U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 65c

BASIC ELECTRIC STEEL, 0.3% CARBON

ANALYST*	C	Mn		P		S			Si	Cu	Ni	Cr	V	Mo	Sn	
	Direct combustion	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)	Evolution with HCl (1-1) ZnS-Iodine (theoretical sulfur titre) [b]	Combustion	Sulfuric acid dehydration	H_2S-CuS-CuO	Weighed as nickel dimethylglyoxime	$FeSO_4$-$KMnO_4$ titration		Colorimetric		
1	0. 338	0. 880	0. 884	0. 022	[c]0. 023	0. 029	0. 030		[d]0. 444	0. 047	0. 040	[e]0. 025	[f]0. 002	0. 007	[g]0. 007	
2	. 334	. 881	[h]. 878	. 022	. 022	. 032	. 033		[d]. 443	[i]. 053	[j]. 040	. 026			[k]. 008	
3	. 336		[h]. 872	. 023	[h]. 024	. 032			[d]. 438	. 054	. 038	. 026			[l]. 008	
	. 333	. 878	[h]. 877		. 024			[m]0.033	[nd].440	[o]. 051	[p]. 039	. 025			[l]. 009	
	. 341		[h]. 877		. 025			[m].030		[q]. 049		. 025				
	. 346		[n]. 886		[h]. 024			. 032	. 440	[q]. 048	[j]. 040	. 024			. 008	
7	. 348		[h]. 87		[h]. 023			[r]. 031	[d]. 434	. 050	[s]. 045	. 024				
8	. 334		[h]. 875	. 024	[h]. 024	. 029	. 030	[m]. 030	[d]. 440	[t]. 050	. 039	. 024			[l]. 009	
Averages	0. 339	0. 880	0. 877	0. 023	0. 024	0. 031	0. 031	0. 031	0. 440	0. 050	0. 040	0. 025	0. 002	0. 007	0. 008	
General average	0. 339	0. 878		0. 023		0. 031			0. 440	0. 050	0. 040	0. 025	0. 002	0. 007	0. 008	

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

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

[d] Double dehydration with intervening filtration.

[e] Persulfate oxidation and potentiometric titration with ferrous ammonium sulfate.

[f] Nitric acid oxidation and potentiometric titration with ferrous ammonium sulfate.

[g] Determination made by R. K. Bell by the sulfide-separation-iodate titration method. See BS J. Research **8**, 309(1932) RP415.

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

[i] KI-$Na_2S_2O_3$ titration method.

[j] Dimethylglyoxime colorimetric method.

[k] Tin preferentially precipitated with ammonium hydroxide in presence of ferrous iron, solution of precipitate reduced with Stanreduce and titrated with iodate standardized with tin.

[l] Sulfide-iodate method.

[m] Sulfur dioxide absorbed in acidified starch-iodine solution, the equivalent iodine being liberated by the addition of standard KIO_3 solution during combustion.

[n] Nitric-sulfuric acid dehydration.

[o] Copper separated as sulfide, reprecipitated as the thiocyanate and titrated with KIO_3.

[p] Glyoxime-cyanide titration method.

[q] Finished by electrolysis.

[r] Sulfur gases absorbed in NaOH-H_2O_2 solution. Titrated with H_2SO_4 solution.

[s] Colorimetric method.

[t] H_2S-α-benzoinoxime precipitation, ignited and weighed as CuO.

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