



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 690

#### Iron Ore Concentrate (Canada)

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

This Standard Reference Material (SRM) is in the form of powder (<0.1mm) for use in checking chemical methods of analysis and in calibration with instrumental methods of analysis. Results are given below and are based on samples that were dried for one hour at 105 °C.

Constituent	Total Fe	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	P	S	TiO <sub>2</sub>	MnO	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O
Certified <sup>1</sup> Value, % by wt.	66.85	3.71	0.18	0.011	0.003	0.022	0.23	0.20	0.18	0.003	0.0030
Estimated <sup>2</sup> Uncertainty	0.07	0.02	0.01	0.002	0.001	0.002	0.01	0.01	0.01	0.001	0.0005
Method <sup>3</sup>											
Labs	SnCl <sub>2</sub> K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	HClO <sub>4</sub> Dehydration	Atomic Absorption	Photometric	Combustion- Titration	Photometric	Atomic Absorption	Atomic Absorption	Atomic Absorption	Atomic Absorption	Atomic Absorption
A	<sup>a</sup> 66.91	<sup>b</sup> 3.70	0.17	<sup>c</sup> 0.009	<0.005	<sup>d</sup> 0.021	0.024	0.20	0.17	0.0026	0.0030
B	66.88	3.76	0.17	<sup>c</sup> 0.013	0.003	<sup>e</sup> 0.026	0.23	0.20	0.19	0.004	0.003
C	<sup>f</sup> 66.82	3.70	0.19	0.011	0.006	<sup>g</sup> 0.024	<sup>h</sup> 0.23	<sup>i</sup> 0.19	<sup>j</sup> 0.19	<sup>k</sup> 0.0023	<sup>l</sup> 0.0034
D	66.85	3.73	0.18	-----	-----	<sup>j</sup> 0.021	0.23	<sup>j</sup> 0.21	0.18	0.0028 0.0030	<sup>j</sup> 0.0029
E	66.83	<sup>m</sup> 3.69 3.73	<sup>k</sup> 0.20	0.009	0.002	<sup>g</sup> 0.022	0.24	0.21	0.18	0.002	0.003

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

<sup>2</sup>The estimated uncertainty is based on judgement and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability for samples of 0.5 g or more. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determinations.)

<sup>3</sup>A detailed description of many of the methods of analysis employed in the certification program for this SRM may be found in Part 12, Chemical Analysis of Metals and Metal Bearing Ores, Annual Book of ASTM Standards.

<sup>a</sup>H<sub>2</sub>S reduction.

<sup>b</sup>Sample fused in Na<sub>2</sub>CO<sub>3</sub>.

<sup>c</sup>Alkali-molybdate method.

<sup>d</sup>H<sub>2</sub>O<sub>2</sub> photometric method.

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

<sup>f</sup>Silver reductor.

<sup>g</sup>Chromotropic acid photometric method.

<sup>h</sup>Photometric method.

<sup>i</sup>Spectroscopic method.

<sup>j</sup>Flame emission spectrometry.

<sup>k</sup>Chromazurol S photometric method.

*This Certificate of Analysis has undergone editorial revision to reflect program and organizational changes at NIST and at the Department of Commerce. No attempt was made to reevaluate the certificate values or any technical data presented in this certificate.*

Gaithersburg, MD 20899

June 19, 1992

(Revision of Certificate dated 10-24-78)

(over)

William P. Reed, Chief  
Standard Reference Materials Program

PLANNING, PREPARATION, TESTING, ANALYSIS: The iron ore concentrate material for this SRM was prepared in final powder form, minus 74  $\mu\text{m}$  (200 mesh), by the Iron Ore Company of Canada, Labrador City, Newfoundland, Canada, through the courtesy of L. Rompre.

At NIST, the material was resieved and thoroughly blended.

Homogeneity testing of selected samples representative of the final lot was performed at NIST by R.K. Bell, Assistant Research Associate, ASTM/NIST Research Associate Program. The results for iron indicate that the material variability (0.5 g samples) is  $\leq$  the method imprecision.

Chemical analyses for certification were performed in the following laboratories:

- Bethlehem Steel Corporation, Homer Research Laboratories, Bethlehem, Pennsylvania, D.A. Flinchbaugh.
- Inland Steel Company, Indiana Harbor Works, East Chicago, Indiana, J.E. Joyce.
- Ledoux and Company, Teaneck, New Jersey, S. Kallman and C.L. Maul.
- National Institute of Standards and Technology, Inorganic Analytical Research Division, Gaithersburg, Maryland, T.C. Rains, T.J. Brady, J.D. Messman, T.A. Rush, and R.K. Bell, ASTM Assistant Research Associate.
- STELCO, The Steel Company of Canada, Ltd., Hilton Works, Hamilton, Ontario, Canada, O.P. Bhargava.

The overall direction and coordination of the technical measurements leading to certification were performed jointly by R.E. Michaelis, Standard Reference Materials Program, and by 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 W.P. Reed. Revision of the certificate was coordinated through the Standard Reference Materials Program by J.S. Kane.