U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 650

Unalloyed Titanium A

(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 openings (35 and 16 mesh). It is intended for use primarily in chemical methods of analysis.

Constituent	Certified Value[1] Percent by Weight	Estimated[2] Uncertainty
Aluminum	<0.01	- - -
Iron	.024	0.004
Tin	.03	.02
Chromium	.002	.001
Silicon	.004	.002
Vanadium	.009	.001
Molybdenum	.002	.001
Manganese	.016	.002
Nickel	.003	.001
Magnesium	<.001	- - -
Tungsten	1.55	.06
Copper	0.033	.003

[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.)

The overall coordination of the technical measurements leading to certification was 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. Alvarez, R.E. Michaelis, and W.P. Reed.

Gaithersburg, MD 20899
November 18, 1985

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

(Over)

PLANNING, PREPARATION, TESTING, ANALYSIS:

The material for this SRM was provided to NBS as a result of an Industry-Government program for the preparation of composition standards of titanium base alloys, and is intended for use primarily in chemical methods of analysis.

Following homogeneity testing, samples were sent to the following laboratories for cooperative analysis for certification.

Analytical Associates, Inc., Detroit, Michigan, C.K. Deak.

Ledoux & Company, Teaneck, New Jersey, S. Kallmann and C.L. Maul.

National Bureau of Standards, Inorganic Analytical Research Division, R.M. Lindstrom and G.J. Lutz.

Oremet Titanium, Oregon Metallurgical Corp., Albany, Oregon, A.D. Fryer.

Shieldalloy Corp., Newfield, New Jersey, E. Stuve.

Teledyne, Wah Chang Albany, Albany, Oregon, J.H. Schlewitz and G.L. Beck.

Timet, Henderson Technical Laboratory, Henderson, Nevada, G.F. Boesenecker.

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 Weight
Antimony	(0.0005)
Barium	(<.005)
Boron	(<.001)
Calcium	(<.001)
Cerium	(<.0001)
Cesium	(<.0001)
Cobalt	(<.0001)
Lead	(<.01)
Rubidium	(<.0001)
Scandium	(<.0001)
Selenium	(<.0002)
Strontium	(<.01)
Thorium	(<.0001)
Uranium	(<.0001)
Zinc	(<.0005)
Zirconium	(<.01)
Carbon	(.01)
Nitrogen	(.01)