

DEPARTMENT OF COMMERCE

Bureau of Standards  
Certificate of Analyses

OF  
STANDARD SAMPLE No. 7b  
CAST IRON  
(HIGH PHOSPHORUS)

ANALYST*	C			Mn	P		S		Si	COPPER H <sub>2</sub> S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO <sub>4</sub> -KMnO <sub>4</sub> 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 <sub>4</sub> -KMnO <sub>4</sub> )	PHOSPHORUS 1. Alkali-Molybdate <sup>a</sup>	2. Gravimetric (Weighed as Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub> after removal of arsenic)	1. SULPHUR Gravimetric (Direct oxidation and final precipitation in reduced solution)	2. SULPHUR <sup>b</sup> Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre) <sup>c</sup>	SILICON Sulphuric acid dehydration							
1.....	2.82	2.27	0.55	0.478	0.886	0.889	0.074	0.069	2.08	0.017	0.005	0.012	0.059	0.005 <sup>d</sup>	0.071 <sup>e</sup>	-----
2.....	2.81	2.32	.49	.480	.880	.889	.075	.070	2.08	.011	.009	.011 <sup>f</sup>	.058 <sup>f</sup>	.003 <sup>d</sup>	.067	0.090
3.....	2.88	2.36	.52	.475	.873	.892	.074	.065	2.07	.014	.005	.013	.052	.006	.061	.070
4.....	2.85	2.36	.49	.467	.874	.89	.072	.069	2.08	.023	-----	-----	-----	-----	-----	-----
5.....	2.84	2.32	.52	{.487 .470 <sup>g</sup> }	.877	.868	.076	.071	2.06	.011 <sup>h</sup>	-----	-----	-----	-----	.067	-----
6.....	2.83	-----	-----	.490 <sup>i</sup>	.875	.868	.075	.071	2.06	-----	-----	-----	-----	-----	-----	-----
7.....	2.86	2.28	.58	{.483 .48 <sup>g</sup> }	.884	.886	.075	.070	2.08	.012 <sup>j</sup>	.010	.011	.054	-----	.072	.078
8.....	2.85	2.25	.60	.47	.87	-----	.074	.064	2.06	.02	-----	-----	.05	-----	.08	-----
Averages	2.84	2.31	.53	.478	.877	.883	.074	.069	2.07	.015	.007	.012	.055	.005	.070	.079
General averages	2.84	2.31	.53	.478	.880		.074 <sup>†</sup>	.069	2.07	.015	.007	.012	.055	.005	.070	.079

† Recommended value.

<sup>a</sup> Precipitated at 40° C., washed with a 1 per cent solution of KNO<sub>3</sub> and titrated with alkali standardized by the use of B. S. benzoic acid and the 23:1 ratio.

<sup>b</sup> 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 0.060 per cent was

obtained by five analysts and the results varied from 0.057 to 0.061 per cent.

<sup>c</sup> Value obtained by standardization of titrating solution against sodium oxalate through KMnO<sub>4</sub> and Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>.

<sup>d</sup> Determined colorimetrically by developing color with KCNS and SnCl<sub>2</sub>.

<sup>e</sup> Represents total titanium determined gravimetrically by the use of cupferron.

<sup>f</sup> Electrometric titration.

<sup>g</sup> Persulphate oxidation.

<sup>h</sup> Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>-CuS—Finished by electrolysis.

<sup>i</sup> Bismuthate-arsenite.

<sup>j</sup> Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>-CuS-CuO.

<sup>k</sup> Determinations by analyst No. 1 on 10g samples showed 0.01 per cent cobalt, 0.005 per cent aluminum, and no zirconium.

\* LIST OF ANALYSTS

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5. F. A. Hull, Testing Laboratory, General Electric Co., Schenectady, N. Y.

6. G. A. England, American Car & Foundry Co., St. Louis, Mo.
7. F. G. Kelly and F. S. Andrews, Tennessee Coal, Iron & R. R. Co., Ensley, Ala.
8. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

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GEORGE K. BURGESS,  
Director.