

DEPARTMENT OF COMMERCE

Bureau of Standards
Certificate of Analyses

OF

STANDARD SAMPLE No. 11D

BASIC OPEN-HEARTH STEEL, 0.2% CARBON

ANALYST*	C	Mn		P		S		Si						
	CARBON Direct combustion	MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄) 2. Persulphate Arsenite		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. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre) ^b		SILICON Sulphuric acid dehydration	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM Colorimetric	ARSENIC
1	0.203	0.422	0.427	0.007	0.004	0.041	0.043	0.029	0.008 ^c	0.010	0.009 ^d	0.002 ^d	0.001	0.008 ^e
2	.203		.434 ^f	.007		.041	.040	.028						
3	.205		.44 ^f	.010		.040 ^g	.041 ^h	.031	.012 ^c	Trace ⁱ	.013			
	.202		.428	.007		.042	.042 ^h	.026	.012					
5	.202	.426		.006		.039	.041	.027	.012		.008			
6	.202	.433		.005	.005	.041	.040	.023	.012		.005			
7	.200	.428	.430	.006		.040	.040	.028	.014	.007	.007	.001	.001	
8	.201	.422	.43	.006		.039	.040	.023	None ^j	.008	<.01	<.01	.001	
9	.199	.426	.420	.006	.005	.042	.043	.031	.013	.006	.006			
Averages General	.202	.426	.433	.007	.005	.041	.041	.027	.010	.008	.008	.002	.001	.008
Averages	.202	.430		.006		.041		.027	.010	.008	.008	.002	.001	.008

^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 Finished by electrolysis.

^d Electrometric titration.
^e Distillation as AsCl₃, precipitation as As₂S₃, conversion to Ag₃As₂O₄ and titration with KCN.S.
^f Bismuthate-arsenite.
^g Precipitated in FeCl₃ solution.
^h Absorbed in cadmium chloride.

ⁱ Solution of nickel dimethylglyoxime and KCN titration.
^j Thiocyanate precipitation method, "Methods of the Chemists of The United States Steel Corporation" for the Sampling and Analysis of Alloy Steel, pp. 65-66.

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

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George K. Burgess
Director.