

National Bureau of Standards

Certificate of Analysis

Standard Reference Materials 1197, 1198, 1199, 1200, 1201

High Temperature Alloys

M308, Incoloy 901, L605, S816 and Hastelloy X

These standards are in the form of disks 31 mm (1 1/4 in) in diameter and 6.3 mm (1/4 in) thick, primarily for use in x-ray spectrometric analysis.

SRM Alloy Type	1197 M308	1198 Incoloy 901	1199 L605	1200 S816	1201 Hastelloy X
<u>Element</u>	<u>Percent by Weight</u>				
Carbon	(0.045) ^a	(0.048)	(0.14)	(0.40)	(0.039)
Manganese	(.047)	(.49)	1.42	1.34	--
Phosphorus	(.008)	(.006)	(.005)	(.015)	(.008)
Sulfur	(.002)	(.002)	--	--	--
Silicon	(.13)	(.38)	0.83	0.86	(.54)
Chromium	12.9	12.9	19.9	19.9	20.7
Nickel	32.6	40.1	10.2	20.0	45.7
Cobalt	(0.07)	0.70	51.6	42.0	0.56
Molybdenum	3.2 ₅	6.0 ₈	(<0.02)	4.0 ₀	9.1 ₈
Tungsten	6.0 ₈	(0.2)	15.4	3.86	(0.15)
Niobium	(<0.02)	(<.02)	(<0.02)	3.1 ₈	(<.02)
Titanium	2.32	2.59	(<.01)	(0.03)	(<.01)
Aluminum	0.41	0.24	--	--	--
Iron	41.9	36.2	.6 ₅	3.19	23.2
Copper	--	(0.012)	--	--	--
Tantalum	--	--	--	1.08	--
Boron	(0.0059)	(.0064)	--	--	--
Zirconium	.15	(.014)	--	--	--
Total	(99.9)	(100.0)	(100.1)	(100.0)	(100.1)

^a Values in parenthesis are not certified but are provided for additional information on the composition.

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.

Washington, D.C. 20234
 August 17, 1974

J. Paul Cali, Chief
 Office of Standard Reference Materials

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PREPARATION, TESTING, ANALYSIS: The material for each standard was vacuum melted and cast into ingot form and processed at Allvac Metals Company, Monroe, N. C. Each ingot was processed by forging to a slab having one dimension of the cross section about four times that of the other dimension. After cropping top and bottom, about 1/4 of the slab at the center was cut lengthwise to discard (corresponding to the center of the original ingot.) The two retained slab portions were hot rolled to oversized rods, annealed, and centerless ground to size.

Extensive homogeneity testing was performed at NBS and by a task group of Subcommittee V, ASTM Committee E2 on Emission Spectroscopy. Only that material meeting a critical evaluation was selected for certification.

Cooperative analyses for certification were performed in the analytical laboratories of the Carpenter Technology Corporation, Research and Development Center, Reading, Pa., A. L. Sloan; Ladish Company, Cudahy, Wisc., F. J. Kohls and J. Rafalski; Pratt and Whitney Aircraft, Division of United Aircraft Corporation, Hartford, Conn., O. H. Kriege and J. Marks; Sundstrand Aviation, Rockford, Ill., F. Carriglitto and J. Edwards; and United Aircraft Research Laboratories, Hartford, Conn., G. S. Golden.

Analyses were performed in the Analytical Chemistry Division, National Bureau of Standards by R. K. Bell, R. W. Burke, and S. A. Wicks.

The overall direction and coordination of the technical measurements at NBS leading to certification were performed under the direction of O. Menis and J. I. Shultz.

The technical and support aspects involved in the preparation, certification, and issuance of these SRM's were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.