



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 Mass Fraction 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 Mass Fraction Values: Information values for additional constituents of SRM 1727 are given in Table 2. An information value is considered to be a value that will be of interest to the SRM user, but insufficient information is available to assess the uncertainty associated with the value [2].

Expiration of Certification: The certification of **SRM 1727** is valid indefinitely, within the uncertainty specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Use"). Periodic recertification of this SRM is not required. However, the certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this material over the period of its certification. If substantive technical changes occur that affect the certification, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

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

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

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

Support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the NIST Office of Reference Materials.

Carlos A. Gonzalez, Chief
Chemical Sciences Division

Gaithersburg, MD 20899
Certificate Issue Date: 29 October 2013
Certificate Revision History on Last Page

Robert L Watters, Jr., Director
Office of Reference Materials

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. Take chips from the disk as needed; do not chip a large quantity for later use.

MATERIAL PREPARATION⁽¹⁾

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.

Table 1. Certified Mass Fraction Values for SRM 1727 Anode Tin

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

Table 2. Information Mass Fraction 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.

⁽¹⁾ Certain commercial equipment, instruments or materials are identified in this certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.
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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] JCGM 100:2008; Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (2008); available at http://www.bipm.org/utis/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Oct 2013); 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://www.nist.gov/pml/pubs/tn1297/index.cfm> (accessed Oct 2013).
- [3] Hahn, G. J.; Meeker, W.Q.; *Statistical Intervals; A Guide for Practitioners*; John Wiley & Sons, Inc., New York (1991).

Certificate Revision History: 29 October 2013 (Instructions for use updated; certification period changed to indefinite; editorial changes); 29 January 2003 (Original certificate date)
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Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet <http://www.nist.gov/srm>.