

# National Bureau of Standards

## Certificate of Analyses

OF

### STANDARD SAMPLE No. 4e CAST IRON

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 Colorimetric by developing color with KCNS and SnCl <sub>2</sub>	TITANIUM Determined colorimetrically in resi- due after HCl (sp. gr. 1.10) attack	ARSENIC
	CARBON 1. Total	2. Graphitic	3. Combined	MANGANESE 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 re- duced solution)	2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sul- phur titre <sup>c</sup> )	SILICON Sulphuric acid dehydration							
1.....	2.87	2.37	0.50	0.725	0.107	0.108	0.050	0.049 <sup>d</sup>	1.30	0.010	0.010	0.010 <sup>e</sup>	0.034 <sup>e</sup>	<0.001	0.069	0.008
2.....	2.90	2.42	.48	.72 <sup>f</sup>	.105	.103	.054	.050	1.28						.065	
3.....	2.93	2.45	.48	.72	.114		.050	.052	1.30	.016	.015	.011	.029	<.001	.073	.006
	2.85	2.42	.43	.72 <sup>f</sup>	.110	.107 <sup>g</sup>	.055	.052	1.28							
	2.94	2.45	.49	.732	.108	.108	.054	.051 <sup>h</sup>	1.29							
6.....	2.87	2.39	.48	.720 <sup>i</sup>	.096	.112	.054	.053	1.28		.011	.012 <sup>j</sup>			.002	.066
7.....	2.87	2.39	.48	.719	.110	.112	.050	.048	1.28							
8.....	2.94	2.42	.52	.72	.108		.055	.051 <sup>d</sup>	1.32	.01 <sup>k</sup>		.01			.001	
9.....	2.87	2.37	.50	.720	.111	.113	.050	.047	1.31	.005	.010	.013	.031	.001	.062	.005
10.....	2.88	2.38	.50	.71 <sup>f</sup>	.110		.052	.052	1.29							
Averages	2.89	2.41	.49	.721	.108	.109	.052	.051	1.29	.010	.012	.012	.031	.001	.067	.006
Recom- mended values	2.89	2.41	.49	7.21	.109		.052		1.29	.010	.012	.012	.031	.001	.067	.006

<sup>a</sup> Precipitated at 40°C, washed with a 1 percent solution of KNO<sub>3</sub> and titrated with alkali standardized by the use of National Bureau of Standards acid potassium phthalate and the 23:1 ratio.  
<sup>b</sup> Sample annealed by wrapping it in filter paper and heating for 20 minutes in tightly covered porcelain crucible at a bright red heat.  
<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> Sample annealed under a covering of graphite, by heating for 20 minutes at 685° C. Sulphur evolved with concentrated HCl.

<sup>e</sup> Potentiometric titration.  
<sup>f</sup> Bismuthate-arsenite method.  
<sup>g</sup> Titrating solution standardized against a standard cast iron.  
<sup>h</sup> Absorbed in CdCl<sub>2</sub> solution.  
<sup>i</sup> Persulphate-arsenite method.  
<sup>j</sup> Colorimetric method.  
<sup>k</sup> Finished by electrolysis.

#### \*LIST OF ANALYSTS

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