

# National Bureau of Standards Certificate of Analysis Standard Reference Material 1212a<sup>1/</sup> Zirconium Metal C

This standard, in the form of disks 31 mm (1 1/4 in) in diameter and 9.5 mm (3/8 in) thick, is intended mainly for use in optical emission and x-ray spectrometric analysis.

Element	Recommended Value	Range of Values
		Reported by Laboratories
Concentration in percent by weight		
Carbon	0.28	0.27 – 0.29
Chromium	.063	.061 – .064
Copper	.015	.014 – .017
Iron	.071	.070 – .073
Manganese	.030	.028 – .033
Molybdenum	.012	.011 – .013
Nickel	.043	.040 – .048
Nitrogen	.012	.012 – .013
Silicon	.035	.032 – .039
Titanium	.015	.014 – .016
Tungsten	.014	.012 – .017
Uranium	.010	.008 – .013

<sup>1</sup> Difficulty was encountered in fabricating this high residual element content material and SRM 1212 was not issued. SRM 1212a is in short supply, but it has been well characterized and, therefore, is being made available. The sample thickness, however, has been reduced from the normal size of 19 mm (3/4 in) to 9.5 mm (3/8 in). For application in optical emission analyses, specimens of this SRM should be bonded in accordance with ASTM Designation E 401-70 "Recommended Practice for Bonding Thin Spectrochemical Samples and Standards to a Greater Mass of Material" (copy attached).

**PREPARATION, TESTING, ANALYSIS:** The material for this standard was provided by the U. S. Atomic Energy Commission. The sponge, together with suitable additions, was triple arc-melted in vacuum by the Albany, Oregon, Station of the U. S. Bureau of Mines. The molten metal was poured from a skull into a graphite mold to form a single ingot, the casting also being done under vacuum.

Washington, D.C. 20234  
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J. Paul Cali, Chief  
Office of Standard Reference Materials

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After cropping top and bottom, the ingot was cut lengthwise to remove the center section (approximately one-fourth of the ingot) which was also discarded. The remaining sections then were fabricated to rods, annealed, and centerless ground to 31 mm (1 1/4 in) in diameter.

Homogeneity testing was performed by spectrochemical and chemical analyses at the National Bureau of Standards, Washington, D. C.. and by the following cooperating laboratories:

Columbia-National Corp., Pensacola, Fla.  
Reactive Metals Inc., Ashtabula, Ohio  
Westinghouse Electric Corp., Bettis Plant, Pittsburgh, Pa.

Chemical analyses, and spectrochemical analyses relative to carefully prepared synthetic standards, were made on millings cut from the cross section of the rods by the following laboratories:

National Bureau of Standards, Washington, D. C.  
General Electric Co., Knolls Atomic Power Laboratory,  
Schenectady, N. Y.  
Lcdoux and Co., Tcaneck, N. J.  
Metals and Control Inc., Attleboro, Mass.  
Oregon Metallurgical Corp., Albany, Ore.  
U. S. Atomic Energy Commission, New Brunswick Lab.,  
New Brunswick, N. J.  
U. S. Department of the Interior, Bureau of Mines,  
Albany, Ore.  
Westinghouse Electric Corp., Bettis Plant,  
Pittsburgh, Pa.  
Westinghouse Electric Corp., Atomic Fuels Dept.  
Cheswick, Pa.

Chemical analyses were also made by:

United Nuclear Corporation, New Haven, Conn.

Spectrographic analyses were also made by:

The Carborundum Co., Akron, N. Y.

ADDITIONAL INFORMATION ON THE COMPOSITION: The following values are not certified and are included for information only.

<u>Element</u>	<u>Percent by Weight</u>
Aluminum	(0.024)
Cobalt	(.008)
Hafnium	(.026)
Lead	(.028)
Vanadium	(.015)