

UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.

National Bureau of Standards
Certificate of Analyses

Standard Sample 54D
Tin-Base Bearing Metal

ANALYST	TIN SnCl ₂ -KIO ₃	ANTIMONY KBrO ₃ titration	COPPER Electrolytic	LEAD Weighed as PbCrO ₄	ARSENIC Photometric	BISMUTH Photometric	IRON Photometric	SILVER	NICKEL Photometric
1.....	88.54	{ ^b 7.06 7.04}	^e 3.61	^c 0.62	^d 0.090	^e 0.048	^f 0.028	^g 0.003 ₂	0.002 ₈
2.....	88.60	7.00	3.63	^h .64	ⁱ .090	^e .046	^j .023	^k .003 ₅	.003 ₅
3.....	88.66	^l 7.00	3.58	.61	^m .085	^e .050	^j .027	ⁿ .003	.002
4.....	88.55	7.10	3.65	^o .63	^p .092	^o .037	^q .025	^r .001 ₇	.002 ₉
5.....	88.57	7.06	3.61	.60	{ ^p .088 ^o .085}	^o .050	^o .031	^o .003 ₆	^o .002
6.....	88.54	7.06	3.62	.63	{ ⁱ .09 ^o .09}	{ ^e .046 ^o .045}	{ ^j .028 ^o .028}	^o .003 ₅
7.....	^e 88.55	7.03	3.64	{ ^t .62 ^h .62}	ⁱ .084	^v .040	{ ^j .026 ^q .027}	^v .004 ₁	.002 ₈
8.....	88.54	7.04	^w 3.62	^h .63	^p .09	^e .037	^j .03
Average.....	88.57	7.04	3.62	0.62	0.088	0.044	0.027	0.003 ₂	0.002 ₇

^a Tin distilled from a 0.25-g sample (aliquot of 1 g), precipitated with cupferron, and ignited to SnO₂. (See J. Research NBS 33, 307 (1944) RP1610.)

^b Antimony distilled from a 1-g sample as described in J. Research NBS 21, 95 (1938) RP1116. Distillate treated with H₂S. Antimonous sulfide dissolved and titrated with KMnO₄ standardized with sodium oxalate.

^c Copper and lead deposited electrolytically after removal of tin, antimony, arsenic, bismuth, and silver from a 20-g sample.

^d Sodium hypophosphite-ammonium molybdate-photometric method.

^e Thiourea-photometric method.

^f SnCl₂-K₂Cr₂O₇ method.

^g Silver separated from a 20-g sample by internal electrolysis, using a copper wire anode and a weighed platinum cathode on which the silver is deposited.

^h Lead deposited electrolytically as PbCrO₄.

ⁱ Distillation-molybdenum-blue photometric method.

^j Thiocyanate-photometric method.

^k Dithizone-photometric method.

^l KOH-K₂S separation made in a solution of a 1-g sample. Antimony precipitated with H₂S in an acid solution of oxalic acid and ammonium oxalate. AsCl₃ separated and antimony determined by KI-Na₂SO₃ titration.

^m Distillation-As₂S₃-gravimetric method.

ⁿ 20-g sample dissolved in HNO₃-HF. Silver precipitated as chloride and determined turbidimetrically.

^o Determined by spectrochemical analysis.

^p Arsenic separated by distillation and titrated with KBrO₃.

^q ortho-Phenanthroline-photometric method.

^r Rhodamine-photometric method.

^s Copper and antimony separated with iron, and tin titrated with KIO₃. See Anal. Chem. 22, 729 (1950).

^t Weighed as PbSO₄.

^u Bismuth, in a 20-g sample, concentrated in a lead button by the fire assay method and determined photometrically with thiourea.

^v Fire assay method.

^w Copper deposited in a HNO₃-HF solution.

List of Analysts

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| <p>1. R. K. Bell and E. E. Maczkowske, National Bureau of Standards, Washington, D. C.</p> <p>2. M. Eisemann and W. J. Wagner, American Smelting and Refining Co., South Plainfield, N. J.</p> <p>3. F. J. Oswiecinski, E. F. Wyanske, and H. W. Brummer, National Lead Co., Brooklyn, N. Y.</p> <p>4. John Danaczko, Jr., J. A. Mamica, and F. V. Chmielowiec, Western Electric Co., Chicago, Ill.</p> | <p>5. E. K. Jaycox, J. F. Jensen, and H. E. Johnson, Bell Telephone Laboratories, Murray Hill, N. J.</p> <p>6. J. P. Brull, North American Smelting Company, Wilmington, Del.</p> <p>7. Silve Kallmann, Ledoux and Co., Teaneck, N. J.</p> <p>8. J. W. Claypool and Amy Palmer, Nassau Smelting & Refining Company, New York, N. Y.</p> |
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The metal for this standard was prepared by the National Lead Company, and atomized by the Metals Disintegrating Company.

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A. V. ASTIN, *Director*