National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1727

Anode Tin

(In cooperation with ASTM International)

This Standard Reference Material (SRM) is intended primarily for use in evaluating chemical methods and instrumental methods of analysis of refined pig tin in anode form as specified by ASTM International B 339-00 Standard Specification for Pig Tin [1]. A unit of SRM 1727 consists of a block of Grade "A" tin for the Manufacture of Tinplate with dimensions approximately 30 mm × 30 mm × 30 mm.

Certified Value: The certified value for lead (Pb) in SRM 1727 is given in Table 1. The certified value listed for Pb is the present best estimate of the "true" value based on the results of analyses performed at NIST using isotope dilution-inductively coupled plasma-mass spectrometry. The uncertainty listed with the value is an expanded uncertainty (95 % confidence) and is calculated according to the method in the ISO Guide to the Expression of Uncertainty in Measurement [2,3].

Information Values: Information values for additional constituents of SRM 1727 are given in Table 2. These are non-certified values with no uncertainty reported because there is insufficient information with which to make the appropriate assessments.

Expiration of Certification: The certification of this SRM is valid until **01 January 2028**, within the uncertainty specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see *Instructions for Use*). However, the certification will be nullified if the SRM is damaged or contaminated.

Stability: This material is considered to be stable during the period of certification. NIST will monitor this material and will report any significant changes in certification to the purchaser. Return of the attached registration card will facilitate notification.

Material Preparation: The material for SRM 1727 was obtained in the form of anode castings, otherwise known as pigs [1]. Three castings were selected from a normal shipment of pigs purchased by Bethlehem Steel for electroplating of sheet steel.

Coordination of the technical measurements for certification was accomplished under the direction of J.R. Sieber of the NIST Analytical Chemistry Division.

Analytical measurements for certification of this SRM were performed by K.E. Murphy and S.E. Long of the NIST Analytical Chemistry Division.

Preparation and packaging of SRM 1727 were performed by C.N. Fales of the Standard Reference Materials Group.

Statistical consultation for this SRM was provided by S.D. Leigh and J.H. Yen of the NIST Statistical Engineering Division.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the NIST Standard Reference Materials Program by B.S. MacDonald and J.M. Adams.

Willie E. May, Chief
Analytical Chemistry Division

Gaithersburg, MD 20899
Certificate Issue Date: 29 January 2003
SRM 1727

John Rumble, Jr., Chief
Measurement Services Division

INSTRUCTIONS FOR USE

The test surface is the side opposite to the labeled surface. The entire volume of each unit is certified. The user must determine the optimum surface preparation procedure for each instrumental analytical technique. The user is cautioned to use care when either resurfacing the block or performing additional polishing, as these processes may contaminate the surface. To relate analytical determinations to the certified value on this Certificate of Analysis, a minimum sample quantity of 20 mg is recommended. At NIST, testing of the material for Pb involved acid dissolution of small pieces cut from the solid using a razor blade or chipped using a milling machine.

Table 1. Certified Values for SRM 1727 Anode Tin

Constituent	Mass Fraction (mg/kg)
Pb	33.26 ± 0.33

Table 2. Information Values for SRM 1727 Anode Tin

Constituent	Mass Fraction (mg/kg)
As	<100
Bi	8
Co	2
Cu	4
Fe	20
In	20
Ni	3
Sb	40

Cooperating Laboratories: Homogeneity testing of this material was performed by K.D. Ernst, Bethlehem Steel Corporation, Bethlehem, PA using spark source atomic emission spectrometry. Additional determinations were performed by Shiva Technologies, Inc., Syracuse, NY using glow discharge mass spectrometry.

REFERENCES

[1] ASTM B 339-00, *Standard Specification for Pig Tin*; *Annu. Book ASTM Stand.*; Vol. 02.04, West Conshohocken, PA, p. 1202 (2002).

[2] *Guide to the Expression of Uncertainty in Measurement*, ISBN 92-67-10188-9, 1st Ed. ISO, Geneva, Switzerland (1993); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC (1994); available at http://physics.nist.gov/Pubs/.

[3] Hahn, G. J.; Meeker, W.Q.; *Statistical Intervals*; *A Guide for Practitioners*; John Wiley & Sons, Inc., New York (1991).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet http://www.nist.gov/srm.