



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 1223

#### Chromium Steel

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

This Standard Reference Material (SRM) is in the form of a disk, approximately 32 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick. The SRM is intended for use in calibrating optical emission and x-ray spectrometric methods of analysis.

<u>Element</u>	<u>Certified Value<sup>a</sup></u> <u>wt %*</u>	<u>Estimated Uncertainty<sup>b</sup></u>
Carbon	0.127	0.003
Copper	0.081	0.004
Chromium	12.64	0.03
Manganese	1.08	0.01
Molybdenum	0.053	0.001
Nickel	0.232	0.004
Phosphorus	0.018	0.001
Silicon	0.327	0.005
Sulfur	0.329	0.009
Vanadium	0.068	0.002

\* wt % = mg/kg x 10<sup>-4</sup>

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

<sup>b</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. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the analysis of most constituents.)

*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 on this certificate.*

Homogeneity testing was performed at NIST by optical emission spectrometric analysis by J.A. Norris, B.I. Diamondstone, and T.W. Vetter of the NIST Inorganic Analytical research Division and by R.K. Bell, ASTM-NIST Research Associate Program.

The technical and support aspects involved in the original preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by W.P. Reed. Revision of this certificate was coordinated through the Standard Reference Materials Program by P.A. Lundberg.

Gaithersburg, MD 20899  
May 26, 1993  
(Revision of certificate dated 9-5-85)

Thomas E. Gills, Acting Chief  
Standard Reference Materials Program

(over)

## PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was provided by the Republic Steel Corp. through the courtesy of R.W. Jones.

Cooperative analyses for certification were performed in the following laboratories:

Amax Materials Research Center, Ann Arbor, MI, R.C. Binns.

LTV Steel Co., Bar Division, Canton, OH; B. Pitts, J. Lawrence, and C. Myers.

National Institute of Standards and Technology, Inorganic Analytical Research Division, Gaithersburg, MD, B.I. Diamonstone, T.W. Vetter, and R.K. Bell, ASTM-NIST Research Associate Program.

The Timken Co., Canton, OH; N.J. Stecyk.

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 wt %</u>
Aluminum	(<0.005)
Calcium	(<0.0005)
Lead	(0.0001)
Magnesium	(<0.0005)
Tin	(0.004)
Nitrogen	(0.05)