

Bureau of Standards

Certificate of Analyses

OF STANDARD SAMPLE No. 101 18 CHROMIUM-8 NICKEL STEEL

ANALYSTS*	C			Mn	P	S		Si		Ni	Cr				NITROGEN Tin = 0.005%
	CARBOY 1. Direct combustion 1,250°-1,400° C. 2. Direct combustion at 1,000°-1,200° C. with red lead as accel- erator 3. Direct combustion at 1,000°-1,200° C. with tin as accelerator			MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄)	PHOSPHORUS 1. Alkali-molybdate ^a 2. Gravimetric (weighed as Mg ₂ P ₂ O ₇ after re- moval of arsenic)	SULPHUR 1. Gravimetric (direct ox- idation and precipi- tation in reduced solution) 2. Evolution with HCl (I-I) ZnS-Iodine (theoretical sulphur titre ^b)	SILICON 1. Sulphuric acid dehy- dration COPPER 1. H ₂ S-CuS-CuO NICKEL Weighed as nickel di- methylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration VANADIUM MOLYBDENUM NITROGEN							
1	0.064	0.061	0.059	0.555 ^c	0.010 ^d	0.010	0.010 ^e	0.012	0.766 ^f	0.054	8.44	17.53 ^g	0.045 ^h	0.005	0.028
2		.061		.57 ^h	.008 ⁱ		.014 ^j		.760	.062 ^j	8.45 ^j	17.66			
3		.060		.559 ^k	.010	.010	.012 ^l	.011 ^{m, n}	.757 ^f	.053 ^o	8.49 ^o	17.52			
4		.060	.058	.555 ^p	.012 ^q			.015 ⁿ	.75		8.40	17.50 ^g			
5			.059	.561	.011 ^d			.012 ^m	.76 ^f	.058 ^o	8.43	17.61	.047 ^r	.005	
6	.064	.063		.548 ^s	.013 ⁱ		.013 ^l	.015 ⁿ	.771 ^f	.050 ^t	8.43	17.56			
			.059	.56 ^s	.012 ^d		.012	.76	.06	8.48 ^v	17.60				
8		.058	.056	.559 ^c	.010 ⁱ			.015	.778		8.48	17.57 ^g			
9		.059 ^u	.548 ^g	.012	.011	.015 ⁱ	.014 ⁿ	.75 ^f	.051 ^o	8.44	17.56 ^g	.041 ^g	.006		
10		.061		.552 ^s	.013		.012	.011	.777 ^f		8.44	17.60			
11	.061	.060	.545 ^p	.010				.765 ^v			17.54				
12	.060		.548 ^s	.012		.015	.015	.760 ^f	.052 ^o	8.47	17.62				
13		.060	.55	.013 ^q		.015		.757	.060	8.43	17.52		.006		
14	.063		.561 ^w	.011		.012		.771	.052 ^o	8.39	17.51				
15	.064	.062	.557 ^x	.013 ^s			.013	.766 ^f		8.42	17.55				
Averages.....	.063 ^z	.061	.059	.555	.011	.010	.013	.013	.763	.055	8.44	17.56	.044	.006	.028
General Averages..	.061			.555	.010		.013	.763	.055	8.44	17.56	.044	.006	.028	

^a Precipitated at 40°C., washed with a 1 percent solution of KNO₃ and titrated with alkali standardized by use of Bureau of Standards standard acid potassium phthalate and the 2:1 ratio.
^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₅.
^c Chromium separated by precipitating with NaHCO₃ before the bismuthate oxidation.
^d Solution in mixture of equal volumes of HCl and HNO₃, silica separated by dehydration with HClO₄ before precipitating with molybdate.
^e Meinelke's method.
^f Perchloric acid dehydration.
^g Potentiometric titration.

^h Chromium separated by precipitating with ZnO before oxidation of the manganese with lead peroxide.
ⁱ Solution in a mixture of equal volumes of HCl and HNO₃.
^j KCN titration.
^k The bulk of the iron removed by extraction with ether, chromium removed by a persulphate-NaOH separation, and the manganese determined by the bismuthate method.
^l Solution in a mixture of 2 parts HNO₃ 1 part HCl.
^m Dissolved in concentrated HCl.
ⁿ Absorbed in CdCl₂ solution.
^o Finished by electrolysis.
^p Volhard-arsenite method.

^q Titration solution standardized by means of standard steel.
^r Iron and vanadium precipitated with cupferron. Precipitate ignited and vanadium determined by the persulphate method.
^s ZnO separation.
^t Colorimetric.
^u Burned with low carbon (0.05C) steel.
^v HCl dehydration.
^w Arsenite titration.
^x ZnO separation, persulphate oxidation, and potentiometric titration with sodium arsenite.
^y Sample dissolved in nitric and hydrofluoric acids.
^z Recommended value.

*LIST OF ANALYSTS

1. Ferrous Laboratory, Bureau of Standards, H. A. Bright in charge; analysis by R. M. Fowler and J. C. Redmond.
2. C. M. Johnson, The Crucible Steel Co. of America, Pittsburgh, Pa.
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4. R. J. Price, The Electro Metallurgical Co., New York, N.Y.
5. E. B. Welch, Firth Sterling Steel Co., McKeesport, Pa.
6. H. N. Austin, The Babcock & Wilcox Tube Co., Beaver Falls, Pa.
7. P. L. Tyson, The Carpenter Steel Co., Reading, Pa.
8. J. A. Wiley, The Midvale Co., Philadelphia, Pa.
9. R. G. Schaeffer, General Motors Corporation, Research Laboratory, Detroit, Mich.
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11. C. K. Mitchell, W. B. Coleman & Co., Philadelphia, Pa.
12. W. T. Hartley, Ludlum Steel Co., Dunkirk, N.Y.
13. H. H. Craver, Pittsburgh Testing Laboratory, Pittsburgh, Pa.
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