



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 1297

#### Stainless Steel (SAE 201)

(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 as SRM 895.

<u>Element</u>	<u>Certified Value,<sup>1</sup></u> <u>% by wt.</u>	<u>Estimated</u> <u>Uncertainty</u>
Carbon <sup>a</sup>	0.066	0.002
Manganese <sup>b,c,d</sup>	7.11	0.06
Phosphorus <sup>c,d,e,f</sup>	0.038	0.002
Sulfur <sup>a</sup>	0.0033	0.0003
Silicon <sup>b,c,d,e,f,g</sup>	0.397	0.004
Copper <sup>b,c,d,f</sup>	0.442	0.008
Nickel <sup>c,d,e,f,g</sup>	5.34	0.04
Chromium <sup>a,f,h</sup>	16.69	0.02
Vanadium <sup>b,c,d,f</sup>	0.080	0.003
Molybdenum <sup>b,c,d,e,f,g</sup>	0.331	0.008
Cobalt <sup>c,d</sup>	0.127	0.003

<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	e-Spectrophotometry
b-Atomic Absorption Spectrometry	f-X-ray Fluorescence Spectrometry
c-Inductively Coupled Plasma Spectrometry	g-Gravimetry
d-DC Plasma Spectrometry	h-Fe(NH <sub>4</sub> ) <sub>2</sub> (SO <sub>4</sub> ) <sub>2</sub> ·KMnO <sub>4</sub> Titration

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 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  
December 18, 1991

William P. Reed, Chief  
Standard Reference Materials Program

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#### PLANNING, PREPARATION, TESTING, ANALYSIS:

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

Homogeneity testing was performed at NIST by J.A. Norris, P.A. Pella and A.F. Marlow.

Cooperative analyses for certification were performed in the following laboratories:

·Allegheny Ludlum Steel Corporation, Technical Center, Brackenridge, Pennsylvania, R.M. Crain, G.L. Bergstrom, C.C. Gabrielli and T.W. Westerman.

·Armco Advanced Materials Corporation, Butler Works, Butler, Pennsylvania, E. Nowacki.

·Armco Research & Technology, Armco, Inc., Middletown, Ohio, C.C. Borland, H.P. Vail and D.E. Gillum.

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

·General Motors Research Laboratories, Warren, Michigan, N.M. Potter.

·Ledoux & Company, Teaneck, New Jersey, C.L. Maul, E.W. Hobart and J. Pacz.

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

·Elements other than those certified may be present in this material as indicated below:

<u>Element</u>	<u>Concentration % by weight</u>
Aluminum	(0.003)
Antimony	(0.002)
Arsenic	(0.005)
Bismuth	(<0.0001)
Boron	(<0.0003)
Lead	(<0.0001)
Niobium	(<0.009)
Selenium	(<0.0001)
Tantalum	(<0.001)
Tellurium	(<0.0001)
Tin	(<0.010)
Titanium	(<0.0004)
Tungsten	(0.03)