

U. S. DEPARTMENT OF COMMERCE
 WASHINGTON 25, D. C.
 NATIONAL BUREAU OF STANDARDS
 PROVISIONAL CERTIFICATE OF ANALYSES
 (Revised)

ZIRCALOY-2 METAL STANDARDS
 FOR
 SPECTROCHEMICAL ANALYSIS

NBS No. <u>1/</u> Designation	1213 Zircaloy-2 D	1214 Zircaloy-2 E	1215 Zircaloy-2 F
Element <u>2/</u>	Percent		
Tin	1.76	1.60	0.95
Chromium	0.05 ₂	0.10 ₈	.19 ₀
Iron	.06 ₈	.06 ₇	.25 ₉
Nickel	.01 ₈	.05 ₁	.09 ₇
		Parts Per Million	
Aluminum	(50) ^{3/}	--	--
Copper	22	55	140
Manganese	(6)	38	--
Molybdenum	--	30	(100)
Silicon	(30)	(120)	(350)
Titanium	(33)	(50)	--
Tungsten	--	(40)	--
Uranium	2.0	45	9

- 1/ Size: Samples are disks 1 1/4 in. in diameter and 3/4 in. thick.
2/ Other elements also are contained in the standards: B, Cd, Co, Hf, Ph, V, Zn, P, C, O, and N. Some of these may be certified later.
3/ Values in parentheses are not certified, but are given for additional information on the composition.

The material for the standards was provided by the U. S. Atomic Energy Commission. For each standard, 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.

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

Homogeneity testing was performed by spectrochemical and chemical analyses at the National Bureau of Standards, Washington 25, D. C., and by the following cooperating laboratories:

The Carborundum Co., Akron, N. Y.
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 25, D. C.
The Carborundum Co., Akron, N. Y.
General Electric Co., Knolls Atomic Power Lab., Schenectady, N. Y.
Oregon Metallurgical Corp., Albany, Ore.
U. S. Atomic Energy Commission, New Brunswick Lab., New Brunswick, N. J.
Wah Chang Corp., Albany, Ore.
Westinghouse Electric Corp., Bettis Plant, Pittsburgh, Pa.

Chemical analyses were also made by the following laboratories:

Metals and Control Inc., Attleboro, Mass.
Westinghouse Electric Corp., Atomic Fuels Dept., Cheswick, Pa.

Spectrographic analyses were also made by the following laboratories:

Allegheny Ludlum Steel Corp., Watervliet, N. Y.
Babcock and Wilcox Co., Nuclear Facilities Plant, Lynchburg, Va.
Columbia-National Corp., Pensacola, Fla.
Reactive Metals Inc., Ashtabula, Ohio
United Nuclear Corporation, New Haven, Conn.


Harry C. Allen, Jr., Chief
Analytical & Inorganic Chemistry
Division

Washington 25, D. C.
November 29, 1962
(Supersedes certificate dated December 29, 1961)