodium Hydroxide concentrate	---	0.3/0.2 M	250-220-205	---	---
Carbonate/Bicarbonate concentrate	---	0.18/0.17 M	250-220-310	250-220-315	---
Carbonate/Bicarbonate concentrate	---	0.22/0.28 M	250-220-325	250-220-326	---
Carbonate/Bicarbonate concentrate	---	0.30/0.24 M	250-220-340	250-220-341	---
Methanesulfonic Acid concentrate	CH <sub>3</sub> SO <sub>3</sub> H	1 M	---	250-220-491	250-220-490
Sodium Bicarbonate Eluent concentrate	NaHCO <sub>3</sub>	0.5 M	250-220-655	250-220-656	250-220-657
Sodium Carbonate Eluent concentrate	Na <sub>2</sub> CO <sub>3</sub>	0.5 M	250-220-670	250-220-671	250-220-672

#### CHELATION SOLUTIONS

Eluent Solutions	Symbol	Concentration	500 ml	1 L	5 L
Ammonium Acetate	CH <sub>3</sub> COONH <sub>4</sub>	2 M	250-220-145	250-220-146	250-220-147
Nitric Acid*	HNO <sub>3</sub>	2 M	250-035-100	250-035-101	250-035-102

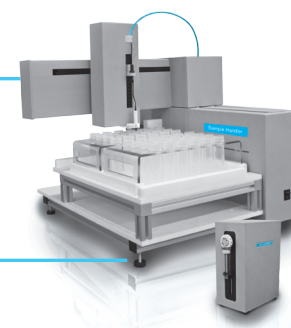
\* Also available in 10 and 20 L volumes



SPECIALLY DESIGNED FOR LABS TO AUTOMATE ALL TYPES OF LIQUID MANIPULATION - DISPENSING, ALIQUOTING, NORMALIZING, TRANSFERING.

**SAVE MONEY AND INCREASE THROUGHPUT  
WITH UNATTENDED SAMPLE PREPARATION AUTOMATION**

[SEE PAGE 56 FOR MORE DETAILS](#)



## Standards Request Form ION CHROMATOGRAPHY STANDARDS

Custom Standards are a great way to save time and money related to preparation of various calibration solutions and QC checks.

**SCP SCIENCE** prepares Custom Standards in compliance with ISO Guide 34 and ISO 17025, and typically ships them with 72 hours from time of order confirmation.

### CONTACT INFORMATION

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

Company: \_\_\_\_\_ Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ Province/State: \_\_\_\_\_ PC/Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-Mail: \_\_\_\_\_

**Please indicate the element, volume and concentration required.**

Anion Custom Multi-Ion Standard	Concentration	Cation Custom Multi-Ion Standard	Concentration
Acetate	_____	Ammonium	_____
Bromate	_____	Ammonia-Nitrogen	_____
Bromide	_____	Barium	_____
Chlorate	_____	Calcium	_____
Chloride	_____	Lithium	_____
Fluoride	_____	Magnesium	_____
Formate	_____	Manganese	_____
Nitrate	_____	Nickel	_____
Nitrate-Nitrogen	_____	Potassium	_____
Nitrite	_____	Sodium	_____
Nitrite-Nitrogen	_____	Strontium	_____
Oxlate	_____	Zinc	_____
Perchlorate	_____	<b>Special Requirements:</b> _____	_____
Phosphate	_____		_____
Phosphate-Phosphorus	_____		_____
Sulfate	_____		_____
Sulfate-Sulfur	_____		_____

Fax this form to (800) 253-5549/(514) 457-4499 & we will have a quotation prepared within 24 hours, or visit [www.scpscience.com](http://www.scpscience.com) to fill out your custom blend request online.

## STANDARDS, BUFFERS, AND REAGENTS

**AccuSPEC** Standards, Buffers, and Reagents are manufactured to meet a wide variety of laboratory needs. Choose from a wide selection of products, concentrations and formats, and take advantage of competitive pricing, superior quality and excellent customer service. Custom preparations are available for selected products.

Each product is supplied with a Certificate of Analysis detailing critical parameters and uncertainties where relevant.



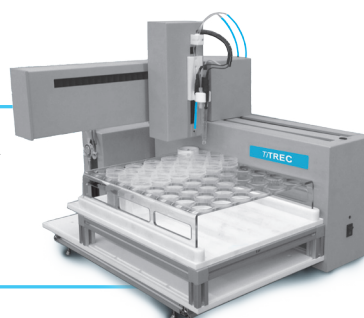
Products	Page
Acids and Bases	199
pH Buffers	202
Conductivity Standards	203
BOD Reagents	204
COD Reagents	205
TIC/TOC Standards	205
Ion Selective Electrode Products	206
High Purity Compounds	207



### AUTOMATED ELECTROCHEMISTRY ANALYZER

MULTIPARAMETER ROBOTIC PLATFORM DESIGNED FOR  
pH - CONDUCTIVITY - ALKALINITY MEASUREMENTS

SEE PAGE 60 FOR MORE DETAILS



## Standards, Buffers and Reagents

### ACIDS AND BASES

#### Features

Products available in multiple concentrations.

- Flexibility in selecting the best concentrations to fit your analytical requirements

Certificate of Analysis with actual concentration, lot number, expiry date, and traceability to NIST, where applicable

- Complete documentation for audit purposes

Custom Solutions and Bulk Sizes available

**SCP SCIENCE** offers a full range of acids and bases available as reagents and/or titrants. Our wide range of concentrations is sure to satisfy most applications.

#### ACIDS

Solutions	Description	Concentration	500 ml	1 L	5 L	20 L
Acetic Acid	CH <sub>3</sub> COOH	0.1 N	250-000-100	250-000-101	250-000-102	250-000-104
Acetic Acid	CH <sub>3</sub> COOH	3 N	250-000-250	250-000-251	250-000-252	250-000-254
Acetic Acid	CH <sub>3</sub> COOH	1% v/v	250-000-300	250-000-301	250-000-302	250-000-304
Acetic Acid	CH <sub>3</sub> COOH	50% v/v	---	250-000-701	250-000-702	250-000-704
Ammonium Hydroxide	(as NH <sub>3</sub> ), HN <sub>4</sub> OH	5N	---	250-100-301	250-100-302	---
Boric Acid	H <sub>3</sub> BO <sub>3</sub>	2% w/v	250-015-100	250-015-101	250-015-102	250-000-104
Boric Acid	H <sub>3</sub> BO <sub>3</sub>	3% w/v	---	---	250-015-106	---
Boric Acid	H <sub>3</sub> BO <sub>3</sub>	4% w/v	250-015-200	250-015-201	250-015-202	250-015-204
Citric Acid	H <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub>	0.7% w/v	---	250-025-205	---	---
Citric Acid	H <sub>3</sub> C <sub>6</sub> H <sub>5</sub> O <sub>7</sub>	10% w/v	250-025-200	250-025-201	250-025-202	250-025-204
Hydrochloric Acid	HCl	0.01 N	250-030-100	250-030-101	250-030-102	250-030-104
Hydrochloric Acid	HCl	0.02 N	250-030-130	250-030-131	250-030-132	250-030-134
Hydrochloric Acid	HCl	0.1 N	250-030-190	250-030-191	250-030-192	250-030-194
Hydrochloric Acid	HCl	0.2 N	250-030-220	250-030-221	250-030-222	250-030-224
Hydrochloric Acid	HCl	0.5 N	250-030-280	250-030-281	250-030-282	250-030-284
Hydrochloric Acid	HCl	1 N	250-030-400	250-030-401	250-030-402	250-030-404
Hydrochloric Acid	HCl	2 N	250-030-430	250-030-431	250-030-432	250-030-434
Hydrochloric Acid	HCl	2.4 N	250-030-460	250-030-461	250-030-462	250-030-464
Hydrochloric Acid	HCl	5 N	250-030-520	250-030-521	250-030-522	---
Hydrochloric Acid	HCl	1% v/v	---	250-030-671	250-030-672	250-030-674
Hydrochloric Acid	HCl	20% v/v	250-030-790	250-030-791	250-030-792	250-030-734

## Standards, Buffers and Reagents

### ACIDS AND BASES

#### ACIDS

Solutions	Description	Concentration	500 ml	1 L	5 L
Nitric Acid	HNO <sub>3</sub>	2 N	250-035-250	250-035-251	250-035-252
Nitric Acid	HNO <sub>3</sub>	20% v/v	---	250-035-351	250-035-352
Nitric Acid	HNO <sub>3</sub>	50% v/v	---	250-035-401	250-035-402
Nitric Acid	HNO <sub>3</sub>	2 M	250-035-100	250-035-101	250-035-102
Oxalic Acid	C <sub>2</sub> H <sub>2</sub> O <sub>4</sub>	0.1 N	250-040-100	250-040-101	250-040-102*
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	0.02 N	250-060-100	250-060-101	250-060-102
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	0.1 N	250-060-160	250-060-161	250-060-162
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	0.2 N	250-060-190	250-060-191	250-060-192
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	0.5 N	250-060-250	250-060-251	250-060-252
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	1 N	250-060-280	250-060-281	250-060-282

\* 4L Glass bottle

#### BASES

Solutions	Description	Concentration	500 ml	1 L	5 L
Potassium Hydroxide	KOH	0.1 N	250-104-100	250-104-101	250-104-102
Potassium Hydroxide	KOH	0.5 N	250-104-150	250-104-151	250-104-152
Sodium Hydroxide	NaOH	0.01 N	250-108-100	250-108-101	250-108-102
Sodium Hydroxide	NaOH	0.02 N	250-108-130	250-108-131	250-108-132
Sodium Hydroxide	NaOH	0.1 N	250-108-220	250-108-221	250-108-222
Sodium Hydroxide	NaOH	0.2 N	250-108-250	250-108-251	250-108-252
Sodium Hydroxide	NaOH	0.25 N	250-108-280	250-108-281	250-108-282
Sodium Hydroxide	NaOH	0.5 N	250-108-370	250-108-371	250-108-372
Sodium Hydroxide	NaOH	1 N	250-108-400	250-108-401	250-108-402
Sodium Hydroxide	NaOH	2 N	250-108-430	250-108-431	250-108-432
Sodium Hydroxide	NaOH	2.5 N	250-108-460	250-108-461	250-108-462
Sodium Hydroxide	NaOH	10 N	250-108-580	250-108-552	250-108-582

#### AccuSPEC INDICATORS

Indicators	Concentration	60 ml	125 ml	500 ml	1 L
Bromophenol Blue	0.04%	250-120-200	250-120-201	250-120-202	250-120-203
Calmagite Indicator (Aqueous)	0.10%	250-120-210	250-120-211	250-120-212	250-120-213
Eriochrome Black T in 2-Methoxyethanol	0.5% w/v	250-120-350	250-120-351	250-120-352	250-120-353
Eriochrome Black T in Triethanolamine	1% w/v	250-120-360	250-120-361	250-120-362	250-120-363
Ferrioin Indicator	0.025 M	250-120-380	250-120-381	250-120-382	250-120-383
Phenolphthalein (Ethanol 1+1)	0.5%	250-120-550	250-120-551	250-120-552	250-120-553
Phenolphthalein (Isopropanol)	1%	250-120-580	250-120-581	250-120-582	250-120-583
Starch Indicator (perserved with Salicylic Acid)	1%	250-120-650	250-120-651	250-120-652	250-120-653



**SCP SCIENCE**Providing Innovative Solutions to Analytical Chemists /  
Solutions innovatrices pour chimistes analystes**Certificate of Analysis**

Catalogue numbers	250-030-40x
Description	<b>AccuSPEC – Hydrochloric Acid</b>
Nominal Concentration	1 N
Lot Number	<b>S141222019</b>
Expiry Date	<b>December 2016</b>

**HCl 1 N**

This volumetric standard solution analyzed by titration is traceable to a KHP primary standard.

**Actual Concentration: 1.002 N**

**SAMPLE**

Certified by: Yaling Sui Date of certification: December 23, 2014  
Yaling Sui, chemist

This solution is guaranteed to be stable and accurate to within  $\pm 0.5\%$  of the actual concentration up to the expiry date provided the solution is kept tightly capped and stored under normal laboratory conditions. For these solutions, 18 megohm/cm double deionized water, ACS-grade starting materials (where applicable) and Class A glassware are used. The equipment used (balances, pH-meters, Conductivity meters, etc...) are calibrated daily (internally) and bi-annually (externally) and traceable to NIST. The Material Safety Data Sheet and this Certificate of Analysis are available on our web site. (Egalement disponible en Français)

SCP SCIENCE is ISO 9001 registered and ISO 17025 / Guide 34\* accredited.

(\*This product is **not accredited**. See our Scope of Accreditation for an official list of accredited certified reference materials).

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## Standards, Buffers and Reagents

### AccuSPEC BUFFERS

SCP SCIENCE provides a full range of pH buffers for most laboratory applications. Our buffers are traceable to NIST standards and each is supplied with a comprehensive Certificate of Analysis.



**Volume**  
500 ml

**Catalog No.**  
250-200-000

#### Features

Color coded Buffers with flip-top cap for pH 4, 7 & 10.

- Easy recognition, easy dispersing

Available in sizes from 500 ml to 20 liters

- Use only what is required. Save money on larger volumes

Certificate of Analysis with actual concentration, lot number, expiry date, and traceability to NIST, where applicable

- Complete documentation for audit purposes

Buffer Solutions (pH certified at 25°C)	500 ml	1 L	5 L
pH 1	250-201-001	250-201-002	250-201-003
pH 2	250-202-001	250-202-002	250-202-003*
pH 3	250-203-001	250-203-002	250-203-003*
pH 4	250-204-001	250-204-002	250-204-003*
pH 4 red	250-204-501	---	250-204-502*
pH 5	250-205-001	250-205-002	250-205-003*
pH 6	250-206-001	250-206-002	250-206-003*
pH 7	250-207-001	250-207-002	250-207-003*
pH 7 yellow	250-207-501	---	250-207-502*
pH 7.2 (phosphate)	250-110-100	250-110-101	250-110-102*
pH 7.40	250-200-580	250-200-581	250-200-582*
pH 8	250-208-001	250-208-002	250-208-003*
pH 9	250-209-001	250-209-002	250-209-003*
pH 10	250-210-001	250-210-002	250-210-003*
pH 10 Blue	250-210-501	---	250-210-502*
pH 11	250-211-001	250-211-002	250-211-003
pH 12	250-212-001	250-212-002	250-212-003

\* Also available in 10 and 20 L bottles

## Standards, Buffers and Reagents

### AccuSPEC CONDUCTIVITY STANDARDS

Solutions	Conductivity ( $\mu\text{S}$ )	500 ml	1 L
Conductivity Standards (KCl)	12.9	250-160-700	250-160-701
Conductivity Standards (KCl)	84	250-160-720	250-160-721
Conductivity Standards (KCl)	146.9	250-160-760	250-160-761
Conductivity Standards (KCl)	1413	250-160-820	250-160-821
Conductivity Standards (KCl)	2767	250-160-840	250-160-841
Conductivity Standards (KCl)	12 856	250-160-880	250-160-881
Conductivity Standards (KCl)	111 342	250-160-900	250-160-901
Conductivity Standards (KCl)	160 000	250-160-950	250-160-951
Conductivity Standards with TDS	5	250-160-050	250-160-051
Conductivity Standards with TDS	10	250-160-070	250-160-071
Conductivity Standards with TDS	23.8	250-160-090	250-160-091
Conductivity Standards with TDS	50	250-160-130	250-160-131
Conductivity Standards with TDS	70	250-160-150	250-160-151
Conductivity Standards with TDS	100	250-160-170	250-160-171
Conductivity Standards with TDS	200	250-160-190	250-160-191
Conductivity Standards with TDS	445	250-160-210	250-160-211
Conductivity Standards with TDS	500	250-160-230	250-160-231
Conductivity Standards with TDS	700	250-160-250	250-160-251
Conductivity Standards with TDS	1000	250-160-270	250-160-271
Conductivity Standards with TDS	2000	250-160-290	250-160-291
Conductivity Standards with TDS	3900	250-160-330	250-160-331
Conductivity Standards with TDS	5000	250-160-350	250-160-351
Conductivity Standards with TDS	7000	250-160-370	250-160-371
Conductivity Standards with TDS	10 000	250-160-390	250-160-391
Conductivity Standards with TDS	16 630	250-160-410	250-160-411
Conductivity Standards with TDS	20 000	250-160-430	250-160-431
Conductivity Standards with TDS	30 100	250-160-450	250-160-451
Conductivity Standards with TDS	50 000	250-160-470	250-160-471
Conductivity Standards with TDS	70 000	250-160-490	250-160-491
Conductivity Standards with TDS	100 000	250-160-510	250-160-511

## Standards, Buffers and Reagents

## AccuSPEC STANDARDS &amp; REAGENTS FOR BOD

Biological Oxygen Demand (BOD) is a measure of the level of organic pollution in water. Specifically, it represents the amount of dissolved oxygen needed by biological organisms to completely break down the organic material in a given volume of water.

SCP SCIENCE offers the reagents required for this analysis, both individually and in kit format. For labs considering automation, check out **the new EasyPREP BOD-200 on page 62.**



Volume	Catalog No.
500 ml	250-110-150
1 L	250-110-151
5 L	250-110-152

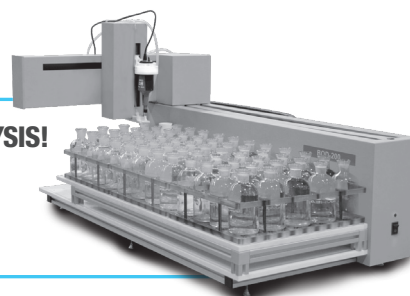
Solutions included in Kit	Concentration	500 ml	1 L	5 L
Buffer pH 7.2 (phosphate)	---	250-110-100	250-110-101	250-110-102
Calcium Chloride, CaCl <sub>2</sub>	2.75% w/v	250-110-200	250-110-201	250-110-202
Ferric Chloride, FeCl <sub>3</sub>	0.025% w/v	250-110-300	250-110-301	250-110-302
Magnesium Sulfate, MgSO <sub>4</sub>	2.25% w/v	250-110-400	250-110-401	250-110-402

Product	Quantity	Catalog No.
BOD Glucose Powder for check solution	10 g	250-110-500
BOD Glutamic Acid for check solution	10 g	250-110-600



**BOD, CBOD AND DO AUTOMATED, UNATTENDED ANALYSIS!**  
SPECIFICALLY DESIGNED FOR STATE, MUNICIPAL &  
COMMERCIAL ENVIRONMENTAL TESTING LABS

SEE PAGE 62 FOR MORE DETAILS



## Standards, Buffers and Reagents AccuSPEC STANDARDS & REAGENTS FOR COD

### AccuSPEC COD DIGESTION TUBES

**AccuSPEC** COD Digestion Tubes are standard 16 mm tubes that have been pre-filled with the reagents required for EPA 410.4, ISO 15705, DIN 38409 and Standard Methods 5220. Available in three ranges, the solution contains mercuric sulfate ( $HgSO_4$ ) to remove up to 2000 ppm of chloride interference.

Simply add 2 ml of sample to the tube, tightly replace the screw cap, and mix the contents by inverting the tube a few times. Place the vials in the **DigiPREP** CUBE or other reactor, set to 150 °C, and allow to reflux for 2 hours. Once cooled to room temperature, the samples can be measured spectrophotometrically.



Concentration	25 tube box + 1 QC	Case of 200
0 - 150 ppm	250-130-006	250-130-007
0 - 1500 ppm	250-130-016	250-130-017
0 - 15,000 ppm	250-130-026	250-130-027

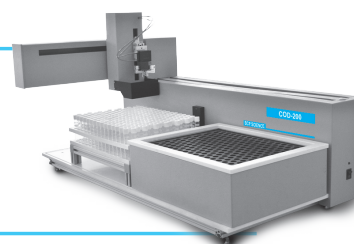
### AccuSPEC COD CONTROL SOLUTIONS

**AccuSPEC** COD Control Solutions are critical components for COD analysis. Use Control Solutions to help build the required calibration curve in conjunction with **AccuSPEC** COD Digestion Tubes.

Concentration	125 ml	500 ml	1 L
100 mg/l O <sub>2</sub>	250-130-512	250-130-550	250-130-551
1000 mg/l O <sub>2</sub>	250-130-602	250-130-600	250-130-601
10 000 mg/l O <sub>2</sub>	250-130-652	250-130-650	250-130-651



**ALL-IN-ONE UNATTENDED COD ANALYSIS**  
**AUTOMATES MIXING, HEATING, COOLING AND ANALYSIS**  
 DESIGNED FOR PERMANGANATE AND DICHROMATE METHODS  
 FOLLOWING EPA, DIN & ASIAN NORMS  
[SEE PAGE 64 FOR MORE DETAILS](#)



### AccuSPEC STANDARDS & REAGENTS FOR TIC/TOC

SCP SCIENCE TIC/TOC Standards are prepared with ultra-pure starting materials and traceable to NIST 3152/84

TOTAL INORGANIC CARBON STANDARD		
Concentration µg/ml	125 ml	500 ml
100	---	250-250-003
1000	250-250-000	250-250-001
10 000	---	250-250-002

TOTAL ORGANIC CARBON STANDARD		
Concentration µg/ml	125 ml	500 ml
100	250-250-153	250-250-053
1000	250-250-050	250-250-051
10 000	250-250-054	250-250-052

## Standards, Buffers and Reagents

### AccuSPEC BUFFERS AND SOLUTIONS FOR ION SELECTIVE ELECTRODE ANALYSIS

Ion Selective Electrodes provide a quick and convenient method of analysis for many ionic species. Save on standards and reagents manufactured under our ISO Quality Program.

#### Features

Complete list of products for most Ion Selective Electrodes

- One source for all your solution needs, efficient ordering

Direct equivalent to original manufacturers

- Product confidence while saving money

Manufactured and tested under our ISO Certified Quality Program.

- Complete documentation for audit purposes

### AccuSPEC REAGENTS

Reagents	Description	Concentration	125 ml	500 ml	1 L	5 L
Ammonium Chloride	NH <sub>4</sub> Cl	0.1 M	250-180-150	250-180-151	250-180-152	250-180-153
Buffer TISAB with CDTA			---	---	250-200-463	250-200-430*
Buffer TISAB II with CDTA			---	---	250-200-433	250-200-460*
Electrode Storage Solution			250-180-325	250-180-326	250-180-327	250-180-328
Electrode Storage Solution (buffered)			250-180-350	250-180-351	250-180-352	250-180-353
Ionic Strength Adjustor (ISA) for Solid State ISE			250-180-400	250-180-401	---	---
Nitrate Interference Suppressor Solution			250-180-425	250-180-426	---	---
Sodium Chloride	NaCl	5 M	---	250-180-550	250-180-551	250-180-552*
Sodium Nitrate	NaNO <sub>3</sub>	5 M	---	250-180-600	250-180-601	---

\* Also available in 10 and 20 L bottles

### AccuSPEC MAINTENANCE SOLUTIONS

Maintenance Solutions	125 ml	500 ml
Ag/AgCl Reference Electrode Fill Solution	250-180-100	250-180-101
Ammonia Electrode Filling Solution	250-180-125	250-180-126
Combination Chloride Reference Internal Filling Solution	250-180-250	250-180-251
Ross Reference Electrode Filling Solution	250-180-500	250-180-501
Single Junction Reference Internal Filling Solution	250-180-525	250-180-526

## Standards, Buffers and Reagents

### AccuSPEC HIGH PURITY COMPOUNDS

#### Features

99.99% - 99.9999% Pure

Certificate of Analysis included with each compound listing the individual impurities

Available on a per gram basis - maximum flexibility

Tight control on the level of metallic impurities present in the material

Individual concentration of each impurity present, not just a total impurities number

**SCP SCIENCE** High Purity Compounds are perfect for scientists who prepare their own standards or require high purity materials for matrix matching. Products are tested for impurities and are supplied with a comprehensive Certificate of Analysis.

Symbol	Compound	Catalog No.
Al	Aluminum Nitrate	140-140-001
Al	Aluminum Metal	140-140-002
As	Arsenic (V) Oxide	140-140-004
As	Arsenic (III) Oxide	140-140-085
Au	Gold Metal	140-140-016
B	Ammonium Tetraborate	140-140-008
Ba	Barium Carbonate	140-140-005
Be	Beryllium Acetate Basic	140-140-006
Bi	Bismuth Metal	140-140-007
Ce	Cerium Nitrate	140-140-044
Co	Cobalt Metal	140-140-050
Cr	Chromium Nitrate	140-140-011
Cr	Chromium Metal	140-140-012
Cs	Cesium Chloride	140-140-070
Cs	Cesium Nitrate	140-140-011
Cu	Copper Metal	140-140-014
Fe	Iron Metal	140-140-017
Ga	Gallium Metal	140-140-015

Symbol	Compound	Catalog No.
In	Indium Metal	140-140-053
La	Lanthanum Chloride	140-140-071
La	Lanthanum Nitrate	140-140-072
La	Lanthanum (III) Oxide	140-140-054
Li	Lithium Carbonate	140-140-019
Mo	Ammonium Heptamolybdate hydrate	140-140-025
Mo	Ammonium Molybdate	140-140-023
N	Ammonium Nitrate	140-140-067
P	Ammonium Dihydrogen Orthophosphate	140-140-025
P	Ammonium Phosphate Dibasic	140-140-068
Pb	Lead Nitrate	140-140-018
Pt	Ammonium Hexachloroplatinate	140-140-027
S	Ammonium Sulfate	140-140-035
Sb	Antimony (III) Oxide	140-140-003
Si	Ammonium Hexafluorosilicate	140-140-031
Ti	Ammonium Hexafluorotitanate	140-140-038
W	Ammonium Metatungstate	140-140-039

## Standards, Buffers and Reagents

### AccuSPEC HIGH PURITY COMPOUNDS

Symbol	Compound	Catalog No.
Ag	Silver Nitrate	140-140-032
Hg	Mercury (II) Chloride	140-140-046
K	Potassium Chloride	140-140-077
K	Potassium Nitrate	140-140-028
Li	Lithium Chloride	140-140-073
Li	Lithium Nitrate	140-140-074
Mg	Magnesium Metal	140-140-020
Mg	Magnesium Nitrate Hexahydrate	140-140-075
Mn	Manganese (II) Acetate Hydrate	140-140-021
Na	Sodium Chloride	140-140-084
Na	Sodium Carbonate	140-140-033
Nb	Niobium (V) Oxide	140-140-047
Ni	Nickel Nitrate	140-140-076
Ni	Nickel Powder	140-140-024
Pd	Palladium Powder	140-140-026

Symbol	Compound	Catalog No.
Rb	Rubidium Nitrate	140-140-058
Sc	Scandium (II) Oxide	140-140-029
Se	Selenium Metal	140-140-030
Sn	Tin Metal	140-140-037
Sr	Strontium Carbonate	140-140-034
Ta	Tantalum (V) Oxide	140-140-048
Th	Thorium (IV) Nitrate	140-140-064
Tl	Thallium Nitrate	140-140-036
U	Uranium Oxide	140-140-065
W	Tungsten Powder	140-140-049
Y	Yttrium Granules	140-140-081
Y	Yttrium (II) Oxide	140-140-041
Yb	Ytterbium (II) Oxide	140-140-066
Zn	Zinc Metal	140-140-042
Zr	Zirconyl Nitrate	140-140-043



**2x25 ml PlasmaCAL ICP-OES/MS STANDARDS**  
 PERFECT FOR DISPENSING PRECISE AMOUNTS, AVOIDING CROSS-CONTAMINATION,  
 REDUCING WASTE AND MAXIMIZING STABILITY BY MAINTAINING A CONSTANT HEADSPACE  
 CONTACT OUR SALES DEPARTMENT  
 FOR MORE INFORMATION [SALES@SCPSCIENCE](mailto:SALES@SCPSCIENCE).





**SCP SCIENCE**

Providing Innovative Solutions to Analytical Chemists /  
Solutions innovatrices pour chimistes analystes

# Certificate of Analysis

Numéro de catalogue : 140-140-005  
 Description : Barium Carbonate,  
High Purity 99.999%  
 Lot Number: S140129024  
 Assay: 69.8% Ba

**BaCO<sub>3</sub>**

**Metallic Impurities (ppm)**

Ag	< 2	Cs	* < 10	K	< 1	Pd	< 1	Ti	< 0.3
Al	< 2	Cu	< 0.5	La	< 2	Pt	< 2	Tl	< 1
As	< 2	Dr	< 0.5	Li	1	Rb	< 2	Tm	< 1
Au	< 1	Er	< 1	Lu	< 0.1	Re	< 1	V	< 0.3
Be	< 0.1	Eu	< 1	Mg	4	Ru	< 2	W	< 2
Bi	< 2	Fe	< 1	Mn	< 0.2	Sc	< 0.2	Y	< 0.5
Ca	2.3	Gd	< 1	Mo	< 1	Sn	< 0.3	Yb	< 0.2
Cd	< 0.1	Ge	< 2	Na	< 1	Sr	< 0.2	Zn	< 0.5
Ce	< 2	Hf	< 2	Nb	< 1	Ta	< 2	Zr	< 0.5
Co	< 1	Ho	< 2	Ni	< 1	Tb	< 2		
Cr	< 1	Ir	< 2	Pb	< 2	Te	< 2		

**Total Metallic Impurities(TMI) determined: 7.3 ppm**

The impurities are detected by ICP-AES spectrometry.  
\*Determined by AA

Certified by: Yaling Sui  
Yaling Sui, chemist

Date of certification: February 04, 2014

SCP SCIENCE is ISO 9001 registered and ISO 17025 / Guide 34\* accredited.

(\*This product is not accredited. See our Scope of Accreditation for an official list of accredited certified reference materials).

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