National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 364

High-Carbon Steel (Modified)

This Standard Reference Material (SRM) is in the form of chips sized between 16 and 35 mesh sieves. It is intended for use in chemical methods of analysis.

Element	wt %*	Element	wt %*
Carbon	0.87	Niobium	0.15_7
Manganese	0.25_5	Tantalum	0.11
Phosphorus	0.01	Boron	0.0106
Sulfur	0.0250 ± 0.0003^a	Lead	0.023_0
Silicon	0.06_5		
Copper	0.24_9	Zirconium	0.068
Nickel	0.14_4	Antimony	0.034
Chromium	0.06_3	Gold	0.0001
Vanadium	0.10_5	Calcium	0.00003
Molybdenum	0.49	Magnesium	0.00016
Tungsten	0.10	Cerium	0.0005_7
Cobalt	0.15	Neodymium	0.0001_8
Titanium	0.24		
Arsenic	0.05_2		
Tin	0.008		

*wt % = mg/kg x 10^{-4}

[a]Sulfur certification is based on results of SSMS-ID at NIST, and on results of IDMS at JAERI.

Certification: The value listed for a certified element is the *present best estimate* of the "true" value based on the results of the cooperative analytical program. The value listed is not expected to deviate from the true value by more than $\pm$ 1 in the last significant figure reported; for a subscript figure, the deviation is not expected to be more than $\pm$ 5.

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.

The overall direction and coordination of the technical measurements at NIST leading to certification were performed under the direction of O. Menis, B.F. Scribner, J.I. Shultz, and J.L. Weber, Jr.

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

Gaithersburg, MD 20899
May 17, 1993
(Revision of certificate dated 2-24-81)

Thomas E. Gills, Acting Chief
Standard Reference Materials Program

(over)

PLANNING, PREPARATION, TESTING, ANALYSIS: Material from the same melt is available in a variety of forms to serve in checking methods of analysis and in calibrating instrumental techniques.

The material for this standard was vacuum melted and cast at the Carpenter Technology Corporation, Reading, PA, under a contract with the National Institute of Standards & Technology. The contract was made possible by a grant from the American Iron and Steel Institute.

The ingots were processed by Carpenter Technology Corp. to provide material of the highest possible homogeneity. Following acceptance of the composition based on NIST analyses, selected portions of the ingot material were extensively tested for homogeneity at NIST by D.M. Bouchette, S.D. Rasberry, and J.L. Weber, Jr. Only that material meeting a critical evaluation was processed to the final forms.

Chemical analyses for certification were performed in the analytical laboratories of Ford Motor Co., Dearborn, MI, G.A. Nahstoll; Kawecki Berylco Industries, Inc., Boyertown, PA, F.T. Coyle; and Lukens Steel Co., Coatesville, PA, J.H. Morris and J. Scott.

Analyses were performed in the NIST Analytical Chemistry Division by the following: R.K. Bell, T.E. Gills, E.J. Maienthal, S.D. Rasberry, B.S. Thompson, and S.A. Wicks.

SUPPLEMENTAL INFORMATION

Certification is made only for the elements indicated. This standard contains 40 elements and information on the elements not certified may be of importance in the use of the material. Although these are not certified upper limit values are presented in the following tables for the remaining elements.

Value from a single laboratory

Element	wt %	Element	wt %
Aluminum (total)	(0.0080)	Praseodymium	(0.0001)
Bismuth	(0.009)	Hafnium	(0.0013)
Silver	(0.00002)	Nitrogen	(0.0032)
Selenium	(0.00021)	Oxygen	(0.0010)
Tellurium	(0.0002)	Hydrogen	(<0.0005)
Lanthanum	(0.0002)		
Strontium	(0.001)		
Iron (By difference)	(96.7)		

Approximate value from heat analysis

Zinc	[0.001]
Germanium	[0.003]