



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material® 349a

#### Waspaloy

(In Cooperation with the ASTM)

One unit of Standard Reference Material (SRM) 349a consists of 150 g of material in the form of chips sized between 0.50 mm and 1.18 mm sieve openings (35 mesh and 16 mesh) respectively. It is intended primarily for use in chemical methods of analysis. Material from the same lot is available in disk form as SRM 1243 for use in optical emission and x-ray spectrometric methods of analysis.

The certified concentration values for 16 elements are listed in Table 1. All values are expressed as mass fractions [1]. Non-certified values for two elements are listed in Table 2.

Table 1. Certified Mass Fractions

Element	(%)	Element	(%)
Aluminum	1.23 ± 0.05	Molybdenum	4.25 ± 0.05
Boron	0.005 ± 0.001	Nickel	58.1 ± 0.1
Carbon	0.035 ± 0.003	Phosphorus	0.003 ± 0.001
Chromium	19.3 ± 0.1	Silicon	0.018 ± 0.002
Cobalt	12.46 ± 0.08	Sulfur	0.0024 ± 0.0006
Copper	0.007 ± 0.001	Titanium	3.06 ± 0.07
Iron	1.15 ± 0.04	Vanadium	0.12 ± 0.02
Manganese	0.019 ± 0.002	Zirconium	0.053 ± 0.003

The certified value listed for a constituent is the present best estimate of the "true" value based on the results of the NIST (formerly NBS) Cooperative Program for Certification. 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 for samples of 0.5 g or more. No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.

The overall direction and coordination of the technical measurements leading to certification were performed under the direction of J.I. Shultz, Research Associate, ASTM-NIST Research Associate Program.

The technical and support aspects involved in the original preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by W.P. Reed.

*This Certificate of Analysis has undergone editorial review by C.M. Beck II of the Standard Reference Materials Program 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.*

Gaithersburg, MD 20899  
Certificate Issue Date: January 7, 1997\*  
6/5/87 (original certificate date)  
\*Editorial Revision

Thomas E. Gills, Chief  
Standard Reference Materials Program

## PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was provided by Carpenter Technology Corporation, Reading, PA.

Homogeneity testing was performed at NIST by J.A. Norris, T.W. Vetter, and R.C. Gauer, Inorganic Analytical Research Division.

Cooperative analyses for certification were performed in the following laboratories:

Allegheny Ludlum Steel Corp., Analytical Services, Brackenridge, PA, R.M. Crain, G.L. Bergstrom and C.M. Bottegal.

Crucible Materials Corp., Specialty Metals Division, Syracuse, NY, R.J. Wlodarczyk.

Crucible Materials Corp., Research Center, Pittsburgh, PA, G.L. Vassilaros and C.J. Byrnes.

Cytemp Specialty Steel Division, Cyclops Corp., Titusville, PA, F.F. Liberato and D.K. Luoni.

General Electric Co., Cleveland, OH, J.W. Fulton.

Ladish Co. Inc., Cudahy, WI, G. Bugalski and J.E. Rafalski.

National Institutes of Standards and Technology, Inorganic Analytical Research Division, R.C. Gauer.

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

Table 2. Non-Certified Mass Fractions

Element	(%)
Niobium	0.05
Tungsten	0.06

## REFERENCE

- [1] Taylor, B.N., "Guide for the use of the International System of Units (SI)," NIST Special Publication 811, 1995 Ed., (April 1995).