



National Institute of Standards & Technology

Certificate of Analysis Standard Reference Material 3160

Spectrometric Standard Solution

Thulium

This Standard Reference Material (SRM) is intended 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 3160 is a single element solution prepared gravimetrically to contain 10.00 mg/mL of thulium with a hydrochloric acid concentration (V/V) of 10 percent. The certified values are based on gravimetric procedures, i.e., weight per volume composition of the high-purity oxide dissolved in NIST high-purity reagents.

	Concentration	Source	Acid Conc. (V/V)
<u>Metal</u>	<u>(mg/mL)</u>	<u>Purity, %</u>	<u>Approximate</u>
Tm	10.00 $\pm$ 0.03	Tm ₂ O ₃ (99.99)*	HCl, 10%

*This high-purity material was analyzed by optical emission spectrometry and atomic absorption spectrometry and found to contain less than 100 μ g/g total impurities. Titrimetry was used to confirm stoichiometry of the oxide.

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 normal laboratory conditions. NIST will monitor the stability of these solutions; if any changes occur that invalidate this certification, NIST will notify purchasers.

Preparation of Working Standard Solutions:

All solutions should be brought to 22 $\pm$ 1 $^{\circ}$ C before use and all glass or plastic surfaces coming into contact with the standard must have been previously cleaned. A working standard solution can be prepared from the SRM solution by serial dilution. Dilutions should be made with certified volumetric class A flasks and 5 or 10 mL class A pipets. All volumetric transfers of solutions should be performed using 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 on the final acid concentration; therefore, care should be exercised to insure that the final acid concentration of the dilution closely approximates that of the SRM. To achieve the highest accuracy, the analyst should prepare daily working solutions from 100 μ g/mL dilutions of the original SRM solution.

SRM 3160 was prepared by T.A. Butler of the NIST Inorganic Analytical Research Division. Atomic absorption and emission spectrometric and titrimetric analyses were made by T.A. Butler, C.M. Beck II, 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 Standard Reference Materials Program by J.S. Kane.

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William P. Reed, Chief
Standard Reference Materials Program