



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 1295

#### Stainless Steel (SAE 405)

(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, intended for use in optical emission and x-ray spectrometric methods of analysis. Similar material for use in chemical methods of analysis is available in chip form as SRM 893.

<u>Element</u>	<u>Certified Value,<sup>1</sup></u> <u>% by wt.</u>	<u>Estimated</u> <u>Uncertainty<sup>2</sup></u>
Carbon <sup>a</sup>	0.027	0.002
Manganese <sup>b,c,d,e</sup>	0.387	0.007
Phosphorus <sup>c,d,e</sup>	0.022	0.002
Sulfur <sup>a</sup>	0.0003	0.0002
Silicon <sup>b,c,d,e,f</sup>	0.321	0.007
Copper <sup>b,c,d,e</sup>	0.260	0.006
Nickel <sup>b,c,d,e</sup>	0.194	0.006
Chromium <sup>a,g</sup>	13.52	0.05
Vanadium <sup>b,c,d</sup>	0.082	0.003
Molybdenum <sup>b,c,d,e</sup>	0.023	0.002
Cobalt <sup>b,c,d</sup>	0.020	0.001

<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. No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.

#### Methods/Techniques

a-Combustion-Infrared Detection  
b-Atomic Absorption Spectrometry  
c-Inductively-Coupled Plasma Spectrometry  
d-DC Plasma Spectrometry

e-X-ray Fluorescence Spectrometry  
f-Spectrophotometry  
g-Titrimetry

The overall coordination of the technical measurements leading to certification was 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.

Gaithersburg, MD 20899  
March 9, 1992

William P. Reed, Chief  
Standard Reference Materials Program

(over)

## PLANNING, PREPARATION, TESTING, ANALYSIS:

The material for this SRM was provided by Allegheny Ludlum Steel Corporation, Brackenridge, Pennsylvania.

Homogeneity testing was performed by J.A. Norris, T.W. Vetter, P.A. Pella and A.F. Marlow of the NIST Inorganic Analytical Chemistry Division.

Cooperative analyses for certification were performed in the following laboratories:

-Allegheny Ludlum Steel Corporation, Technical Center, Brackenridge, Pennsylvania, R.M. Crain, G.L. Bergstrom, T.W. Westernman and C.B. Farrell.

-Cytemp Specialty Steel, Cyclops, Corporation, Titusville, Pennsylvania, R. Gardiner, L. Carter, R. Ewing, C. Slater, B. Bronson, J. Reynolds, D. Lorenz and J. Guerra.

-National Institute of Standards and Technology, Gaithersburg, Maryland, T.W. Vetter, P.A. Pella and A.F. Marlow.

-Stelco Steel, Hilton Works, Hamilton, Ontario, Canada, O.P. Bhargava.

-Wymen-Gordon Company, Eastern Division, North Grafton, Massachusetts, K.D. Norlin.

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>	Concentration
	<u>% by wt.</u>
Aluminum	(0.20)
Antimony	(0.003)
Arsenic	(0.006)
Bismuth	(<0.0001)
Boron	(<0.0004)
Lead	(0.0001)
Niobium	(<0.0005)
Selenium	(<0.0001)
Tantalum	(<0.001)
Tellurium	(<0.0001)
Tin	(0.02)
Titanium	(0.01)
Tungsten	(0.002)