

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 2121

Spectrometric Standard Solutions

Cadmium, Lead, Silver, and Zinc

This Standard Reference Material (SRM) is intended as standard stock solutions for use in atomic absorption spectrometry, optical emission (plasma) spectrometry, spectrophotometry, or any other analytical technique that requires aqueous standard solutions for calibrating instruments. SRM 2121 consists of four single element solutions of Cd, Pb, Ag, and Zn. Each solution was prepared gravimetrically at 22 °C to contain 10.00 ± 0.01 mg/mL of the metal ion in a 10 percent acid medium. The certified values (Table 1) are based on gravimetric procedures, i.e., weight per volume composition of high purity metals (>99.99% purity) dissolved in NBS high purity acids.

Table 1

Solution	Metal	Concentration (mg/mL)	Source (Purity, %)	Acid Conc. (V/V)
2121-1	Cd	10.00 ± 0.01	SRM 746, (99.999+)	HNO ₃ , 10%
2121-2	Pb	10.00 ± 0.01	SRM 49e, (99.99 ^a)	HNO ₃ , 10%
2121-3	Ag	10.00 ± 0.01	SRM 748, (99.999+)	HNO ₃ , 10%
2121-4	Zn	10.00 ± 0.01	SRM 740, (99.99+)	HCl, 10%

(a) The purity of this metal was verified by spark source mass spectrometry by P.J. Paulsen and found to contain less than 50 ppm of detectable impurities.

SRM 2121 was prepared by T.C. Rains of the Inorganic Analytical Research Division. Atomic absorption spectrometric analyses were made by T.A. Butler, T.A. Rush, and T.C. Rains.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R.W. Seward.

Procedures for Use

Stability:

This certificate is valid for one year from the shipping date provided the solutions are kept tightly capped and stored under proper laboratory conditions. NBS will monitor the stability of these solutions; if any changes occur that invalidate this certification, purchasers will be notified by NBS.

Preparation of Working Standard Solution:

All solutions should be at 22 ± 1 °C and all glass or plastic surfaces coming into contact with the standard must have been previously cleaned. The working standard solution is prepared from the stock solution by serial dilution. The dilution should be made into certified volumetric class A flasks with 5 or 10 mL class A pipets. All volumetric transfers of solution should be by a proven analytical technique. Each dilution is acidified with an appropriate high-purity acid and diluted to calibrated volume using high-purity water. The stability of the dilution will depend upon the acid concentration added. For the highest accuracy, it is recommended that the analyst prepare daily working solutions from the 100 µg/mL dilution prepared by serial dilution from the original standard solution.