



U.S. Department of Commerce  
C. William Verity  
Secretary

National Bureau of Standards  
Ernest Ambler, Director

# National Bureau of Standards

## Certificate of Analysis

### Standard Reference Material C2416

#### Bullet Lead

(In Cooperation with the American Society for Testing and Materials)

This Standard Reference Material (SRM) is intended for use as a composition standard for optical emission spectrometric methods of analysis. It is in the form of a disk 50 mm (2 in.) in diameter and 16 mm (5/8 in.) thick.

<u>Element</u>	<u>Certified Value<sup>1</sup> Percent by Weight</u>	<u>Estimated<sup>2</sup> Uncertainty</u>
Antimony	0.79	0.01
Arsenic	.056	.001
Bismuth	.10	.01
Copper	.065	.002
Sulfur	.0015	.0005
Silver	.0044	.0002
Tin	.09	.01

<sup>1</sup> The certified value listed for a constituent is the present best estimate of the "true" value based on the results of the cooperative program for certification.

<sup>2</sup> The estimated uncertainty listed for a constituent is based on judgment and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability. No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.

Use: The smaller diameter surface (containing a cast indentation) is the surface intended for analytical use. A fresh surface should be prepared by lathe turning for each use of the SRM.

The overall coordination of the technical measurements leading to certification was performed under the direction of J.I. Shultz, Research Associate, ASTM-NBS Research Associate Program.

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 W.P. Reed.

February 16, 1988  
Gaithersburg, MD 20899

Stanley D. Rasberry, Chief  
Office of Standard Reference Materials

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**PLANNING, PREPARATION, TESTING, ANALYSIS:**

Support for the development of this SRM was provided by the Federal Bureau of Investigation, U.S. Dept. of Justice.

The material for this SRM was provided and prepared by the East Penn Manufacturing Co. Inc., Lyon Station, Pennsylvania..

Extensive homogeneity testing by J.A. Norris and T.W. Vetter was performed at the National Bureau of Standards, Inorganic Analytical Research Division.

Cooperative analyses for certification were performed in the following laboratories:

- C&D Power Systems, Inc., Plymouth Meeting, Pennsylvania, M. Kresz.
- East Penn Manufacturing Co., Inc., Lyon Station, Pennsylvania, K.M. Smith.
- Exide Corporation, Yardley, Pennsylvania, W. Trego and J.O. Ciccone.
- General Battery Corporation, Reading, Pennsylvania, K.R. Centrella.
- Johnson Controls, Inc., Milwaukee, Wisconsin, G.M. Trischan, D. Wynn, D. Mongan and E. Laird.
- RSR Corporation, Dallas, Texas, H. McDonald.
- University of California, Irvine, California, Department of Chemistry, V.P. Guinn.

Additional elements have been determined as indicated below. These values are not certified, but are given as additional information on the composition.

<u>Element</u>	<u>Percent, by Weight</u>
Aluminum	(< 0.0001)
Cadmium	( .0002)
Calcium	( <.001)
Cobalt	( <.0002)
Iron	( <.0005)
Manganese	( <.0005)
Nickel	( <.0005)
Tellurium	( <.0005)
Zinc	( <.0005)