

U. S. DEPARTMENT OF COMMERCE
 WASHINGTON 25, D. C.
 NATIONAL BUREAU OF STANDARDS
 PROVISIONAL CERTIFICATE OF ANALYSIS
 HIGH-TEMPERATURE ALLOY STANDARDS
 FOR
 OPTICAL EMISSION AND X-RAY FLUORESCENCE ANALYSIS

NBS No. ^{1/}	1184	1185	1187	1189
Designation	19-9DL	AMS 5360A AISI 316	AMS 5376A Multimet (N-155)	Nimonic 80a
Element	Percent			
C	0.25	0.11	0.040	0.041
Mn	1.04	1.22	1.28	.81
Si	0.70	0.40	0.94	.92
Cr	19.44	17.09	21.62	20.30
Ni	9.47	13.18	20.26	72.60
Co	-- ^{2/}	--	20.80	0.06
Mo	1.46	2.01	3.41	--
W	1.39	--	2.40	--
Nb	0.49	<0.001	1.28	--
Ti	.056	<0.001	<0.001	2.52
Al	--	--	--	1.21
Fe	--	--	27.4	1.40
P	0.015	0.019	0.011	--
S	.012	.016	--	--
Cu	--	.067	--	--
Ta	.022	<0.001	.04	--

^{1/} Size: Disks 1 1/4 in. in diameter and 3/4 in. thick.

^{2/} Dashes indicate elements not certified.

OVER

The material for each standard was obtained from Cannon-Muskegon; it had been air-melted to nominal composition and chill-cast into small ingots. This material was remelted and recast under argon at the National Bureau of Standards into a single ingot. Each ingot was processed at the Naval Gun Factory by forging to a slab having one dimension of the cross section four times that of the other dimension. After cropping top and bottom, one fourth 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 oversize rods and centerless ground to size.

Homogeneity of the standards was investigated by optical emission, X-ray fluorescence, and chemical analyses at the National Bureau of Standards both in slab form and in finished sample form and was found satisfactory for the elements certified.

Samples for chemical analysis were prepared by milling the cross section of the finished rods. Chemical analyses were made by the National Bureau of Standards, Washington, D. C.; Allegheny Ludlum Steel Corp., Brackenridge, Pa.; Armco Steel Corp., Research Labs., Middletown, Ohio; Driver-Harris Co., Harrison, N. J.; Haynes Stellite Co., Kokomo, Ind.; The International Nickel Co.; Huntington, W. Va.; Ledoux and Co., Teaneck, N. J.; Watertown Arsenal, Watertown, Mass.; and Wilbur B. Driver Co., Newark, N. J.

Additional high-temperature alloy standards are in preparation and announcements of availability for these and other standards will appear in the technical literature.

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