National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 893

Stainless Steel (SAE 405)

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

This Standard Reference Material (SRM) is in the form of chips sized between 0.50 and 1.18 mm (Sieve Nos. 35 and 16). It is intended for use primarily in chemical methods of analysis. Similar material for use in spectrometric methods of analysis is available in disk form as SRM 1295.

Element	Certified Value[1] % by wt.	Estimated Uncertainty[2]
Carbon[a]	0.027	0.002
Manganese[b,c,d]	0.378	0.006
Phosphorus[c,d]	0.022	0.003
Sulfur[a]	0.0003	0.0002
Silicon[b,c,d,e]	0.326	0.002
Copper[b,c,d]	0.261	0.007
Nickel[b,c,d]	0.192	0.002
Chromium[f]	13.55	0.02
Vanadium[b,c,d,e]	0.080	0.001
Molybdenum[b,c,d]	0.023	0.005
Cobalt[c,d]	0.020	0.001

[1]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.

[2]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-Spectrophotometry
f-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

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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 by J.A. Norris and T.W. Vetter 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. Westerman, 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. Gerra.

-National Institute of Standards & Technology, Gaithersburg, Maryland, T.W. Vetter.

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

-Wyman-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.

Element	Concentration % by wt.
Aluminum	(0.20)
Antimony	(0.003)
Arsenic	(0.003)
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)