

Bureau of Standards

Certificate of Analyses

OF
STANDARD SAMPLE No. 5e
CAST IRON

ANALYST*	C			Mn	P		S		Si	COPPER H ₂ S-Cu ₂ S-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM	TITANIUM Determined colorimetrically in residue after HCl (sp. gr. 1.10) attack	ARSENIC
	CARBON 1. Total	2. Graphitic	3. Combined	MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄)	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 ^b Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre ^c)	SILICON Sulphuric acid dehydration							
1	2.36	1.65	0.71	0.752	0.242	0.247	0.090	0.085	{ 2.31 2.28 ^d }	0.585	0.109	0.015 ^e	0.013 ^e	0.005 ^e	0.034	-----
2	2.37	1.64	.72	.756	.246	.243	.091	.085	{ 2.28 2.27 ^d }	.583	.117	.014	.017	.004	.033	0.031
3	2.36	1.63	.73	{ .754 ^f .76 ^f }	.246	.246	.092	-----	2.31	.612	.110	.011	.014	.009	.042	.030
4	2.38	1.66	.72	.74	.251	.249	.091	.086	2.28	-----	.111	-----	-----	-----	-----	-----
5	2.36	1.64	.72	{ .754 ^f .76 ^f }	.240	.241	.092	.081	{ 2.28 2.27 ^d }	.572 .569 ^g }	.103	.015	.015	-----	.040	.031
6	2.35	1.64	.71	{ .747 ^f .750 ^f }	.245	.247	.089	.081	{ 2.31 2.28 ^d }	.59	-----	.017	-----	-----	-----	-----
7	2.35	1.63	.72	.75	.246	-----	.087	.085	2.29 ^d	.57 ^h	-----	-----	-----	-----	-----	-----
8	2.37	1.61	.76	.765	.243	.249	.092	.082	2.27	.613	-----	.010	.009	-----	.030	-----
9	2.36	1.64	.72	{ .756 ^f .758 ^f }	-----	.249	.093	.077	{ 2.28 2.31 ^d }	.573	.109	.015	.012 ⁱ	-----	.035	.030
10	2.36	1.63	.73	{ .75 ^f .76 ^f }	.240	.234	.089	.084	2.29 ^j	.57	.104	.012	.009	-----	.036	-----
Averages	2.36	1.64	.72	.754	.244	.245	.091	.083	2.29	.584	.109	.014	.013	.006	.036	.031
General averages	2.36	1.64	.72	.754	.245	-----	.091	.083 ^b	2.29	.584	.109	.014	.013	.006	.036	.031

^a Precipitated at 40° C., washed with a 1 per cent solution of KNO₃ and titrated with alkali standardized by the use of B. S. benzoic acid and the 23:1 ratio.
^b Sample annealed by wrapping it in filter paper and heating for 20 minutes in a tightly covered porcelain crucible at a bright red heat. On the unannealed sample an average of 0.074 per cent sulphur was obtained by 10 analysts, and the

results varied from 0.068 to 0.079 per cent. Owing to the inconsistent results obtained both on the annealed and unannealed samples, this iron is not recommended as a standard for evolution sulphur.
^c Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₃.

^d Nitro-sulphuric.
^e Colorimetric.
^f Persulphate-arsenite.
^g Low's iodide method.
^h Electrolysis.
ⁱ Precipitated as lead vanadate.
^j HCl dehydration.

* LIST OF ANALYSTS

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| <ol style="list-style-type: none"> 1. James I. Hoffman, Bureau of Standards. 2. Ferrous laboratory, Bureau of Standards, Harry A. Bright in charge. 3. W. F. Muehlberg, Newburgh Steel Works, Cleveland, Ohio. W. Woodward, W. H. C. Berg, and C. A. H. Knapp, The Whitney Manufacturing Co., Hartford, Conn. F. G. Kelly, Tennessee Coal, Iron & Railroad Co., Ensley, Ala. | <ol style="list-style-type: none"> 6. Charles E. Nesbitt, Carnegie Steel Co., Edgar Thomson Works, Braddock, Pa. 7. H. E. Slocum, Jones & Laughlin Steel Corp., Pittsburgh, Pa. 8. J. Gorham, Colorado Fuel & Iron Co., Pueblo, Colo. 9. F. W. Willard, Western Electric Co., Chicago, Ill. 10. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. |
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Washington, D. C.

September 25, 1925

GEORGE K. BURGESS,
Director.