

DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE NO. 33b

NICKEL STEEL

ANALYST *	C CARBON Direct combustion	Mn MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄) 2. Other methods	P PHOSPHORUS 1. Alkali-Molybdate ^a 2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic)	S 1. SULPHUR Gravimetric (Direct oxidation and final precipitation in reduced solution) 2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sul- phur titre ^b)	Si SILICON Sulphuric acid dehydration		Ni COPPER H ₂ S-CuS-CuO NICKEL Weighed as nickel dimethylgly- oxime	Cr CHROMIUM FeSO ₄ -KMnO ₄ titration						
1.....	0.368	0.705	0.037	0.035	0.034	0.032	0.237	0.105	{ 3.47 3.48 ^c 3.48 3.48 ⁱ }	0.025 ^d	0.005 ^d	0.002 ^e	0.015 ^f	
2.....	.362	{ 0.70 ^g .70 ^h }	.038	.030	.028	.223	.108	.108	{ 3.48 3.48 3.48 ⁱ }	.038				
3.....	.369	.71 ^g	.038	{ .038 ^j .037 }	.033	.032	.232	.110	3.46					
4.....	.365	.694	.698 ^g	.040	.034	.033	.228	{ .122 .118 ^k }	3.50 ^l	< .01	< .01	.004		
5.....	.360	.600	.037	.038	.032	.033	.238	.12	3.40	.028	< .001		.016	
6.....	.370	.700	.035		.032	.031	.235	.098	3.49					
7.....	.360	.694	.037		.032	.031	.236	.12 ^l	3.51					
8.....	.367	.692	.039		.032		.236	.126	3.48					
9.....	.366	.70 ^g	.036	.036	.033	.032	.240		3.47	.018				
10.....	.364	.70	.036		.031	.032	.225	.11	3.50 ^m	.040				
Averages.....	.366	.698	.701	.037	.037	.032	.031	.233	.114	3.48	.029	.005	.003	.016
General averages.....	.366	.700		.037		.032		.233	.114	3.48	.029	.005	.003	.016

^a Precipitated at 40° C., washed with a 1 per cent solution of KNO₃ and titrated with alkali standardized by means of B. S. acid potassium phthalate and the 23:1 ratio.

^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₃.

^c Precipitated with dimethyl glyoxime, dissolved and finished by electrolysis.

^d Electrometric titration.

^e Colorimetric by developing color with KSCN and SnCl₂.

^f Distilled as AsCl₃, precipitated as As₂S₃, converted to arsenate, precipitated as Ag₃AsO₄, dissolved in HNO₃ and titrated with KSCN.

^g Persulphate arsenite.

^h Volhard's method.

ⁱ Cyanide titration.

^j Weighed as phosphomolybdate.

^k Precipitated with thiocyanate and titrated with potassium iodate and thiosulphate.

^l Finished by electrolysis.

^m Analyst 10 also reports 0.04 per cent cobalt.

* LIST OF ANALYSTS

1. Ferrous Laboratory, Bureau of Standards, H. A. Bright in charge; analysis by C. P. Larrabee and R. M. Fowler.
2. J. M. Gotshall, The Timken Roller Bearing Co., Canton, Ohio.
3. A. D. Beers, Illinois Steel Co., Gary, Ind.
4. E. J. Dunn, Carnegie Steel Co., Duquesne, Pa.
5. W. F. Muehlberg, Newburgh Steel Works, Cleveland, Ohio.

6. H. E. Slocum, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
7. R. G. Schaeffer and F. L. Clifton, General Motors Corporation, Detroit, Mich.
8. E. A. Loos, Carpenter Steel Co., Reading, Pa.
9. J. L. Mayberry, Republic Iron & Steel Co., Youngstown, Ohio.
10. F. M. Portz, Central Alloy Steel Corporation, Massillon, Ohio.

This standard is not recommended for colorimetric carbon determinations because of uncertainty as to the condition of the carbon.

Washington, D. C.

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George K. Burgess

Director.