

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 129A

BESSEMER STEEL, 0.1% CARBON (HIGH SULFUR)

ANALYST*	C	Mn		P		S		Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM Colorimetric	ARSENIC
	Direct combustion	Bismuthate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Gravimetric (weighed as MgP ₂ O ₇ after removal of arsenic)	Alkali-Molybdate ^a	Gravimetric (direct oxidation and precipitation after reduction of iron)	Combustion	Sulfuric acid dehydration						
1.....	0.096	0.807	0.815	0.092	^b 0.093	0.269		^o 0.020	0.019	0.025	^d 0.020	^e 0.004	0.007	^f 0.007
2.....	.095	.81	.81		.095	.271	^g 0.272	^h 0.020	ⁱ 0.026	.030	.019			
3.....	.099	ⁱ 0.802			.096	.273	^k 0.275	^{k, o} 0.020	^l 0.021	.033	^d 0.024			
.....	.098		^m 0.80	.092	^m 0.093	.271	^k 0.269	.022	ⁱ 0.020	.027	^d 0.022			
5.....	.094		^m 0.79	.094	^m 0.096			ⁿ 0.021		.027				
6.....	.096		.804		^m 0.093	.273	^o 0.274	.024	.020	.021	.021			
7.....	.100		.81		.095	.274		.018	^p 0.021	^q 0.026	^r 0.023			
8.....	.096		^m 0.81		^m 0.095	.277		^o 0.021	^s 0.018	.026	^d 0.018			
9.....	.100	.806	^m 0.807	.095	^m 0.095	.265		ⁿ 0.020	.024	^t 0.026	.023			
Averages....	0.097	0.806	0.806	0.093	0.095	0.272	0.273	0.021	0.021	0.027	0.021	0.004	0.007	0.007
General average....	0.097	0.806		0.094		^u 0.272		0.021	0.021	0.027	0.021	0.004	0.007	0.007

^a Precipitated at 40° C, washed with a 1-percent solution of KNO₃, and titrated with alkali standardized by the use of acid potassium phthalate and the ratio 23NaOH:1P.

^b Molybdenum-blue photometric method. See J. Research NBS 26, 405 (1941) RP1386.

^c Double dehydration.

^d Persulfate oxidation and potentiometric titration with ferrous ammonium sulfate.

^e Nitric acid oxidation and potentiometric titration with ferrous ammonium sulfate.

^f Determination made by K. D. Fleischer by the distillation molybdenum-blue photometric method. See J. Research NBS 24, 7 (1940). RP1267.

^g Sulfur dioxide absorbed in acidified starch-iodine solution, and titrated as evolved with standard KIO₃ solution.

^h Perchloric acid dehydration.

ⁱ H₂S-α-benzoinoxime-CuO method.

^j Potentiometric titration with HgNO₃

^k Hydrochloric acid dehydration.

^l Thiosulfate precipitation, electrolytic deposition method.

^m Titrating solution standardized by the use of a standard steel.

ⁿ Nitric-sulfuric acid dehydration.

^o Sulfur gases absorbed in NaOH-H₂O₂ and excess NaOH titrated with H₂SO₄.

^p Copper-ammonia complex colorimetric method.

^q Dimethylglyoxime colorimetric method.

^r Diphenylcarbazide colorimetric method.

^s KI-Na₂S₂O₃ titration method.

^t Glyoxime precipitate dissolved and titrated with KCN.

^u This standard is not recommended for evolution sulfur determinations, because the amount of sulfur evolved decreases slowly under ordinary conditions of storage.

*LIST OF ANALYSTS

1. Ferrous Laboratory, National Bureau of Standards. John L. Hague in charge; analysis by John P. Hewlett, Jr., J. I. Shultz, Florence Yenchius, and Jewel Doran.
2. E. R. Vance, The Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio.
3. J. A. Wiley, The Midvale Co., Nicetown, Philadelphia, Pa. Charles O. Geyer, Inland Steel Co., Indiana Harbor Works, East Chicago, Ind.

5. H. M. Graul, Wheeling Steel Corporation, Steubenville Works, Steubenville, Ohio.
6. George Dreher, Rotary Electric Steel Co., Detroit, Mich.
7. C. E. Nesbitt, Carnegie-Illinois Steel Corporation, Edgar Thomson Works, Braddock, Pa.
8. E. L. Bush, Carnegie-Illinois Steel Corporation, Vandergrift Plant, Vandergrift, Pa.
9. W. D. Brown, Carnegie-Illinois Steel Corporation, Duquesne Works, Duquesne, Pa.

The steel for the preparation of this standard was furnished by The Youngstown Sheet & Tube Co.