

# Certificate of Analysis

## STANDARD REFERENCE MATERIAL 59a

### Ferrosilicon

	Si	Fe	C	Mn	P	S	Cu	Ni	Cr	Al	B	Ca
ANALYSTS			Combustion-gravimetric		Photometric	Combustion-Iodate	Photometric					
1	48.12 <sup>a</sup>	50.00 <sup>b</sup>	0.044 <sup>c</sup>	0.75 <sup>d</sup>	0.015	0.001 <sup>e</sup>	0.052 <sup>e,f</sup>	0.032	0.084 <sup>g</sup>	0.35 <sup>h,i</sup>	0.059 <sup>j</sup>	0.039 <sup>k</sup>
2	48.12 <sup>l</sup>	50.06 <sup>m</sup>	.044 <sup>n</sup>	.76 <sup>o</sup>	.016	.001 <sup>n</sup>	.051 <sup>p</sup>	.032	.079 <sup>q</sup>	.35 <sup>r</sup>	.063 <sup>s</sup>	.048 <sup>t</sup>
3	48.13 <sup>l</sup>	50.09	.050	.76	.017	.002	—	.039	.079	.35	.05	—
4	48.08 <sup>a</sup>	50.08 <sup>u</sup>	.045 <sup>v</sup>	.74 <sup>w</sup>	.015	—	.056 <sup>x</sup>	—	.076 <sup>g</sup>	.37 <sup>y</sup>	.060 <sup>z</sup>	.038 <sup>z1</sup>
5	48.07	50.00	.046 <sup>v</sup>	.76	.016	.003	.049 <sup>e</sup>	.028 <sup>e</sup>	{.080 <sup>z2</sup> } {.085 <sup>e</sup> }	.35	.057	.042 <sup>e</sup>
Average	48.10	50.05	0.046	0.75	0.016	0.002	0.052	0.033	0.080	0.35	0.058	0.042

<sup>a</sup> 0.5g sample fused with Na<sub>2</sub>O<sub>2</sub>, double dehydration with HCl.

<sup>b</sup> 1-g sample dissolved in nitrohydrofluoric acids and fumed with H<sub>2</sub>SO<sub>4</sub>. Iron precipitated with NH<sub>4</sub>OH, acidified with HCl, reduced with SnCl<sub>2</sub> and titrated with standard solution of K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>.

<sup>c</sup> Iron accelerator.

<sup>d</sup> Persulfate-arsenite titration method.

<sup>e</sup> Atomic absorption method.

<sup>f</sup> Same value by isotope dilution.

<sup>g</sup> Chromium oxidized with ammonium persulfate and titrated potentiometrically with ferrous ammonium sulfate solution.

<sup>h</sup> Polarographic method.

<sup>i</sup> Same value by atomic absorption.

<sup>j</sup> Isotope dilution.

<sup>k</sup> Flame emission spectrophotometric method.

<sup>l</sup> Double dehydration with HClO<sub>4</sub>.

<sup>m</sup> Iron reduced with SnCl<sub>2</sub> and titrated with standard solution of K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>.

<sup>n</sup> Iron and tin-coated copper accelerators.

<sup>o</sup> Sodium pyrophosphate method.

<sup>p</sup> Diethyldithiocarbamate photometric method.

<sup>q</sup> Diphenylcarbazide photometric method.

<sup>r</sup> Sodium hydroxide separation of aluminum, followed by titration with 1,2-diaminocyclohexanetetraacetic acid.

<sup>s</sup> Azure C photometric method.

<sup>t</sup> EDTA titration.

<sup>u</sup> Iron titrated with standard solution of KMnO<sub>4</sub>.

<sup>v</sup> Combustion-conductometric method.

<sup>w</sup> KIO<sub>4</sub> photometric method.

<sup>x</sup> Neocuproine photometric method.

<sup>y</sup> Cupferron-NH<sub>4</sub>OH-Al<sub>2</sub>O<sub>3</sub> gravimetric method.

<sup>z</sup> Spectrographic method.

<sup>z1</sup> Calcium precipitated as oxalate and titrated with standard solution of KMnO<sub>4</sub>.

<sup>z2</sup> Spectrometric method.

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Homogeneity testing was performed at NBS by S. D. Rasberry and C. Gifford and was found to be satisfactory for the elements certified.

The overall direction and coordination of the technical measurements leading to certification were performed under the chairmanship of O. Menis and J. I. Shultz.

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