DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 19c

ACID 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 $Mg_2P_2O_7$ 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_2S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM $FeSO_4$-$KMnO_4$ titration	VANADIUM	MOLYBDENUM Colorimetric	ARSENIC	
1	0. 217	0. 628	0. 634	0. 048	0. 047	0. 041	0. 042	0. 204	0. 160[c]	0. 179	0.064[d]	0. 004[d]	0. 015	0. 013[e]	
2	. 215		. 639[f]	. 052		. 039	. 038	. 197							
3	. 220		. 620[f]	. 051		. 041[g]	. 041[h]	. 198	. 160[c]	. 17	. 052[i]				
	. 215		. 627	. 050		. 040	. 039[h]	. 198	. 156						
5	. 21	. 63		. 050		. 040	. 039	. 202	. 162	. 19	. 057				
6	. 215	. 640		. 051	. 049	. 039	. 037	. 198	. 162	. 19	. 08				
7	. 212	. 629	. 633	. 050		. 041	. 041	. 204	. 170	. 174	. 059	. 005	. 014		
8	. 209	. 63	. 64	. 051		. 039	. 040	. 198	. 15[j]	. 178	. 07	<. 01	. 018		
9	. 216	. 625	. 620	. 049	. 048	. 042	. 042	. 206	. 165	. 169	. 060				
Averages	. 214	. 630	. 630	. 050	. 048	. 040	. 040	. 201	. 161	. 179	. 063	. 005	. 016	. 013	
General Averages	**. 214**	**. 630**		**. 049**		**. 040**		**. 201**	**. 161**	**. 179**	**. 063**	**. 005**	**. 016**	**. 013**	

[a] Precipitated at 40° C., washed with 1 per cent KNO_3 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 $KMnO_4$ and $Na_2S_2O_3$.

[c] Finished by electrolysis.

[d] Electrometric titration.

[e] Distillation as $AsCl_3$, precipitation as As_2S_3, conversion to Ag_3AsO_4 and titration with KCNS.

[f] Bismuthate-arsenite.

[g] Precipitated in $FeCl_3$ 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.

*LIST OF ANALYSTS

1. Ferrous Laboratory, Bureau of Standards, H. A. Bright in charge; analysis by R. M. Fowler and C. P. Larrabee.
2. E. J. Richards, Robert W. Hunt Co., Chicago, Ill.
3. W. F. Lantz, Bethlehem Steel Co., Bethlehem, Pa.
4. W. E. Steiner, Bethlehem Steel Co., Cambria Plant, Johnstown, Pa.
5. E. C. Raysor, Bethlehem Steel Co., Coatesville Plant, Coatesville, Pa.
6. L. P. Chase, Illinois Steel Co., South Works, Chicago, Ill.
7. C. E. Nesbitt, Carnegie Steel Co., Edgar Thomson Works, Braddock, Pa.
8. W. D. Brown, Carnegie Steel Co., Duquesne Works, Duquesne, Pa.
9. J. L. Mayberry, Republic Iron and Steel Co., Youngstown, Ohio.

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

Washington, D. C.
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George K. Burgess
Director.

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