UNITED STATES DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

Standard Sample 107A

Nickel-Chromium-Molybdenum Cast Iron

ANALYST	C		Mn		P		S		Si	Cu	Ni	Cr	V	Mo		Ti
	Total	Graphitic	Bismuthate ($FeSO_4$–$KMnO_4$)	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	Perchloric acid dehydration	H_2S–CuS–CuO	Weighed as nickel dimethylglyoxime	$FeSO_4$–$KMnO_4$ titration		Gravimetric	Colorimetric	Colorimetric
1	2.70	1.86		[b]0.582	0.286	[c]0.28	0.095	[d]0.094	[e,f]1.36	0.106	0.968	[g]0.479	[h]0.029	[i]0.762	0.77	[j]0.033
	2.72	1.83	.587	[k,l].585	.278	[l].278		[m,l].094	1.33	[n].103	.96	.469	[b].028		.774	[j].036
3	2.71	1.81	[o].58	[l].58	.275	.277	.096	[d,l].097	1.35	[n].101	.970	.479	[p].031	[i].760		[q].031
4	2.74	1.82	.579		.278	.275	.096		1.35	[r].098	.961	.481	[s].024	[i].777		
5	2.69	1.86		[l].579		[l].276		[d].093	[e]1.36	[n].111	.98	.491	.025	[t].784		.040
6	2.74	1.85		[u].581	.275		.093		[f]1.33	[n].101	[v].966	[w].475	[p].029		.765	[j].037
7														[i].771	.773	
Average	2.72	1.84	0.582	0.581	0.278	0.277	0.095	0.095	1.35	0.103	0.968	0.479	0.028	0.771	0.771	0.035
General average	2.72	1.84	0.582		0.278		0.095		1.35	0.103	0.968	0.479	0.028	0.771		0.035

[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 23NaOH:1P.
[b] Potentiometric titration.
[c] Molybdenum-blue photometric method. See J. Research NBS 26, 401 (1941) RP1386.
[d] 1-g burned in oxygen at 1,425° C, and sulfur dioxide absorbed in starch-iodine solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO_3 solution based on 93 percent of the theoretical factor.
[e] Sulfuric acid dehydration.
[f] Double dehydration with intervening filtration.
[g] Chromium separated from the bulk of iron in a 5-g sample by $NaHCO_3$ hydrolysis, oxidized with persulfate, and titrated potentiometrically with ferrous ammonium sulfate.
[h] Vanadium separated as in (g), oxidized with HNO_3, and titrated potentiometrically with ferrous ammonium sulfate.
[i] Alpha-benzoinoxime method. See BS J. Research 9, 1 (1932) RP453.
[j] Solution in HCl(1:2). Precipitation with cupferron. Precipitate ignited, fused in $KHSO_4$, and vanadium separated with NaOH.
[k] Bismuthate-arsenite method.
[l] Titrating solution standardized by use of a standard iron or steel.
[m] Combustion at 2,500° F.
[n] Finished by electrolysis.
[o] Chromium removed by volatilization as CrO_2Cl_2.
[p] Bicarbonate hydrolysis, phosphotungstovanadate photometric method.
[q] Cupferron-hydroquinone photometric method.
[r] KI-$Na_2S_2O_3$ titration.
[s] $FeSO_4$-$(NH_4)_2S_2O_8$-$KMnO_4$ titration.
[t] Alpha-benzoinoxime-$PbMoO_4$ method.
[u] KIO_4 photometric method.
[v] Dimethylglyoxime photometric method.
[w] Chromium separated as in (g) and titrated with $FeSO_4$-$K_2Cr_2O_7$, using diphenylaminesulfonate indicator.

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