UNITED STATES DEPARTMENT OF COMMERCE

WASHINGTON 25, D.C.

National Bureau of Standards Certificate of Analyses

Standard Sample 115A

Copper-Nickel-Chromium Cast Iron

ANALYST	C		Mn	P		S		Si	Cu	Ni	Cr	V	Mo	Ti	
	Total	Graphitic	Persulfate-Arsenite	Gravimetric (weighed as $Mg_2P_2O_7$ after removal of arsenic)	Alkali-Molybdate [a]	Gravimetric (direct oxidation and precipitation after reduction of iron)	Combustion Iodate titration	Perchloric acid dehydration		Weighed as nickel dimethylglyoxime	$FeSO_4$-$KMnO_4$ titration	Colorimetric	Colorimetric	H_2O_2-photometric	
1	2.62	[b] 1.95	[c] 0.99	0.084	[d] 0.086	0.066	[e] 0.067	[f] 2.14	[g] 5.51	[h] 14.46	[i] 1.98	[j] 0.014	0.052	[k] 0.020	
2	[l] 2.62	[l] 1.98	[m] .99	[n] .087	----------	.061	----------	2.11	[g] 5.54	[o] 14.47	1.99	[p] .016	.047	----------	
3	2.64	1.95	1.01	----------	.089	.061	[q] .062	2.15	[r] 5.53	[s] 14.51	[t] 1.94	[u] .014	[v] .049	[w] .019	
4	2.62	1.94	1.00	.084	.084	.067	.067	[f] 2.16	[g] 5.51	14.50	[i] 1.97	[x] .014	.054	.020	
5	2.60	----------	[y] 1.01	----------	.089	----------	.062	2.11	[g] 5.54	[o] 14.51	[z] 2.01	----------	----------	----------	
6	2.64	[b] 1.97	[a'] 1.01	----------	[b'] .084	----------	[e] .067	[f] 2.14	[g] 5.50	[o] 14.45	1.98	----------	.048	----------	
7	2.62	1.99	----------	[n] .089	[d] .085	.063	[b'] .066	2.09	[g] 5.49	14.51	1.99	----------	----------	----------	
Average	2.62	1.96	1.00	0.086	0.086	0.064	0.065	2.13	5.52	14.49	1.98	0.014	0.050	0.020	
General average	2.62	1.96	1.00	0.086		0.064		2.13	5.52	14.49	1.98	0.014	0.050	0.020	

[a] Precipitated at 40 °C, washed with a 1-percent solution of KNO_3, and titrated with alkali standardized by the use of acid potassium phthalate and the ratio 23 NaOH:1P.

[b] Sample treated with HNO_3 (Sp. gr. 1.20), filtered and washed. Residue digested with HCl (Sp. gr. 1.19), filtered, washed, dried, and burned.

[c] Potentiometric titration.

[d] *Molybdenum-blue photometric method.* See *J. Research* NBS **26,** 405 (1941) RP1386.

[e] 1-g sample burned in oxygen at 1,450 °C, and sulfur dioxide absorbed in starch-iodide solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO_3 solution. Titer based on 93 percent of the theoretical factor.

[f] Double dehydration with intervening filtration.

[g] H_2S-electrolytic method.

[h] Nickel precipitated with dimethylglyoxime from an aliquot portion of a 2-g sample.

[i] Persulfate oxidation, potentiometric titration with $FeSO_4$.

[j] Ether, mercury cathode, HNO_3 oxidation, potentiometric titration with $FeSO_4$.

[k] Cupferron separation after solution of the sample in diluted HCl (1+2). Vanadium separated by treatment with NaOH.

[l] Gasometric method.

[m] KIO_4 photometric method.

[n] Weighed as ammonium phosphomolybdate.

[o] Dimethylglyoxime-electrolytic method after removal of copper.

[p] Spectrochemical determination.

[q] Sulfur gases absorbed in NaOH–H_2O_2 solution and excess NaOH titrated with H_2SO_4.

[r] H_2S–CuS–CuO.

[s] Dimethylglyoxime-nickel oxide method.

[t] Perchloric acid oxidation.

[u] $FeSO_4$–$(NH_4)_2S_2O_8$–$KMnO_4$.

[v] α-benzoinoxime-$PbMoO_4$ method.

[w] *Vanadium separated by Na_2CO_3 fusion.*

[x] Ether-cupferron separation on a 10-g sample. Vanadium determined by $FeSO_4$–$(NH_4)_2S_2O_8$—$KMnO_4$ method.

[y] ZnO-Bismuthate method.

[z] Perchloric acid oxidation, titration with $FeSO_4$–$K_2Cr_2O_7$.

[a'] Bismuthate method.

[b'] Titrating solution standardized by the use of a standard iron or steel.

List of Analysts

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