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 C1248

Nickel-Copper Alloy (66Ni-30Cu)

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

This Standard Reference Material (SRM) is in the form of a disk approximately 32 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick, intended for use in optical emission and x-ray fluorescence spectrometric methods of analysis.

Constituent	Certified Value,[1] Percent by Weight	Estimated Uncertainty[2]
Carbon	0.266	0.003
Manganese	.31	.01
Phosphorus	.002	.001
Sulfur	.0008	.0002
Silicon	1.61	.02
Copper	29.80	.04
Nickel	65.75	.05
Chromium	0.095	.002
Molybdenum	.006	.001
Iron	2.10	.02
Aluminum	0.009	.001
	μg/g	μg/g
Zinc	3	1
Lead	3.8	0.1
Tin	1.1	.1

[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.)

Metallurgical Condition: The specimens were chill cast by a rapid unidirectional solidification technique.

Certified Portion: The certified portion for each specimen is that extending upward 16mm (5/8) from the chill cast or test surface (the largest surface opposite the numbered surface). Only this portion was analyzed in the cooperative program for certification.

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 W.P. Reed.

December 16, 1986
Gaithersburg, MD 20899
(Revision of Certificate
dated 7-31-86)

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

(over)

PLANNING, PREPARATION, TESTING, ANALYSIS:

The material for this SRM was prepared and processed at Esco Corporation, Portland, Oregon under an NBS cooperative program with the Steel Founders' Society of America. Homogeneity testing was performed at NBS by optical emission spectrometric analysis, J.A. Norris; by x-ray fluorescence analysis, P.A. Pella, and by chemical analysis by B.I. Diamondstone and R.K. Bell.

Several specimens indicated slight variability between the chill face and a position (13 mm (l/2 in)) above the chill face. Differences varied from element to element and among samples; however, most elements are within the estimated uncertainty. Carbon may vary by 0.0l percent and iron by 0.03 percent.

Composite samples for chemical analysis were prepared in the form of millings cut from specimens representative of the entire lot of material.

Cooperative analyses for certification were performed in the following laboratories:

- Carpenter Technology Corporation, Carpenter Steel Division, Reading, Pa., T.R. Dulski.

- General Dynamics, Electric Boat Division, Groton, Conn., E.H. Frank.

- General Motors Research Laboratories, Warren, Mich., L.L. Lewis, M.P. Balogh, P.M. Hanley and N.M. Potter.

- Huntington Alloys, Huntington, W.Va., F.A. Blair.

- KBI, Division of Cabot Corporation, Boyertown, Pa., F.T. Coyle.

- National Bureau of Standards, Inorganic Analytical Research Division, Gaithersburg, MD, B.I. Diamondstone, T.W. Vetter, R.K. Bell, K.W. Pratt, E.S. Beary, I.L. Barnes, D.A. Becker, and P.J. Paulsen.

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
V	(<0.001)
Co	(.03-.04)
Mg	(.003)
Ti	(.002)