

UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON

National Bureau of Standards
Certificate of Analyses

Standard Sample 53C
Lead-Base Bearing Metal

ANALYST	ANTIMONY	TIN	COPPER	BISMUTH	ARSENIC	NICKEL Colorimetric	IRON
1.....	^a 10.19	^b 5.18	{ ^c 0.215 ^d 0.212 }	{ ^e 0.091 ^f 0.093 }	^g 0.042	0.0021	^h 0.0019
2.....	ⁱ 10.20	^j 5.17	^k 0.212	^l 0.044	.0022	^m 0.0015
3.....	ⁱ 10.22	ⁿ 5.17	^d 0.214	^o 0.091	^p 0.043	.0034	^q 0.0018
4.....	ⁱ 10.20	^r 5.15	^s 0.217	^o 0.094	^l 0.043	.0016
5.....	ⁱ 10.21	^t 5.13	^s 0.215	^o 0.095	^l 0.046	.0021
Average.....	10.20	5.16	0.214	0.093	0.044	0.0023	0.0017

^a Antimony separated by distillation from a 1-g sample, precipitated with H₂S, and titrated with KMnO₄. See J. Research NBS 21, 95 (1938) RP1116. KMnO₄ standardized on antimony of high purity.
^b Tin separated by distillation from a 4-g sample, precipitated with cupferron, and ignited to SnO₂. See J. Research NBS 33, 339 (1944) RP1610.
^c 5-g sample treated with HBr-Br₂-HClO₄. Bismuth separated as BiOCl and lead as PbSO₄. Copper determined by electrolysis.
^d Internal electrolysis.
^e Bismuth in BiOCl separation (footnote c) determined photometrically with thiourea.
^f Bismuth separated by internal electrolysis, precipitated as basic carbonate, and ignited to Bi₂O₃.

^g Arsenic separated by double distillation from a 10-g sample and titrated with 0.01 N iodine. See J. Research NBS 21, 95 (1938) RP1116.
^h 10-g sample treated with HBr-Br₂-HClO₄. Lead separated as PbCl₂, filtrate treated with H₂S, aluminum added, and iron precipitated with NH₄OH and determined photometrically with orthophenanthroline.
ⁱ H₂SO₄-H₂SO₃-KBrO₃ method. See ASTM method E-57.
^j Tin reduced with iron and titrated with iodine.
^k Four 5-g samples treated with HBr-Br₂. Lead separated as PbSO₄, filtrates combined (~20-g sample), copper precipitated as CuCNS and determined electrolytically.
^l Molybdenum-blue photometric method. See ASTM method E-57.

^m KCNS-photometric method on a 20-g sample.
ⁿ Tin reduced with iron. See ASTM method E-46.
^o Thiourea-photometric method. See ASTM method E-46.
^p Arsenic separated by distillation and titrated with KBrO₃. See ASTM method E-57.
^q Titrated with Ce(SO₄)₂ using orthophenanthroline indicator. See ASTM method E-46.
^r Iodimetric titration. See ASTM method E-46.
^s HBr-photometric method.
^t Tin reduced with lead and titrated with KIO₃. Analyst 2 reported 84.3 percent lead by the PbSO₄ and PbCrO₄ methods. Analyst 4 reported less than 0.001 percent aluminum by the aluminon-photometric method.

List of Analysts

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| 2. John P. Brull, North American Smelting Co., Wilmington, Del. | 4. M. Eisemann, American Smelting and Refining Co., Barber, N. J. |
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The metal for the preparation of this standard was furnished by the National Lead Co. and atomized by the Metals Disintegrating Co.

E. U. CONDON, *Director.*

WASHINGTON 25, D. C., July 11, 1951.