U.S. Department of Commerce
Juanita M. Kreps
Secretary

National Bureau of Standards
Ernest Ambler, Acting Director

National Bureau of Standards Certificate of Analysis

Standard Reference Material 1267

Stainless Steel (AISI 446)

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

This Standard is in the form of annealed disks, 32 mm (1 1/4 in) in diameter and 12.7 mm (1/2 in) thick, intended for use in optical emission and x-ray spectrometric methods of analysis.[1]

Constituent	C	Mn	P	S	Si	Cr	V	N	Ni
Certified Value, % by wt.[2]	0.093	0.315	0.018	0.015	0.58	24.14	0.08	0.17	0.29
Estimated Uncertainty[3]	0.002	0.005	0.001	0.001	0.01	0.05	0.01	0.01	0.02
Method / Lab	Combustion-Infrared	Persulfate-Arsenite	Photometric	Combustion-Infrared	Perchloric Acid Dehydration				Gravimetric
1	0.095	0.319	0.018	0.015	[a]0.59	[b]24.14	[c]0.08	[d]0.174	0.31
2	.085	[e].320	.019	.016	.59	[f]24.14	—	[d] .167	[g].28
3	.094	.31	[h].018	.018	.56	[i]24.21	—	[d] .172	—
4	.091	[j].311	.019	.014	[a] .57	24.13	—	[k] .158	—
5	.094	—	—	.014	—	[l]24.14	[m] .08	—	.28

[1]This material also is available in the form of chips, SRM 367, intended for use in chemical methods of analysis.

[2]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.

[3]The estimated uncertainty includes method imprecision, bias among methods, and material variability for samples 1.0 g or more.

[a]Double dehydration.

[b]Perchloric acid oxidation, potentiometric titration with standard $Fe(NH_4)_2(SO_4)_2$.

[c]Spectrochemical.

[d]Inert gas fusion - chromatographic.

[e]KIO_4 photometric method.

[f]Peroxydisulfate oxidation, titration with $FeSO_4$-$K_2Cr_2O_7$.

[g]Photometric.

[h]Color complex extracted with isobutyl alcohol.

[i]Perchloric acid oxidation, titration with $FeSO_4$-$KMnO_4$.

[j]Chromium separated with ZnO.

[k]Inert gas fusion - thermal conductivity.

[l]Peroxydisulfate oxidation, potentiometric titration with standard $Fe(NH_4)_2(SO_4)_2$.

[m]Nitric acid oxidation, potentiometric titration with standard $Fe(NH_4)_2(SO_4)_2$.

Washington, D.C. 20234
January 19, 1978

J. Paul Cali, Chief
Office of Standard Reference Materials

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PLANNING, PREPARATION, TESTING, ANALYSIS: For many metal SRM's, it is desirable to make the material available in the form of chips primarily for chemical methods of analysis, and solids primarily for optical emission and x-ray spectrochemical methods of analysis. Prior to the preparation of SRM 367 (chip form) plans were also made to provide this material as SRM 1267 (solid form).

The material for this standard was provided by the Armco Steel Corporation, courtesy of J. F. Woodruff, in the form of corner-rounded billets approximately 100 mm (4 in) in diameter. At NBS these were lathe cut to a diameter of about 38 mm (1 1/2 in) to provide chips for SRM 367. The remaining cores were processed at the Naval Research Laboratory to the final solid size by forge rolling, annealing, and centerless grinding for SRM 1267.

Homogeneity testing was performed at NBS by S. A. Wicks. The material variability was determined to be within the method imprecision.

Cooperative analyses for certification were performed in the following laboratories:

Lukens Steel Company, Coatesville, Pa., J. H. Morris.

National Bureau of Standards, Analytical Chemistry Division, Washington, D.C., S. A. Wicks, Tsai S. M. Lee, Visiting Scientist, Instituto de Pesquisas Technológicas, Sáo Paulo, Brazil, and R. K. Bell, ASTM Assistant Research Associate.

Standard Steel, Burnham, Pa., J. E. Metzger.

United States Steel Corporation, Research Laboratory, Monroeville, Pa., J. D. Selvaggio, R. W. Cline, F. J. Campbell, J. B. Ferons, H. R. Frisbie, D. T. Glaser, W. T. Harter, and H. S. Karp.

Universal-Cyclops Specialty Steel Division, Cyclops Corporation, Titusville, Pa., A. J. Mirarchi.

The overall coordination of the technical measurements leading to certification were performed under the direction of J. I. Shultz, Research Associate, ASTM-NBS Research Associate Program.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.