



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 122i

#### Cast Iron

(In Cooperation with the American Society for Testing and Materials)

This SRM is in chip form sized between 0.8 and 2.0 mm sieve openings (20 and 10 mesh), and is intended for use in chemical methods of analysis.

This standard contains approximately 2.9 % of graphitic carbon and should be mixed gently before use.

<u>Element</u>	<u>Certified Value<sup>1</sup></u> <u>Percent, by weight</u>	<u>Estimated Uncertainty<sup>2</sup></u>
Total carbon <sup>a</sup>	3.47	0.07 <sup>3</sup>
Manganese <sup>b,c,d,e</sup>	0.530	0.005
Phosphorus <sup>c,d,f,g</sup>	0.28	0.02
Sulfur <sup>a</sup>	0.087	0.008 <sup>3</sup>
Silicon <sup>b,c,d,h</sup>	0.89	0.02
Copper <sup>b,c,d,f</sup>	0.033	0.003
Nickel <sup>b,c,d</sup>	0.047	0.003
Chromium <sup>b,c,d</sup>	0.151	0.005
Vanadium <sup>b,c,d</sup>	0.012	0.001
Molybdenum <sup>c,d</sup>	0.008	0.002
Titanium <sup>c,d,f</sup>	0.024	0.002

<sup>1</sup> The certified value listed for a constituent is the present best estimate of the "true" value based on the results of the cooperative program for certification.

<sup>2</sup> The estimated uncertainty listed for a constituent is based on judgment and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability.

<sup>3</sup> The stated uncertainty includes allowances for measurement imprecision, material variability, and differences among analytical methods. Each uncertainty is the sum of the half-width of a 95% prediction interval and an allowance for a systematic trend in concentration. In the absence of systematic error, a 95% prediction interval predicts where the true concentrations of 95% of the samples of this SRM lie. The within-bottle standard deviation for carbon is 0.023 and for sulfur is 0.004.

#### Methods/Techniques

- Combustion-Infrared Detection
- Atomic Absorption Spectrometry
- DC Plasma Spectrometry
- Inductively Coupled Plasma Spectrometry
- Persulfate-Arsenite Volumetry
- Spectrophotometry
- Alkalimetric Volumetry
- Gravimetry

Gaithersburg, MD 20899  
September 30, 1992  
(Revision of certificate dated 9-18-92)

William P. Reed, Chief  
Standard Reference Materials Program

(over)

The overall coordination of the technical measurements leading to certification were performed under the direction of J.I. Shultz, Research Associate, ASTM-NIST Research Associate Program.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Standard Reference Materials Program by P.A. Lundberg.

#### PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was prepared at the American Cast Iron Pipe Company, Birmingham, AL.

Extensive homogeneity testing was performed at the American Cast Iron Pipe Company by R.N. Smith and R.J. Huffman, at Lukens Steel Company, Coatesville, PA by S. Forese and J.H. Morris, and by T.W. Vetter of the NIST Inorganic Analytical Research Division.

Cooperative analyses for certification were performed in the following laboratories:

-Allegheny Ludlum Steel Corp., Technical Center, Brackenridge, PA; R.M. Crain, G.L. Bergstrom, S.A. Bissell-Seymour, C.M. Bottegal-Farrell and C.C. Gabrielli.

-American Cast Iron Pipe Co., Birmingham, AL; R.N. Smith, R.T. Kirkland, R.G. Moffett, R.J. Huffman and D.R. Denney.

-Cytemp Specialty Steel Division, Titusville, PA; R.A. Gardiner.

-General Motors Research Laboratories, Analytical Chemistry Department, Warren, MI; N.M. Potter, D.E. Esch, and R.L. Passeno.

-Jeffrey A. Nunes Laboratories, Inc., Washington, PA; J.A. Nunes.

-National Institute of Standards & Technology, Inorganic Analytical Chemistry Division, T.A. Vetter.

Elements other than those certified may be present in this material as indicated below. These are not certified, but are given as additional information on the composition.

<u>Element</u>	<u>Concentration, % by weight</u>
Graphitic Carbon	(2.87)
Aluminum	(<0.006)
Arsenic	(0.02)
Boron	(<0.001)
Cobalt	(<0.005)