

# Certificate of Analysis

## Standard Reference Material 1156

### Maraging Steel

SRM 1156, Maraging Steel, derives its name from the formation of martensite on age hardening. This SRM is issued in disk form for application in optical emission and x-ray fluorescence methods of analysis.

	<i>Percent</i>
Carbon -----	0.023
Manganese -----	.21
Phosphorus -----	.011
Sulfur -----	.012
Silicon -----	.184
Copper -----	.025
Nickel -----	19.0
Chromium -----	0.20
Molybdenum -----	3.1
Boron -----	0.003
Titanium -----	.21
Cobalt -----	7.3
Zirconium -----	0.004
Aluminum -----	.047
Calcium -----	<.001

Washington, D.C. 20234  
August 26, 1981  
(Revision of Certificate dated  
4-5-66)

George A. Uriano, Chief  
Office of Standard Reference Materials

(over)

*Size and Metallurgical Conditions:* Samples are 1¼ inch in diameter and ¾ inch thick. They are issued in the annealed condition.

*Material* for the Standard was melted and cast at the Allegheny Ludlum Steel Corporation and sponsored by the International Nickel Company. The single ingot was processed by forging to a slab having one dimension of the cross section four times that of the other dimension. After cropping top and bottom, 15 and 5 percent respectively, the slab was cut lengthwise and the center section corresponding to one-fourth of the original ingot was discarded. The two slab portions were hot rolled to oversize rods and, after annealing, were centerless ground to size.

*Homogeneity testing* was performed by optical emission and x-ray spectrochemical analyses at the National Bureau of Standards by D. M. Bouchette and was found satisfactory for the elements certified.

*Chemical analyses* were made on millings cut from the cross section of the rods by R. K. Bell, E. R. Deardorff, E. J. Maienthal, B. B. Bendigo, R. W. Burke, R. J. Hall, T. C. Rains, and K. M. Sappenfield, Division of Analytical Chemistry, Institute for Materials Research, National Bureau of Standards; P. T. Eismont, Duquesne Works, United States Steel Corp.; L. R. Scharfstein and A. L. Sloan, The Carpenter Steel Co., Reading, Pa.; and C. H. Albright, The International Nickel Co., Inc., Suffern, New York.