

# National Bureau of Standards

## Certificate of Analysis

### Standard Reference Material 865

#### Inconel 625

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

This Standard Reference Material (SRM) is in the form of chips and is intended for use in chemical methods of analysis.

<u>Constituent</u>	<u>Percent, by Weight<sup>1</sup></u>	<u>Estimated Uncertainty<sup>2</sup></u>
Carbon	0.037	0.003
Manganese	.18	.01
Phosphorus	.012	.003
Sulfur	.001	*
Silicon	.41	.01
Copper	.36	.01
Nickel	59.5	.2
Chromium	21.9	.1
Aluminum	0.21	.02
Titanium	.28	.02
Cobalt	.072	.004
Boron	<.001	---
Niobium	3.5	.1
Tantalum	<0.01	---
Molybdenum	8.6	.1
Iron	4.5	.1

NOTE: Inconel is a registered Inco, Ltd., trademark.

<sup>1</sup>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.

<sup>2</sup>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 estimated uncertainty for this value includes the range 0.002 to 0.0005 % sulfur.

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 and W.P. Reed.

## PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was provided and prepared by Huntington Alloys, Inc., Huntington, West Virginia.

Homogeneity testing was performed at NBS: optical emission analysis, J.A. Norris; x-ray fluorescence analysis, P.A. Pella; chemical analysis, D.E. Brown, B.I. Diamondstone, and R.K. Bell, ASTM-NBS Research Associate.

Cooperative analyses for certification were performed in the following laboratories:

Allegheny Ludlum Steel Corporation, Flat Rolled Products Division, Brackenridge, PA, C.W. Hartig, R.M. Chybrzynski, and A.I. Fulton.

Carpenter Technology Corporation, Reading, PA, T.R. Dulski.

Huntington Alloys, Inc., Huntington, WV, R.L. Blake, D.A. Damron, D.E. Howells, M. Kirk, L.J. Lundy, R.D. Laishley, G.T. Marshall, A.H. Roberts, K.S. Roberts, F.H. Robinson, W.L. Stickler, and F.A. Blair.

Laboratoire National D'Essais, Service des Matériaux de Référence, Paris, France, A. Marschal.

National Bureau of Standards, Inorganic Analytical Research Division, B.I. Diamondstone, D.E. Brown, R.M. Lindstrom, M.S. Epstein, E.S. Beary, K.A. Brletic, and R.K. Bell, ASTM-NBS Research Associate Program.

Pratt & Whitney Aircraft Group, Commercial Products Division, Materials Engineering & Research Laboratory; Middletown, CT, J.Y. Marks, G. Welcher, and D. Fornwall.

Pratt & Whitney Aircraft Group, Materials Control Laboratory, East Hartford, CT, R. Spellman.

United Technologies Corporation, East Hartford, CT, G.S. Golden.

Universal-Cyclops Specialty Steel Division, Bridgeville Plant, Bridgeville, PA, F.F. Liberato, W.S. Harbin, S.J. Staron, and S.L. Kelley.

Universal-Cyclops Specialty Steel Division, Titusville Plant, Titusville, PA, D.K. Luoni, and R. Hall.

Wyman Gordon Co., North Grafton, MA, H. Ackermann.

Elements other than those certified are present in this material as indicated below. These are not certified, but are given as additional information on the composition.

<u>Element</u>	<u>Percent, by Weight</u>
Bismuth	(<0.0001)
Lead	( .0001)
Selenium	(< .0001)
Silver	( .0002)
Tellurium	(< .0001)
Thallium	(< .0001)
Vanadium	( .019 )
Arsenic	( .002 )
Gallium	( .012 )
Tungsten	( .007 )
Oxygen	( .004 )
Nitrogen	( .066 )