**104.5 Spectrometry, Single Element Standard Solutions**

These SRMs are intended as standard solutions for calibrating instruments used in atomic spectrometry, including atomic absorption spectrophotometry, inductively coupled plasma optical emission spectrometry, and inductively coupled plasma mass spectrometry. They can also be used in conjunction with any other analytical technique or procedure where standard solutions are required. Each SRM is a single element solution of 50 mL with a nominal concentration of 10 mg/g, except where indicated. Each unit is provided in either a single high density polyethylene bottle or in 5 x 10 mL borosilicate glass ampoules. NOTE: The certified values for SRM standard solution lots produced after March 1997 are stated in mass units, mg/g, rather than mg/mL. For the convenience of the user, each certificate provides instructions for preparing SRM dilutions by volume as well as by mass.

Commercial Producers of Elemental Standard Solutions: Instructions and a spreadsheet have been designed as an aid for establishing traceability of a batch of an elemental solution to the corresponding elemental spectrometric solution from the NIST SRM 3100 Series. Spreadsheet with ICP-OES example data is also included. When all required input fields are filled, the spreadsheet will calculate the traceable mass fraction and uncertainty of the batch elemental solution standard. The uncertainty provided by the spreadsheet assumes that the tested lot is stable. Any uncertainty due to changes over time to the lot tested, need to be quantified by the producer of the lot, and incorporated into the total uncertainty of the lot.

Instructions: http://www.cstl.nist.gov/nist839/PittCon/Version%201-1%20Traceability%20Tool%20Instructions.pdf
Spreadsheet: http://www.cstl.nist.gov/nist839/PittCon/Traceability%20Tool%20Version%201-1.xls
Sample data: http://www.cstl.nist.gov/nist839/PittCon/Example%20Data%20Set%20for%20Traceability%20Tool%20Version%201-1.xls

PLEASE NOTE: The tables are presented to facilitate comparisons among a family of materials to help customers select the best SRM for their needs. For specific values and uncertainties, the certificate is the only official source.

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| SRM | Element | Nominal Acid Concentration |
|---|---|---|
| 3101a | Aluminum | $HNO_3$ 10% |
| 3102a | Antimony | $HNO_3$ 10% + HF 2% |
| 3103a | Arsenic | $HNO_3$ 10% |
| 3104a | Barium | $HNO_3$ 10% |
| 3105a | Beryllium | $HNO_3$ 10% |
| 3106 | Bismuth | $HNO_3$ 10% |
| 3107 | Boron (5 mg/g) | $H_2O$ |
| 3108 | Cadmium | $HNO_3$ 10% |
| 3109a | Calcium | $HNO_3$ 10% |
| 3110 | Cerium | $HNO_3$ 10% |
| 3111a | Cesium | $HNO_3$ 1% |
| 3112a | Chromium | $HNO_3$ 10% |
| 3113 | Cobalt | $HNO_3$ 10% |
| 3114 | Copper | $HNO_3$ 10% |

| | | |
|---|---|---|
| 3115a | Dysprosium | $HNO_3$ 10% |
| 3116a | Erbium | $HNO_3$ 10% |
| 3117a | Europium | $HNO_3$ 10% |
| 3118a | Gadolinium | $HNO_3$ 10% |
| 3119a | Gallium | $HNO_3$ 10% |
| 3120a | Germanium | $HNO_3$ 10% + HF 2% |
| 3121 | Gold | HCl 10% |
| 3122 | Hafnium | $HNO_3$ 10% + HF 2% |
| 3123a | Holmium | $HNO_3$ 10% |
| 3124a | Indium | $HNO_3$ 10% |
| 3126a | Iron | $HNO_3$ 10% |
| 3127a | Lanthanum | $HNO_3$ 10% |
| 3128 | Lead | $HNO_3$ 10% |
| 3129a | Lithium | $HNO_3$ 1% |
| 3130a | Lutetium | $HNO_3$ 10% |
| 3131a | Magnesium | $HNO_3$ 10% |
| 3132 | Manganese | $HNO_3$ 10% |
| 3133 | Mercury | $HNO_3$ 10% |
| 3134 | Molybdenum | HCl 10% |
| 3135a | Neodymium | $HNO_3$ 10% |
| 3136 | Nickel | $HNO_3$ 10% |
| 3137 | Niobium | $HNO_3$ 10% + HF 2% |
| 3138 | Palladium | HCl 10% |
| 3139a | Phosphorus | $HNO_3$ 0.8% |
| 3140 | Platinum | HCl 10% |
| 3141a | Potassium | $HNO_3$ 1% |
| 3142a | Praseodymium | $HNO_3$ 10% |
| 3143 | Rhenium | $HNO_3$ 10% |
| 3144 | Rhodium ( 1 mg/g) | HCl 10% |
| 3145a | Rubidium | $HNO_3$ 1% |
| 3147a | Samarium | $HNO_3$ 10% |
| 3148a | Scandium | $HNO_3$ 10% |
| 3149 | Selenium | $HNO_3$ 10% |
| 3150 | Silicon | $H_2O$ |
| 3151 | Silver | $HNO_3$ 10% |
| 3152a | Sodium | $HNO_3$ 1% |
| 3153a | Strontium | $HNO_3$ 10% |

| | | |
|---|---|---|
| 3154 | Sulfur | $H_2SO_4$ 0.1% |
| 3155 | Tantalum | $HNO_3$ 10% + HF 2% |
| 3156 | Tellurium | HCl 10% |
| 3157a | Terbium | $HNO_3$ 10% |
| 3158 | Thallium | $HNO_3$ 10% |
| 3159 | Thorium | $HNO_3$ 10% |
| 3160a | Thulium | $HNO_3$ 10% |
| 3161a | Tin | $HNO_3$ 5% + HF 1% |
| 3162a | Titanium | $HNO_3$ 10% + HF 2% |
| 3163 | Tungsten | $HNO_3$ 7% + HF 4% |
| 3164 | Uranium | $HNO_3$ 10% |
| 3165 | Vanadium (5 mg/g) | $HNO_3$ 10% |
| 3166a | Ytterbium | $HNO_3$ 10% |
| 3167a | Yttrium | $HNO_3$ 10% |
| 3168a | Zinc | $HNO_3$ 10% |
| 3169 | Zirconium | $HNO_3$ 10% + HF 2% |