

DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE NO. 33b

NICKEL STEEL

ANALYST*	C	Mn	P		S		Si	Ni	Cr	VANADIUM	MOLYBDENUM	ARSENIC		
	CARBON Direct combustion	MANGANESE 1. Biimuthate (FeSO ₄ -KMnO ₄) 2. Other methods	PHOSPHORUS 1. Alkali-Molybdate ^a 2. Gravimetric (Weighed as MgP ₂ O ₇ after removal of arsenic)	1. SULPHUR Gravimetric (Direct oxidation and final precipitation in reduced solution)	2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre) ^b	SILICON Sulphuric acid dehydration	COPPER H ₂ S-CuS-CuO		NICKEL Weighed as nickel dimethylglyoxime				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	.030	.028	.223	.108	{ 3.48 3.48 ⁱ }	.038				
3.....	.369	.71 ^g	.038	{ .038 ^j .037 }	.033	.032	.232	.110	3.46					
.....	.365	.694	.698 ^g	.040	.034	.033	.228	{ .122 .118 ^k }	3.50 ⁱ	< .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

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| <p>1. Ferrous Laboratory, Bureau of Standards, H. A. Bright in charge; analysis by C. P. Larrabee and R. M. Fowler.</p> <p>2. J. M. Gotshall, The Timken Roller Bearing Co., Canton, Ohio.</p> <p>3. A. D. Beers, Illinois Steel Co., Gary, Ind.</p> <p>4. E. J. Dunn, Carnegie Steel Co., Duquesne, Pa.</p> <p>5. W. F. Muehlberg, Newburgh Steel Works, Cleveland, Ohio.</p> | <p>6. H. E. Stocum, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.</p> <p>7. R. G. Schaeffer and F. L. Clifton, General Motors Corporation, Detroit, Mich.</p> <p>8. E. A. Loos, Carpenter Steel Co., Reading, Pa.</p> <p>9. J. L. Mayberry, Republic Iron & Steel Co., Youngstown, Ohio.</p> <p>10. F. M. Portz, Central Alloy Steel Corporation, Massillon, Ohio.</p> |
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This standard is not recommended for colorimetric carbon determinations because of uncertainty as to the condition of the carbon.

Washington, D. C.
 April 10, 1928.

George K. Burgess
 Director.