U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 126a

HIGH-NICKEL STEEL

ANALYST*	Ni			C	Mn		Si				
	Weighed as nickel dimethylglyoxime	Electrolysis	Cyanide titration	Direct combustion	Bismuthate ($FeSO_4$–$KMnO_4$)	Persulfate-arsenite	Perchloric acid dehydration	COPPER H_2S–CuS–CuO	COBALT	CHROMIUM	
1	[a] 35. 89			0. 057	0. 413	0. 417	[b] 0. 194	0. 092	[c] 0. 30	[d] 0. 054	
2	[e] 35. 86		[f] 35. 85	. 060	[g]. 411		. 193	[h]. 091	[i]. 32		
3	[a] 35. 91			. 058		. 417	. 194	[h]. 092	[j]. 29		
4			35. 86	. 052		[k]. 42	. 195	. 091	[l]. 30		
5	35. 97			. 052	[m]. 417	[m]. 420	[n]. 192	[o]. 096	[c]. 30		
	[p] 35. 90	[q] 35. 88		. 055	. 405	. 410	[r]. 198	. 087	[s]. 31		
Averages	35. 91	35. 88	35. 86	0. 056	0. 412	0. 417	0. 194	0. 092	0. 30	0. 054	
General averages	35. 89			0. 056	0. 414		0. 194	0. 092	0. 30	0. 054	

[a] Double precipitation, using a 0.25-g sample. Glyoxime precipitate dried at 150° C to constant weight.

[b] Double dehydration with intervening filtration.

[c] Cobalt separated from iron with ether, followed by double ZnO separation, then precipitated with α-nitroso-β-napthol. Ignited precipitate dissolved and acid solution treated with H_2S, filtered, cobalt precipitated with α-nitroso-β-napthol, ignited and weighed as Co_3O_4. See *BS J. Research* **7**, *883 (1931)* RP380.

[d] Ether separation on a 10-g sample. Silver nitrate-persulfate oxidation, potentiometric titration with ferrous ammonium sulfate solution, corrected for the 0.005 percent of vanadium present in this alloy.

[e] Single precipitation with dimethylglyoxime on a 0.1-g sample aliquoted from 0.25-g sample.

[f] Photometric titration. See Ind. Eng. Chem. Anal. Ed. **10**, 175 (1938).

[g] Preliminary ZnO separation.

[h] Finished by electrolysis.

[i] Ether, α-nitroso-β-napthol, cupferron, α-nitroso-β-napthol procedure, ignited and weighed as Co_3O_4.

[j] Double ZnO and α-nitroso-β-napthol separation on a 5-g sample.

[k] Arsenite-nitrite titration.

[l] *Ether and cupferron separations to remove iron.* Chromium volatilized as CrO_2Cl_2. Cobalt precipitated twice with α-nitroso-β-napthol ignited and weighed as Co_3O_4.

[m] Potentiometric titration with $HgNO_3$.

[n] Double dehydration with HCl and HNO_3.

[o] Copper ammonia-complex photometric method.

[p] Single precipitation on 0.2-g sample.

[q] Nickel separated from a 1-g sample with dimethylglyoxime, then deposited electrolytically on platinum gauze cathode from an ammoniacal sulfate solution. Traces of nickel in the electrolyte recovered with dimethylglyoxime.

[r] Double dehydration with HCl.

[s] Most of the iron removed by ether separation. Double precipitation with KNO_2, and single separation with sodium acetate to remove remainder of iron. *Copper removed with* H_2S and cobalt precipitated with colorless ammonium sulfide, ignited and weighed as the oxide.

Analyst No. 1 reported 0.007 percent of sulfur (gravimetric), and analysts 2 and 4, 0.005 and 0.006 sulfur (combustion), respectively.

*LISTS OF ANALYSTS

1. Ferrous Laboratory, National Bureau of Standards, J. L. Hague in charge; analysis by J. I. Shultz and J. P. Hewlett, Jr.
2. F. W. Dillon and A. L. Sloan, The Carpenter Steel Co., Reading, Pa.
3. T. L. Fluck, Driver-Harris Co., Harrison, N. J.
4. Rustless Iron & Steel Co., Baltimore, Md., W. J. Boyer, chief chemist. Analysis by W. F. Malooly, W. J. Insley, R. W. Mann, and J. Lomakin.
5. J. A. Wiley, The Midvale Co., Nicetown, Philadelphia, Pa.
6. R. H. Wynne and E. W. Beiter, Research Laboratories, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

The steel for the preparation of this standard was furnished by The Carpenter Steel Co.

WASHINGTON, April 22, 1946.

E. U. CONDON, *Director.*

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