

U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 51A

ELECTRIC STEEL, 1.2% CARBON

ANALYST*	C	Mn	P		S		Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM	TIN
	Direct combustion		Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic)	Alkali-molybdate ^a	Gravimetric (Direct oxidation and final precipitation in reduced solution)	Evolution with HCl (1-1) ZnS-Iodine (theoretical sulphur titre) ^b	Sulphuric acid dehydration						
1.....	1.27	0.231 ^c	0.011	0.011	0.008	0.008	0.308	0.087	0.060	0.057 ^d	0.003 ^d	0.002 ^e	0.011 ^f
2.....	1.26	.24 ^g		.010		.009 ^h	.314 ⁱ	.080 ^j	.063	.056		.004 ^e	
3.....	1.27	.232 ^g	.009	.011	.011	.011 ^h	.308 ^k	.088	.060	.052	.001 ^e	.002 ^e	
4.....	1.27	.233 ^g	.010	.011	.012	.011	.310	.080 ^j	.068 ^l	.056	.001 ^e	.002 ^e	
5.....	1.27	.238 ^g	.010	.010	.010	.011	.303	.08	.06	.05			
6.....	1.28	.232 ^g		.011		.011 ^h	.308 ^m	.084 ⁿ	.062	.060			
7.....	1.27	.234 ^g	.010	.011	.012	.011	.301 ^o	.088	.065	.057	<.001	.001 ^e	.010 ^g
8.....	1.28	.224 ^c	.010	.009	.009	.010 ^h	.306	.08	.060	.059 ^d		.001 ^e	
9.....	1.28	.23 ^a		.010		.009 ^h	.313 ^o	.080	.073	.054			
Averages.....	1.27	.233	.010	.010	.010	.010	.308	.082	.063	.056	.002	.002	.011
Recommended values	1.27	0.233	0.010		0.010		0.308	0.082	0.063	0.056	0.002	0.002	0.011

^a Precipitated at 40° C., washed with a 1-percent solution of KNO₃ and titrated with alkali standardized by the use of National Bureau of Standards acid potassium phthalate and the 23:1 ratio.
^b Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₃.
^c Bismuthate (FeSO₄-KMnO₄).
^d Potentiometric titration.
^e Colorimetric.

^f Tin precipitated as sulphide in HNO₃ solution, then separated from copper and molybdenum by precipitation with NH₄OH, and finally reduced with lead and titrated with iodine. See NBS J. Research 8, 309 (1932) RP 415.
^g Fersulphate-arsenite.
^h H₂S absorbed in ammoniacal CdCl₂ solution.
ⁱ Sulphuric-perchloric acid dehydration.
^j Finished by electrolysis.
^k Perchloric acid dehydration.

^l Dimethylglyoxime precipitate ignited to oxide.
^m Nitric-hydrochloric acid dehydration
ⁿ Iodide method. Sodium thiosulphate solution standardized by means of copper.
^o Sulphuric-nitric acid dehydration.
^p Tin precipitated as sulphide in HNO₃ solution, precipitate ignited and fused with Na₂O₂. Melt leached with H₂O. Iron, etc., removed by filtration, tin reduced in HCl solution with lead and titrated with iodate, standardized with pure tin.
^q Bismuthate-arsenite.

* LIST OF ANALYSTS

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This standard is not recommended for colorimetric carbon determinations, because of uncertainty as to the condition of the carbon.

LYMAN J. BRIGGS,
Director.

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