U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 6E

CAST IRON

ANALYST*	C			Mn	P		S		Si	COPPER H_2S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM $FeSO_4$-$KMnO_4$ titration	VANADIUM	MOLYBDENUM Colorimetric by developing color with KCNS and $SnCl_2$	TITANIUM Colorimetric	
	Total	Graphitic	Combined	Persulfate-Arsenite	Gravimetric (weighed as $Mg_2P_2O_7$ after removal of arsenic)	Alkali-Molybdate [a]	Gravimetric (direct oxidation and final precipitation after reduction of iron)	Evolution (HCl, sp. gr. 1.18, ZnS-iodine [b] theoretical sulfur titer [c]).	Sulfuric acid dehydration							
1	2. 63	1. 97	0. 66	[d] 1. 36	0. 432	[e]0. 428	0. 079	0. 079	[f] 2. 32	0. 257	0. 060	[g]0. 078	[h]0. 023	0. 017	[i]0. 027	
2	2. 65	1. 99	. 66	1. 36	. 430	. 433	. 079	. 077	2. 32	. 248	. 057	. 082	. 028	. 021	. 022	
3	2. 66	1. 98	. 68	1. 34		. 434	. 078	. 076	2. 31	. 248	. 055	. 075	. 023	. 019	. 028	
4	2. 58	1. 93	. 65	1. 35		[j]. 433	. 072	[k]. 079	[lf]2. 35	[m]. 262	[n]. 067	[o]. 064	[o]. 019	. 015	[p]. 025	
5	2. 56	1. 94	. 62	1. 38		. 434	. 079	. 073	[f] 2. 32	[q]. 250	[r]. 066	[s]. 073			[p]. 023	
6	2. 65	1. 96	. 69	[t]1. 37	. 428	. 427	. 081	[j]. 072	2. 33	. 249	. 065	. 076	. 027	. 019	[p]. 023	
7	2. 58	1. 94	. 64	1. 38	. 438	. 436	. 081	[u]. 078	2. 34	. 265	. 063	. 072	. 028	. 019	[j]. 026	
8	2. 65	1. 99	. 66	1. 37	. 430	[j]. 420	. 079	[v]. 079	[l] 2. 29	[w]. 262	. 062		. 028	. 010	[j]. 020	
	2. 61	2. 02	. 59	1. 35	. 423	[x]. 423	. 080	. 081	[lf]2. 32	[y]. 250	[z]. 062	. 077	. 019	. 015	[z1]. 025	
0	2. 57	1. 96	. 61	1. 39		. 424		[z2]. 080	[lf]2. 36	. 256	[z]. 059	[z3]. 07			[z1]. 025	
11	2. 62	1. 96	. 66	[d]1. 35	. 432		. 082	. 082	[f] 2. 35	[y]. 253	. 066	[g]. 074	[h]. 026	. 013	[p]. 026	
12	2. 59	1. 94	. 65	1. 35	. 434		. 081	. 082	[f] 2. 34	[y]. 250	. 065	[s]. 078	. 023	. 010	[j]. 028	
Averages	2. 61	1. 96	0. 65	1. 36	0. 431	0. 429	0. 079	0. 078	2. 33	0. 254	0. 062	0. 074	0. 024	0. 016	0. 025	
Recommended values	2. 61	1. 96	0. 65	1. 36	0. 431		0. 079		2. 33	0. 254	0. 062	0. 074	0. 024	0. 016	0. 025	

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

[b] Sample annealed by covering with a layer of graphite, and heating for 20 minutes at 685° C.

[c] Value obtained by standardizing the titrating solution by means of sodium oxalate through $KMnO_4$ and $Na_2S_2O_3$, and the use of the ratio 2I:1S.

[d] Bismuthate oxidation, ferrous sulfate-permanganate titration.

[e] Colorimetric method. See J. Research NBS **26**, 405 (1941) RP1386.

[f] Double dehydration.

[g] Persulfate oxidation and potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.

[h] Nitric acid oxidation and potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.

[i] Solution in HCl (1+2). A few ml of a 6-percent solution of cupferron added. Precipitate ignited, vanadium separated by fusion with sodium carbonate.

[j] Titrating solution standardized by use of a standard iron.

[k] Combustion in oxygen.

[l] Perchloric acid dehydration.

[m] Solution in HNO_3 (1+3), iron separated with ammonium hydroxide, and copper deposited electrolytically.

[n] KCN-dimethylglyoxime colorimetric method.

[o] Potentiometric titration with ferrous ammonium sulfate.

[p] Determined in residue from HCl (1+2) attack.

[q] Ammonia-copper complex colorimetric method.

[r] Dimethylglyoxime colorimetric method.

[s] Diphenylcarbazide colorimetric method.

[t] Bismuthate-arsenite.

[u] Solution in HCl (1+1). Titrating solution standardized by use of a standard steel.

[v] Solution in HCl (1+1). Titrating solution standardized by use of a standard iron.

[w] Copper precipitated with KCNS. Precipitate dried at 105° C and weighed as CuCNS.

[x] Titrating solution standardized by use of a standard steel.

[y] Finished by electrolysis.

[z] Glyoxime precipitate titrated with KCN.

[z1] Sample treated with HCl (1+1). Solution filtered, filtrate treated with sodium thiosulfate and precipitate added to the residue from HCl attack.

[z2] Solution in HCl (1+1).

[z3] Perchloric acid oxidation.

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