National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 1262a

AISI 94B17 Steel (Modified)

This Standard Reference Material (SRM) is in the form of a disk 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 analysis.[a]

Element	Percent by Weight	Element	Percent by Weight
Carbon	0.16_3	Aluminum (total)	0.083
Manganese	1.05	Niobium	.30
Phosphorus	0.044	Tantalum	.21
Sulfur	.037	Boron	.0025
Silicon	.40	Lead	$.0004_3$
Copper	.51	Zirconium	.20
Nickel	.60	Antimony	$.012_0$
Chromium	.30	Silver	.0011
Vanadium	$.04_1$	Calcium	.00014
Molybdenum	$.07_0$	Magnesium	.00062
Tungsten	.20	Tellurium	.0011
Cobalt	.30	Cerium	.0015
Titanium	.097	Lanthanum	.0004
Arsenic	$.09_5$	Neodymium	$.0006_4$
Tin	.016		

[a] This material also is available in the form of chips, SRM 362, for use in chemical methods of analysis; rods, SRM 1096, 6.4 mm (1/4 in) in diameter and 102 mm (4 in) long for the determination of gases in metals by vacuum fusion and neutron activation methods of analysis; and rods, SRM 662, 3.2 mm (1/8 in) in diameter and 51 mm (2 in) long for application in microchemical methods of analysis such as electron probe microanalysis, spark source mass spectrometric analysis, and laser probe analysis.

CERTIFICATION: The value listed for a certified element is the present best estimate of the "true" value based on the results of the analytical program. The value listed is not expected to deviate from the "true" value by more than ± 1 in the last significant figure reported; for a subscript figure, the deviation is not expected to be more than ± 5. Based on the results of homogeneity testing, maximum variations within and among samples are estimated to be less than the uncertainty figures given above.

Renewals of the "1200 series", 1261a-1265a, were prepared from the same ingots used for the original series, but from adjacent positions within the ingots. Little or no change in elemental composition was observed by comparison analysis utilizing several analytical techniques: optical emission spectrometric analysis, J.A. Norris and D.E. Brown; x-ray fluorescence analysis, P.A. Pella and J.R. Sieber, combustion-infrared, B.I. Diamondstone.

June 27, 1989
Gaithersburg, MD 20899
(Revision of certificate dated 2-24-81)

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

(over)

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

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.

PLANNING, PREPARATION, TESTING, ANALYSIS: This standard is one of five replacements for the original eight 1100 series iron and steel SRM's. 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, Pennsylvania, 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 Corporation 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 J.R. Baldwin, D.M. Bouchette, S.D. Rasberry, and J.L. Weber, Jr. Only that material meeting a critical evaluation was processed to the final sizes.

Chemical analyses for certification were made on composite samples representative of the accepted lot of material.

Cooperative analyses for certification were performed in the analytical laboratories of Allegheny Ludlum Steel Corporation, Research Center, Brackenridge, Pennsylvania, R.B. Fricioni; Inland Steel Company, East Chicago, Indiana, R.W. Bley and J.E. Joyce; Republic Steel Corporation, Canton, Ohio, R.W. Jones; and the Youngstown Sheet and Tube Company, Youngstown, Ohio, L. E. Chalker.

Analyses were performed in the Analytical Chemistry Division of the National Institute of Standards & Technology by the following: J.R. Baldwin, R.K. Bell, R.W. Burke, D.M. Bouchette, B.S. Carpenter, T.E. Gills, G.J. Lutz, L.A. Machlan, E.J. Maienthal, L.T. McClendon, J. McKay, L.J. Moore, T.J. Murphy, P.J. Paulsen, T.C. Rains, S.D. Rasberry, B.A. Thompson, J.L. Weber, Jr., and S.A. Wicks.

ADDITIONAL INFORMATION ON THE COMPOSITION: Certification is made only for the elements indicated. The five replacements, however, contain a graded series for 40 elements and information on the elements not certified may be of importance in the use of the material. Although these are not certified, values are presented in the following table for the remaining elements.

Value from a single method of analysis:

Element	Percent by Weight	Element	Percent by Weight
Bismuth	(0.002)	Hafnium	(0.0003)
Gold	(<.00005)	Nitrogen	(.00404)
Selenium	(.0012)	Oxygen	(.00107)
Zinc	(.0005)	Hydrogen	(<.0005)
Praseodymium	(.00012)	Strontium	[b]–(<.0005)
		Iron (by difference)	(95.3)

[b] Dash indicates "not detected." Value in parenthesis following the dash is the conservative "upper limit" of detection.

Approximate value from heat analysis:

Germanium [0.002]