

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 11 c

BASIC OPEN-HEARTH STEEL, 0.2% 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.	ARSENIC.
	CARBON. Direct combustion.	MANGANESE. 1. Bismuthate (FeSO ₄ -KMnO ₄), 2. Other methods.	PHOSPHORUS. 1. Alkali-Molybdate. ^a 2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic).	1. SULPHUR. Gravimetric (Direct oxidation and final precipitation in reduced solution). 2. EVOLUTION WITH HCl (1:1 ZnS-Iodine (theoretical sulphur titre)).	SILICON. Sulphuric acid dehydration.									
1	0.209	0.436		0.006	0.004	0.031	0.032	0.008	0.037	0.078	0.022	none found	0.005	
2	.211	.434		.006	.005	{.031 ^o .032	.032	.008	.034	.080	.025 ^d	none found		0.013 ^e
3	.221		0.427 ^f	.006		.035 ^o		.007	.033 ^g	{.078 ^h .080 ⁱ				
4	.213		.435 ^j	{.005 ^k .005		.034 ^l	.036	.010	{.037 ^m .039					
5	.214	.429		.003	.003	{.033 ^l .035	.036 ⁿ	.007	.033	.072				
6	.215	.44	.44 ^o	.005		.031 ^o	.032	.009 ^p	.026	.077				
7	.216 ^q	.439	.426 ^o	.006		{.034 ^l .034	.032	.010	.028 ^m		.021			
8	.205	.438	.454 ^r	.006	.005 ^s	.034	.032	.008	.043	.076	.013			
9	.220	.425		.004	.004 ^s	.033	.032	.010	.042	{.067 .070 ⁱ				
10	.216	.431	.432 ^f	.005		{.034 ^o .034	.030	{.009 ^t .011	.034 ^m	.077 ⁱ	.015	<.005 ^u	.01 ^v	
Averages	.214	.434	.436	.005	.004	.033	.033	.009	.035	.076	.019		.005	.012
General Averages	.214	.435		.005		.033	.033	.009	.035	.076	.019		.005	.012

NOTE.—By the use of methods employing empirical titres for evolution sulphur an average of 0.034 per cent was obtained by five analysts.

- ^a Precipitated at 40° C., washed with 1 per cent KNO₃ and titrated with alkali standardized against B. S. benzoic acid using the 23:1 ratio.
- ^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₅.
- ^c Precipitated in FeCl₃ solution.
- ^d Electrometric titration.
- ^e Distillation as AsCl₃, precipitation as As₂S₃, conversion to Ag₃AsO₄ and titration with KCNS.
- ^f PbO₂-Arsenite.

- ^g Copper and nickel separated from the bulk of the iron by precipitation with ferricyanide, and copper then precipitated with H₂S and titrated with KCN.
- ^h KCN titration after the above separation of copper. Johnson, "Chemical Analysis of Special Steels, etc.," 3d. Ed., p. 207.
- ⁱ Solution of nickel dimethylglyoxime and KCN titration.
- ^j Bismuthate-Arsenite.
- ^k Reduction of molybdate.
- ^l Meineke's method.

- ^m Electrolysis.
- ⁿ Sulphur compounds absorbed in bromine water and precipitated with BaCl₂.
- ^o Persulphate-Arsenite.
- ^p Drown's method.
- ^q Absorption of CO₂ in Ba(OH)₂ and titration with HCl.
- ^r Fischer's modification of Volhard's method.
- ^s Weighed the yellow precipitate.
- ^t Dehydration with HCl.
- ^u Blair's method.
- ^v Distillation as AsCl₃ and weighed as As₂S₃.

*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.

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