UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

National Bureau of Standards Certificate of Analyses

Standard Sample 344
15 Chromium-7 Nickel Steel
(Mo Precipitation Hardening)

ANALYST	C	Mn	P		S		Si	Cu	Ni	Cr	V	Mo	Al	Ti
	Direct combustion	Persulfate-Arsenite	Gravimetric (weighed as $Mg_2P_2O_7$ after removal of arsenic)	Photometric	Gravimetric (direct oxidation and precipitation after reduction of iron)	Combustion Iodate titration	Perchloric acid dehydration	Photometric	Weighed as nickel dimethylglyoxime	$FeSO_4$-$KMnO_4$ titration	HNO_3 oxidation, potentiometric titration	Photometric		H_2O_2 photometric
1	0.070	[a]0.58	0.020	[b]0.018	0.020	[c]0.019	[d]0.394	[e]0.105	7.28	[f]14.94	0.038	[g]2.42	[h]1.15	[i]0.078
2	.070	[j].57		[k].019		.020	.39	[l].105	7.25	14.93	.039	2.38	[m]1.17	.075
	[n].072	[j].56		[o].017		.018	.392	[l].110	[p]7.23	[q]14.94	.042	2.41	[r]1.15	
4	[n].067 / .068	[j].58		[b].018		[s].020	[t,d].399	.100	7.31	[u]14.97	.045	[g]2.41	1.15	.075
5	.069	[v,w].57		[b].018		.018	.390	[x].110	[p]7.29	[u]14.94	.039	2.38	[y]1.16	[z].072
6	.074	[a',g].58	.016	.018		.017	.396	[e].109	7.28	14.98	[b'].039	2.42	1.18	.074
7	.067	[v].57		[c'].020		.022	[d].402	[d'].107	[e']7.27	[q]14.93	.038	2.42	[f']1.15	.078
8	.068	[a',s].57		[b].020		[s].021	[d].397	[e].103	7.29	14.97 / [q]14.93	[g'].040	[g]2.38	[f']1.17	.077
Average	0.069	0.57	0.018	0.018		0.019	0.395	0.106	7.28	14.95	0.040	2.40	1.16	0.076
General average	0.069	0.57	0.018		0.019		0.395	0.106	7.28	14.95	0.040	2.40	1.16	0.076

[a] Chromium removed by precipitation with $NaHCO_3$.
[b] Molybdenum-blue photometric method. See J. Res. NBS 26, 405 (1941) RP1386.
[c] 1-g sample burned in oxygen at 1,425° 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.
[d] Double dehydration with intervening filtration.
[e] Diethyldithiocarbamate photometric method. See J. Res. NBS 47, 380 (1951) RP2265.
[f] Persulfate oxidation, potentiometric titration with ferrous ammonium sulfate.
[g] Alpha-benzoinoxime-MoO_3 method. See BS J. Res. 9, 1 (1932) RP453.
[h] Aluminum selectively precipitated with 8-hydroxyquinoline in an ammoniacal citrate-cyanide solution. Precipitate ignited under oxalic acid, fused with $KHSO_4$ and dissolved in acid. NaOH separation. Aliquot treated with H_2O_2 and aluminum precipitated with 8-hydroxyquinoline, filtered, dried and weighed. See J. Res. NBS 64A No. 2, 181 (1960).
[i] Cupferron separation after solution of the sample in diluted HCl (1+2). Vanadium separated by treatment with NaOH.
[j] KIO_4 photometric method.
[k] Ammonium molybdate photometric method. Color complex extracted into isobutyl alcohol.
[l] Diethyldithiocarbamate photometric method.
[m] CrO_2Cl_2-mercury cathode-NaOH-Al_2O_3.
[n] Conductometric method.
[o] Molybdenum-blue photometric method.
[p] Dimethylglyoxime precipitate titrated with cyanide.
[q] Perchloric acid oxidation.
[r] Eriochrome Cyanine-R photometric method.
[s] Titrating solution standardized by use of a standard steel.
[t] Sulfuric acid dehydration.
[u] Persulfate oxidation potentiometric titration with $FeSO_4$-$K_2Cr_2O_7$.
[v] Chromium volatilized as CrO_2Cl_2.
[w] Titration with arsenite-nitrite solution.
[x] CuCNS precipitation-$CuCl_2$ photometric method.
[y] Ether-cupferron-mercury cathode-NH_4OH-Al_2O_3.
[z] Vanadium separated with NaOH.
[a'] Chromium separated with ZnO.
[b'] Cupferron separation-HNO_3 oxidation, potentiometric titration with $FeSO_4$.
[c'] Alkali-molybdate method.
[d'] H_2S-electrolytic method.
[e'] Dimethylglyoxime-electrolytic method.
[f'] Mercury cathode-NH_4OH-$AlPO_4$.
[g'] Vanadium separated with cupferron and determined by the H_2O_2-HF photometric method.

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