

National Bureau of Standards

Certificate of Analyses

OF
STANDARD SAMPLE 101 B
18 CHROMIUM—8 NICKEL STEEL

ANALYST ^a	C	Mn	P		S			Si	Ni		Cr	VANADIUM	MOLYBDENUM Colorimetric	COBALT Zinc oxide- α -nitroso- β -naphthol	COLUMBIUM	TIN	NITROGEN Solution—Distillation
	Direct combustion	Zinc Oxide-Per sulfate-Arsenite	Gravimetric (weighed as MgF ₂ O ₃ after removal of arsenic)	Alkali-molybdate ^a	Gravimetric (direct oxidation and precipitation after reduction of iron)	Evolution (HCl sp. gr. 1.18-ZnS-iodine-theoretical sulfur titer) ^b	Combustion	Perchloric acid dehydration	COPPER H ₂ S-CuS-CuO	Weighted as nickel directly glyoxime	FeSO ₄ -KMnO ₄ titration						
1	0.068	^c .0598 _d .602	0.016	0.019	0.024	0.025	0.484	0.167	8.97	18.46	0.050	0.078	0.08	0.06	0.011	0.020	
2	.068	.593	.018	.026	.026	.026	.490	.163	8.99	18.52	.050	.076	.087			.022	
3	.07	.602	.020	.022	.022	.022	.49	.17	9.00	18.48	.045	.077	.073			.016	
4	.070	^d .60	.017	^e .028	.028	^m .028	.481	^r .165	^g 9.07 ^h 9.01	18.51	^t .046	.074	^u .07				
5	.067	^v .595	.017	.021	.021	.021	.49	.168	8.98	18.55	^h .046	.081	.08	.075		.017	
	.068	^w .596	.018	.021	.021	.021	.483	^x .159	9.00	18.50	^h .054	.074					
7	.070	^v .017	.016	.023	.023	.023	^f .477	^y .175	9.05	18.48	^z .055	.078					
8	.072	^z .590	.021	.022	.022	.022	.480	^x .160	9.00	18.47	^h .055	.078	.076			.026	
9	.071	^e .596	.017	.024	.024	.024	.480	.178	^z 8.96	18.50	^h .047	.08	.076	ⁱ .052	^z .012	.021	
10	.067	^e .596	.017	.027	.027	.027	^f .478	.175	^o 8.99 ^h 8.95	18.49	.045	.085	.084			^z .022	
Averages	0.069	0.597	0.017	0.018	0.026	0.023	0.025	0.483	0.168	8.99	18.49	0.049	0.078	0.078	0.062	0.012	0.021
General average	0.069	0.597	0.017		0.025		0.483	0.168	8.99	18.49	0.049	0.078	0.078	0.062	0.012	0.021	

^a Precipitated at 40° C, washed with a 1-percent solution of KNO₃ and titrated with alkali standardized by the use of National Bureau of Standards acid potassium phthalate and the ratio 23NaOH:1P.
^b Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₈, and use of the ratio 2I:1S.
^c Zinc oxide-Bismuthate oxidation, ferrous sulfate titration.
^d Chromium volatilized as CrO₂Cl₂.
^e Molybdenum-blue colorimetric method. See J. Research NBS 26, 405 (1941) RP1386.
^f Double dehydration.
^g Persulfate oxidation and potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^h Nitric acid oxidation and potentiometric titration with ferrous ammonium sulfate.
ⁱ HCl solution treated with cupferron. Precipitate

digested in H₂SO₄-HNO₃ solution diluted, and treated with H₂SO₄. Precipitate dissolved in H₂SO₄-HClO₄-HF. Solution treated with an excess of NH₄OH and filtered. Precipitate digested in HCl. Solution diluted and treated with H₂SO₄. Columbium ignited and weighed as Cb₂O₅.
^j Determined by R. K. Bell by the sulfide-iodine method. See BS J. Research 8, 309 (1932) RP415.
^k Determined by M. Marie Cron by the vacuum-fusion method. See BS J. Research 7, 375 (1931) RP346.
^l Titrating solution standardized with a standard steel.
^m Sulfur dioxide absorbed in H₂O₂-NaOH. Titration with H₂SO₄.
ⁿ Copper precipitated with KCNS. Titration with KI-Na₂S₂O₈.
^o Glyoxime precipitate titrated with cyanide.
^p Perchloric acid oxidation.
^q Precipitated in ferric chloride solution.
^r Copper-ammonia-complex colorimetric method.

^s Glyoxime precipitate ignited to NiO.
^t Vanadium coprecipitated with phosphomolybdate. Oxidized with nitric acid and titrated potentiometrically.
^u Hydrochloric acid colorimetric method. See Iron Age 150, p. 45 (December 3, 1942).
^v Chromium volatilized as CrO₂Cl₂. Bismuthate-arsenite method.
^w Bismuthate oxidation-potentiometric titration with H₂NO₃.
^x Thio-sulfate-electrolytic method.
^y Weighed as ammonium phosphomolybdate.
^z Cupferron-peroxide colorimetric method.
^{aa} Zinc oxide-bismuthate-arsenite method.
^{ab} Sulfur gases absorbed in neutral H₂O₂ solution titrated with NaOH.
^{ac} Direct cyanide titration.
^{ad} Sulfide-iodine method.
^{ae} Chromium removed as PbCrO₄.
^{af} Digested in sulfuric-phosphoric acids plus selenium.

* LIST OF ANALYSTS

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