

## 104.5 - Spectrometry, Single Element Standard Solutions

These SRMs are intended as the primary calibration standards for the quantitative determinations of a single element, typically using either inductively coupled plasma optical emission spectrometry and/or inductively coupled plasma mass spectrometry. They can also be used in conjunction with any other analytical technique or procedure where standard solutions are required. The SRM is a single-element solution of 50 mL with a nominal concentration of 10 mg/g and is provided as either a single high-density polyethylene bottle or in 5 x 10 mL borosilicate glass ampoules. Solutions may contain a nominal amount of acid, such as 10 % Nitric acid or 10 % Hydrochloric acid.

For the convenience of the user, each certificate provides instructions for preparing SRM dilutions by volume as well as by mass.

SRMs marked by an asterisk X are subject to license requirement by the NRC (or Agreement State) for transfer within the United States (U.S.). License certification is required of purchaser by NIST prior to shipment. When an import permit for radioactive material is required of a customer outside the U.S., NIST must have a copy to complete an order and facilitate shipment.

["Radionuclide Calibration Services"](#)

["Radioactive SRM Purchasing Instructions & License Certification Form"](#)

["Radioactive SRMs-General Info"](#)

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.

SRM	Description	Unit of Issue	Nominal Acid Concentration of Matrix	Nominal Mass Fraction (mg/g)	NRC License or Equivalent Required*
<a href="#">3101a</a>	Aluminum (Al) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3102a</a>	Antimony (Sb) Standard Solution	50 mL	HNO <sub>3</sub> 15%	10	--
<a href="#">3103a</a>	Arsenic (As) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 23%	10	--
<a href="#">3104a</a>	Barium (Ba) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 1%	7	--
<a href="#">3105a</a>	Beryllium (Be) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3106</a>	Bismuth (Bi) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 13%	10	--
<a href="#">3107</a>	Boron (B) Standard Solution &lt;br /> /&gt;	50 mL	H <sub>2</sub> O	5	--
<a href="#">3108</a>	Cadmium (Cd) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3109a</a>	Calcium (Ca) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3110</a>	Cerium (Ce) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 16%	10	--
<a href="#">3111a</a>	Cesium (Cs) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 1%	10	--
<a href="#">3112a</a>	Chromium (Cr) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 15%	10	--
<a href="#">3113</a>	Cobalt (Co) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3114</a>	Copper (Cu) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3115a</a>	Dysprosium (Dy) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3116a</a>	Erbium (Er) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 12%	10	--
<a href="#">3117a</a>	Europium (Eu) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3118a</a>	Gadolinium (Gd) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3119a</a>	Gallium (Ga) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3120a</a>	Germanium (Ge) Standard Solution	50 mL	HNO <sub>3</sub> 10% + HF 2%	10	--
<a href="#">3121</a>	Gold (Au) Standard Solution	5 x 10 mL	HCl 9%	10	--
<a href="#">3122</a>	Hafnium (Hf) Standard Solution	50 mL	HNO <sub>3</sub> 17%	10	--
<a href="#">3123a</a>	Holmium (Ho) Standard Solution	5 x 9 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3124a</a>	Indium (In) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3126a</a>	Iron (Fe) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3127a</a>	Lanthanum (La) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3128</a>	Lead (Pb) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3129a</a>	Lithium (Li) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 1%	10	--
<a href="#">3130a</a>	Lutetium (Lu) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3131a</a>	Magnesium (Mg) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3132</a>	Manganese (Mn) Standard Solution	5 x 9 mL	HNO <sub>3</sub> 12%	10	--
<a href="#">3133</a>	Mercury (Hg) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3134</a>	Molybdenum (Mo) Standard Solution	5 x 10 mL	HCl 10%	10	--
<a href="#">3135a</a>	Neodymium (Nd) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	9	--
<a href="#">3136</a>	Nickel (Ni) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3137</a>	Niobium (Nb) Standard Solution	50 mL	HNO <sub>3</sub> 16% + HF 2%	10	--
<a href="#">3138</a>	Palladium (Pd) Standard Solution	5 x 10 mL	HCl 8%	10	--
<a href="#">3139a</a>	Phosphorus (P) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 5%	10	--
<a href="#">3140</a>	Platinum (Pt) Standard Solution	5 x 10 mL	HCl 10%	10	--
<a href="#">3141a</a>	Potassium (K) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 1%	10	--
<a href="#">3142a</a>	Praseodymium (Pr) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 17%	10	--
<a href="#">3143</a>	Rhenium (Re) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3144</a>	Rhodium (Rh) Standard Solution	5 x 10 mL	HCl 6%	1	--
<a href="#">3145a</a>	Rubidium (Rb) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 1%	10	--
<a href="#">3147a</a>	Samarium (Sm) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	9	--
<a href="#">3148a</a>	Scandium (Sc) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3149</a>	Selenium (Se) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3150</a>	Silicon (Si) Standard Solution	50 mL	H <sub>2</sub> O	10	--
<a href="#">3151</a>	Silver (Ag) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3152a</a>	Sodium (Na) Standard Solution	50 mL	HNO <sub>3</sub> 5%	10	--
<a href="#">3153a</a>	Strontium (Sr) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	9	--
<a href="#">3154</a>	Sulfur (S) Standard Solution	5 x 10 mL	H <sub>2</sub> SO <sub>4</sub> 0.1%	10	--
<a href="#">3155</a>	Tantalum (Ta) Standard Solution	50 mL	HNO <sub>3</sub> 13% + HF 1%	10	--
<a href="#">3156</a>	Tellurium (Te) Standard Solution	5 x 10 mL	HCl 10%	10	--
<a href="#">3157a</a>	Terbium (Tb) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 11%	10	--
<a href="#">3158</a>	Thallium (Tl) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3160a</a>	Thulium (Tm) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	13	--
<a href="#">3161a</a>	Tin (Sn) Standard Solution	50 mL	HNO <sub>3</sub> 13% + HF 2%	10	--
<a href="#">3162a</a>	Titanium (Ti) Standard Solution	50 mL	HNO <sub>3</sub> 14% + HF 1%	10	--
<a href="#">3163</a>	Tungsten (W) Standard Solution	50 mL	HNO <sub>3</sub> 7% + HF 4%	10	--
<a href="#">3164</a>	Uranium (U) Standard Solution (Radioactive)	5 x 10 mL	HNO <sub>3</sub> 10%	10	X
<a href="#">3165</a>	Vanadium (V) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	5	--
<a href="#">3166a</a>	Ytterbium (Yb) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	9	--
<a href="#">3167a</a>	Yttrium (Y) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 14%	10	--
<a href="#">3168a</a>	Zinc (Zn) Standard Solution	5 x 10 mL	HNO <sub>3</sub> 10%	10	--
<a href="#">3169</a>	Zirconium (Zr) Standard Solution	50 mL	HNO <sub>3</sub> 16% + HF 2%	10	--
<a href="#">3177</a>	Mercuric Chloride (HgCl <sub>2</sub> Standard Solution)	5 x 10 mL	HNO <sub>3</sub> 3% + HCl 4%	10	--

\*If no "X", then license is not required unless the institution possesses a specific license that covers the listed radionuclide.