

# Bureau of Standards

## Certificate of Analyses

OF

### STANDARD SAMPLE No. 5d

### IRON C

ANALYST.	CARBON.			SILICON.		TITANIUM (COLORIMETRIC METHOD).	PHOSPHORUS.		SULPHUR,* DIRECT OXIDATION (final precipitation in reduced solution).	MANGANESE.		ARSENIC (DISTILLATION OF $AsCl_3$ ).	VANADIUM.	NICKEL.	CHROMIUM.	
	TOTAL.	GRAPHITE.	COMBINED.	SULPHURIC ACID DEHYDRATION.	OTHER METHODS.		ALKALI-MOLYBDATE.	GRAVIMETRIC (corrected for Ti, As, and V, and weighed as $Mg_2P_2O_7$ ).		BISMUTHATE ( $FeSO_4 \cdot KMnO_4$ ).	OTHER METHODS.					COPPER (Cu-S-CuO).
1.....	2.54	1.95	.59	1.84	-----	.079	.231	.234	.050	.826	-----	.090	{ <sup>a</sup> .034 <sup>b</sup> .026}	.02	.02	.015
2.....	2.55	1.93	.62	1.85	-----	.077	.232	.231	.048	.800	-----	.095	<sup>b</sup> .028	<sup>c</sup> .017	-----	<sup>c</sup> .014
3.....	2.58	1.95	.63	1.81	-----	.074	.227	.230	.048	.811	<sup>d</sup> .82	{ <sup>e</sup> .085 <sup>f</sup> .103}	-----	-----	-----	-----
4.....	2.58	-----	-----	1.82	-----	.072	-----	-----	.047	.822	<sup>f</sup> .807	.096	-----	-----	-----	.010
-----	2.55	1.99	.56	1.82	<sup>g</sup> 1.80	.088	.230	.237	.048	.832	<sup>d</sup> .790	{ <sup>h</sup> .110 <sup>i</sup> .096}	-----	-----	-----	-----
6.....	2.64	2.00	.64	1.84	-----	.076	.243	-----	-----	.85	-----	.107	<sup>b</sup> .025	-----	-----	-----
7.....	2.55	1.95	.60	1.81	-----	.076	.227	.220	.050	.823	-----	.077	<sup>a</sup> .034	-----	-----	-----
8.....	2.59	1.98	.61	1.84	-----	<sup>i</sup> .082	{ <sup>l</sup> .230 <sup>m</sup> .228}	-----	.048	.814	{ <sup>k</sup> .81 <sup>j</sup> .813}	.10	-----	{ <sup>c</sup> .016 <sup>n</sup> .018}	-----	-----
9.....	-----	-----	-----	-----	<sup>g</sup> 1.80	-----	.223	-----	<sup>o</sup> .050	.80	-----	<sup>n</sup> .081	-----	-----	-----	-----
10.....	2.61	1.99	.62	1.83	<sup>g</sup> 1.84	.080	.237	-----	.051	.81	<sup>d</sup> .81	.077	-----	-----	-----	-----
AVERAGE	2.58	1.97	.61	1.83	1.81	.077	.231	.230	.049	.819	.808	.093	.029	.018	.02	.013
GEN. AV....	2.58	1.97	.61	1.83	-----	.077	.231	-----	.049	.815	-----	.093	.029	.018	.02	.013

\*NOTE.—The evolution method for sulphur is not recommended. This sample indicates a value of 0.038 per cent sulphur when it is analyzed by the evolution method and the theoretical sulphur titre of the iodate or iodine solution is used.

<sup>a</sup> Weighed as  $As_2S_3$ .  
<sup>b</sup> Converted to  $Mg_2As_2O_7$ .  
<sup>c</sup> Electrometric titration.  
<sup>d</sup> Persulphate—Arsenite.  
<sup>e</sup>  $Na_2S_2O_8$ —CuS—CuO.  
<sup>f</sup> Arsenite titration.  
<sup>g</sup> Drown's method.

<sup>h</sup> Color comparison method.  
<sup>i</sup> Gravimetric.  
<sup>j</sup> Ford-Williams method.  
<sup>k</sup> Separation of Cr and V with ZnO and manganese determined by bismuthate method.

<sup>l</sup> Weighed yellow precipitate.  
<sup>m</sup> Phosphomolybdate separation.  
<sup>n</sup> Finished by electrolysis.  
<sup>o</sup> Precipitated in  $FeCl_3$  solution.

### INDEX TO ANALYSTS

1. James I. Hoffman, Bureau of Standards.
2. Routine Laboratory, Bureau of Standards, H. A. Bright in charge.
3. Charles E. Nesbitt, Carnegie Steel Co., Edgar Thomson Works, Braddock, Pa.
4. V. E. Hillman, Crompton & Knowles Loom Works, Worcester, Mass.

5. M. B. Mayfield, Pittsburgh Testing Laboratory, Pittsburgh, Pa.
6. J. Gorham, Colorado Fuel & Iron Co., Pueblo, Colo.
7. F. G. Kelly, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.
8. H. E. Slocum, Jones & Laughlin Steel Co., Pittsburgh, Pa.
9. A. D. Shankland, Bethlehem Steel Co., Bethlehem, Pa.
10. E. C. Frost, Western Electric Co., Chicago, Ill.

N. B.—As cast, this iron contained 3.85 per cent total carbon. Most of the loose graphite was purposely blown out in preparing the sample, if its loss has affected in no way the nature of the compounds existing in the iron, which are those proper to the iron as cast.

Washington, D. C.

S. W. STRATTON,  
Director.

July 25, 1921.