

U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 52B

CAST BRONZE

ANALYST*	Cu <i>Electrolytic</i>	Sn <i>SnCl₄-Iodate</i>	Zn <i>ZnS-ZnO</i>	Ni <i>Weighed as nickel dimethylglyoxime</i>	IRON	LEAD <i>Weighed as PbO₂</i>	MANGANESE	PHOSPHORUS <i>Colorimetric</i>	
1.....	^a 88.28	^b 7.98	2.95	0.72	^c 0.031	^d 0.012	^e 0.004	^f 0.002	
2.....	88.23	^g 7.99	2.96	^h .72	ⁱ .035	.011		.002	
3.....	^j 88.26	^k 8.00	2.97	.72	^l .035	^m .008	ⁿ .005		
4.....	^o 88.24	^p 8.02	2.96	.72	^q .035	.012	^r .004		
5.....	^s 88.26	^t 8.02	2.97	.71	^u .032	.011	^v .005		
6.....	^w 88.25	^x 7.99	2.95	.72	^y .029	.011	^z .005	^{aa} .002	
7.....	^{ab} 88.25	^{ac} 8.01	2.93	.72	^{ad} .028				
Averages.....	88.25	8.00	2.96	0.72	0.032	0.011	0.005	0.002	

^a Five-gram sample dissolved in 110 ml of HNO₃ (1+4). Solution digested on a steam bath overnight, filtered, and the precipitate washed with hot HNO₃ (1:99). Filtrate diluted to 350 ml, 2 drops of 0.1-N HCl added, and solution electrolyzed overnight by the use of a current density of 0.5 amp/dm². Metastannic-acid precipitate and paper treated with HNO₃-H₂SO₄. Tin, antimony, and arsenic volatilized by HBr-Br₂, and residual copper determined by electrolysis. (The silver content of this alloy is less than 0.001 percent.)

^b Determined by W. D. Mogerman by the distillation-cupferron method. See J. Research NBS **33**, 307 (1944) RP1610.

^c H₂SO₄ added to the electrolyte from the copper determination (footnote a) and solution evaporated to fumes. Zinc precipitated with H₂S in 0.01-N acid. Filtrate boiled to remove H₂S. Iron oxidized and precipitated with NH₄OH. Precipitate dissolved and iron determined by the SnCl₂-K₂Cr₂O₇ method.

^d Ten-gram sample dissolved in 80 ml of HNO₃ (1+1). Solution digested overnight, filtered, and the

precipitate washed with hot HNO₃ (1:99). Filtrate reserved. Metastannic-acid precipitate ignited at 500° C, leached with dilute HNO₃ and filtered. Filtrate combined with the reserved filtrate and electrolyzed for 6 hours by the use of a current density of 0.1 amp/dm².

^e Copper separated electrolytically from a 10-g sample. Anode deposit dissolved and combined with the electrolyte. Manganese determined by the bismuthate method.

^f Phosphorus precipitated with molybdate. Phosphomolybdate dissolved in NaOH and determined by the molybdenum-blue photometric method. See J. Research NBS **26**, 405 (1941) RP1386.

^g Tin reduced with an iron coil in presence of added antimony.

^h Dimethylglyoxime-photometric method.

ⁱ NH₄CNS-photometric method.

^j Copper in metastannic-acid precipitate recovered by the NaOH-Na₂S method.

^k Tin reduced with lead and titrated with iodine.

^l SnCl₂-KMnO₄ method.

^m Dithizone-colorimetric method.

ⁿ Persulfate-arsenite method.

^o Same as footnote (a) except metastannic-acid precipitate treated with HNO₃-HClO₄.

^p Tin reduced with aluminum.

^q KIO₄-photometric method.

^r Same value obtained by depositing copper in the presence of tin from an HNO₃-HF solution of a 2-g sample.

^s Tin reduced with aluminum and titrated with iodine.

^t Five-gram sample dissolved in 100 ml of diluted HNO₃ (1+3). Copper in metastannic-acid precipitate recovered by the HNO₃-HClO₄-HBr method and added to main solution before electrolyzing. (See Chemical analysis of metals, Am. Soc. Testing Materials, p. 183, 1943).

^u Tin reduced with nickel.

^v Tin removed from the metastannic-acid precipitate from a 5-g sample by treatment with HBr. Phosphorus in the nonvolatile residual solution determined by the phosphovanadomolybdate-photometric method.

^w Orthophenanthroline-colorimetric method.

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The bronze for the preparation of this standard was furnished by The American Brass Co.

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