U. S. Department of Commerce
John T. Connor, Secretary
National Bureau of Standards
A. V. Astin, Director

Certificate of Analysis

Standard Reference Materials

445 - 450
845 - 850
D845 - D850

Spectrographic Stainless Steel Standards
(Group II)

This supersedes the Provisional Certificate dated September 15, 1955

NUMBER [a]			DESIGNATION	Mn	Si	Cu	Ni	Cr	Mo	Nb
				Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
445	845	D845	Cr 13–Mo 0.9 (Modified AISI 410) [b]	0.77	0.52	0.065	0.28	13.31	0.92	0.11
446	846	D846	Cr 18–Ni 9 (Modified AISI 321)	.53	1.19	.19	9.11	18.35	.43	.60
447	847	D847	Cr 24–Ni 13 (Modified AISI 309)	.23	0.37	.19	13.26	23.72	.059	.03
448	848	D848	Cr 9–Mo 0.3 (Modified AISI 403)	2.13	1.25	.16	0.52	9.09	.33	.49
449	849	D849	Cr 5.5–Ni 6.5	1.63	0.68	.21	6.62	5.48	.15	.31
450	850	D850	Cr 3–Ni 25	....[c]	.12	.36	24.8	2.99	.....	.05

[a] Sizes: 400 series, rods 7/32 in. in diameter and 4 in. long.
800 series, rods 1/2 in. in diameter and 2 in. long.
D800 series, disks 1 1/4 in. in diameter and 1/4 in. thick.

[b] The carbon content of the standards is between 0.06 and 0.1 percent; phosphorus 0.02 and 0.03 percent; and sulfur 0.01 and 0.02 percent. By difference, the approximate iron contents are 445, 845, and D845—83.2 percent; 446, 846, and D846—68.8 percent; 447, 847, and D847—61.8 percent; 448, 848, and D848—85.3 percent; 449, 849 and D849—84.2 percent; 450, 850, and D850—70.8 percent. The metallurgical structure of the standards is that resulting from hot-rolling and annealing.

[c] Dashes indicate elements not certified for spectrographic analysis.

CAUTION: These standards are intended for the analysis of stainless steel samples with similar metallurgical history and dimensions. Samples with cross section larger than 1/2 in. in diameter may be analyzed with the 1/2 in. standards provided that the latter are mounted in a supporting piece such as a steel disk, 2 1/2 in. in diameter and 3/4 in. thick, drilled near the edge with holes to fit the standard closely and equipped with set screws to lock the standard in place. The standards should be mounted with the circular cross section flush with one surface of the disk and may be cleaned and sparked in this position.

HOMOGENEITY of the standards was examined spectrochemically at the National Bureau of Standards and was found satisfactory for the elements certified.

CHEMICAL ANALYSES were made on millings cut from the cross section of the rods. The values indicated for the certified elements Mn, Si, Cu, Ni, Cr, Mo, and Nb represent the averages of results from chemical analyses made by the National Bureau of Standards, Armco Steel Corporation (Research Laboratories and the Rustless Division), Allegheny-Ludlum Steel Corporation, and Wilbur B. Driver Company.

DISK STANDARD SAMPLES for use in x-ray spectrometric analysis were prepared from the rods 1/2 in. in diameter by upset forging. The use of the disk samples for optical emission analysis has not been investigated and is not recommended.

WASHINGTON, D. C. 20234
January 19, 1966

W. Wayne Meinke, Chief,
Office of Standard Reference Materials.

(This certificate supersedes certificate of 2-24-58. Editorial revision only)

(OVER)

Supplemental Information

OTHER ELEMENTS: In addition to the certified elements, the following are present at the approximate concentrations listed:

NUMBER			Ti	Ta	W	V	Sn
			Percent	*Percent*	*Percent*	*Percent*	*Percent*
445	845	D845	0.03	0.002	0.42	0.05	.....
446	846	D846	.34	.030	.04	.03	0.02
447	847	D847	.02	.002	.06	.03	.....
448	848	D848	.23	.026	.14	.02	.05
449	849	D849	.11	.021	.19	.01	.07
450	850	D850	.05	.002	.21	.006	.09

Because of minor irregularities in the samples observed in homogeneity testing and because the values represent the analytical results by a single laboratory, these elements have *not* been certified; however, the indicated results are given for additional information on the composition of the steels.

MATERIAL in rod form for the standards was furnished to the Bureau by the Uddeholm Company, Sweden.