

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 2125

Spectrometric Standard Solutions

Boron, Chromium, Manganese, and Molybdenum

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 2125 consists of four single element solutions of B, Cr, Mn, and Mo. Each solution contains 50 mL and was prepared gravimetrically at 22 °C to contain 10.00 ± 0.01 mg/mL of the metal ion in approximately 10 percent (V/V) acid medium—except boron. The solubility of H_3BO_3 in water is low, therefore the boron solution was prepared to contain 5.00 ± 0.01 mg/mL. The certified values (Table 1) are based on gravimetric procedures, i.e., weight per volume composition of high-purity metals or salts dissolved in NBS high-purity reagents.

Table 1

Solution	Metal	Concentration (mg/mL)	Source (Purity, %)	Acid Conc. (V/V) (Approximate)
2125-1	B	5.00 ± 0.01	SRM 951 (99.99+)	Water
2125-2	Cr	10.00 ± 0.01	Cr metal (99.99+)*	HCl, 10%
2125-3	Mn	10.00 ± 0.01	Mn metal (99.98+)*	HNO ₃ , 10%
2125-4	Mo	10.00 ± 0.01	Mo metal (99.95+)*	HCl, 10%

*These metals were analyzed by optical emission spectrometry and atomic absorption spectrometry for total impurities: Cr contained less than 100 $\mu\text{g/g}$; Mn and Mo contained less than 200 $\mu\text{g/g}$.

SRM 2125 was prepared by T.C. Rains of the Inorganic Analytical Research Division. Atomic absorption and emission spectrometric analyses were made by T.A. Butler, T.A. Rush, T.C. Rains, and J.A. Norris.

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. NOTE: If solution 2125-1 is stored at temperatures below 22 °C, it must be brought to 22 ± 1 °C and shaken well before sampling. This is due to the low solubility of H_3BO_3 . NBS will monitor the stability of all of these solutions; if any changes occur that invalidate this certification, purchasers will be notified by NBS.

Preparation of Working Standard Solutions:

All solutions should be used 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 SRM 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 solutions should be performed by a proven analytical technique. Each dilution should be acidified with an appropriate high-purity acid and diluted to calibrated volume using high-purity water. The stability of the working standard solution will depend upon the final acid concentration. To achieve the highest accuracy, the analyst should prepare daily working solutions from 100 $\mu\text{g/mL}$ dilutions of the original SRM stock solutions.