UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON 25, D.C.

National Bureau of Standards Certificate of Analyses

Standard Sample 3A

White Iron

ANALYST	C	Mn	P		S		Si	Cu	Ni	Cr	V	Mo	N
	Direct combustion	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		Photometric	Distillation-titration
1	2.28	[b] 0.318	0.119	[c] 0.117	0.082	[d] 0.080	[e] 1.11	[f] 0.121	0.017	[g] 0.048	[h] 0.006	0.006	[i] 0.008
2	2.32	.322		[c] .120		.084	1.10	[j] .121		[k] .049			
3	[l] 2.32	.31		[m] .123		.085	1.11			[n] .047			
4	[l] 2.29	[o] .318		.120	.082	[p] .082	1.12	[q] .124	.019	[r] .046	[s] .006		
	[l] 2.31	.320	.114	.114	.082	[t] .083	1.12	[u] .124	.016	[v] .048	[s] .006		
	[w] 2.25	.321		.119		.082	[x,e] 1.13	[y] .115		[z] .044			
7	[w] 2.33	.31		.119		.084	1.14			[a'] .048			
8	[w] 2.34	[o] .318		[m] .114		.084	1.11		.015	[k] .051			
9	2.25	[o] .315				[p,o] .080				[v] .048			
Average	2.30	0.317	0.116	0.118	0.082	0.083	1.12	0.121	0.017	0.048	0.006		
General Average	2.30	0.317	0.118		0.082		1.12	0.121	0.017	0.048	0.006		

[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: 1 P.
[b] Potentiometric titration.
[c] Molybdenum-blue photometric method. See J. Research NBS **26**, 405 (1941) RP1386.
[d] 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.
[e] Double dehydration.
[f] Diethyldithiocarbamate photometric method. See J. Research NBS **47**, 380 (1951) RP2265.
[g] Chromium separated from the bulk of the iron in a 10-g sample by hydrolytic precipitation with $NaHCO_3$, 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] Sulfuric acid digestion for 3 hr of a 1-g sample. See J. Research NBS **43**, 201 (1949) RP2021.
[j] Diethyldithiocarbamate photometric method.
[k] Diphenylcarbazide photometric method.
[l] Volumetric method.
[m] Molybdenum-blue photometric method.
[n] Chromotropic salt photometric method.
[o] Titrating solution standardized with a standard iron or steel.
[p] Sulfur gases absorbed in $NaOH$–H_2O_2 solution, and excess NaOH titrated with H_2SO_4.
[q] H_2S–CuS–CuO.
[r] Bicarbonate hydrolysis-perchloric acid oxidation.
[s] Bicarbonate hydrolysis-$FeSO_4$–$(NH_4)_2S_2O_8$–$KMnO_4$ method.
[t] Sulfur gases absorbed in $AgNO_3$ solution, and the liberated HNO_3 titrated with NaOH.
[u] H_2S–KI–$Na_2S_2O_3$ titration.
[v] Persulfate oxidation.
[w] Gasometric method.
[x] Sulfuric acid dehydration.
[y] H_2S-electrolytic method.
[z] Perchloric acid oxidation.
[a'] Persulfate oxidation-titration with $FeSO_4$–$Ce(SO_4)_2$.

List of Analysts

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The iron for the preparation of this standard was furnished by the Chain Belt Co., Milwaukee, Wis., with the cooperation of the Malleable Founders' Society, Cleveland, Ohio.

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