

# Certificate of Analyses

## Spectrographic Steel Standards 401 to 430 and 801 to 830

This supersedes the certificate dated April 19, 1957.

NUMBER <sup>1</sup>		NAME	MANGANESE	SILICON	COPPER	NICKEL	CHROMIUM	VANADIUM	MOLYBDENUM	ALUMINUM (Total)	TIN	COBALT
			Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
401	( <sup>4</sup> )	B. O. H., 0.4 C <sup>2</sup>	0.34	0.015	0.015	0.005	0.015	( <sup>3</sup> )				
402	802	B. O. H., 0.8 C	.46	.060	.025	.010	.025					
403a	803a	A. O. H., 0.6 C	1.04	.34	.096	.190	.101	0.005	0.033			
404a	804a	Basic electric	0.88	.44	.050	.040	.025	.002	.007			
405a	805a	Medium manganese	1.90	.27	.032	.065	.037		.005	0.056		
407a	807a	Chromium-vanadium	0.76	.29	.132	.169	.92	.146				
408a	808a	Chromium-nickel	.76	.28	.10	1.20	.655	.002	.065			
409b	809b	Nickel	.46	.27	.104	3.29	.072	.002	.009		0.012	0.025
410a	810a	Cr2-Mo		.36	.11	0.24	2.39		.91			
411a	811a	Cr-Mo (SAE X4130)		.29	.105	.24	0.93	.002	.22			
412a	812a	Cr-Ni-Mo (NE 8637)	.87	.30	.090	.56	.55		.18			
413	( <sup>4</sup> )	A. O. H., 0.4 C	.67	.22	.25	.18	.055	.007	.006			
414	( <sup>4</sup> )	Cr-Mo (SAE 4140)	.67	.26	.11	.080	.99	.003	.32	.020	.014	
415a	815a	Bessemer, 0.5 C		.10	.012	.006	.008	.006		.11		
416a	( <sup>4</sup> )	Nitralloy G	.54	.25	.15	.28	1.14		.20	1.08	.011	
417	( <sup>4</sup> )	A. O. H., 0.4 C	.64	.18		.105	0.028	.004		0.013	.020	
417a	817a	B. O. H., 0.4 C	.78		.13	.062	.050		.013		.036	
418	( <sup>4</sup> )	Cr-Mo (SAE X4130)	.52	.28		.11	.96		.22			
418a	818a	Cr-Mo (SAE X4130)	.52	.27	.040	.125	1.02		.21			
419	( <sup>4</sup> )	Ni-Mo (SAE 4620)	.72	.27	.080	1.71	0.24		.22		.009	
420a	820a	Ingot Iron	.017		.027	0.0092	.0032		.0013	.003	.0017	.006
421	821	Cr-W, 0.9 C	1.24		.080	.10	.49	.012	.040	<b>Tungsten</b> (0.52)		
425	825	Mn-Ni-Cr (NE 9450)										Boron 0.0006
427	827	Cr-Mo (SAE 4150)										.0027
428	( <sup>4</sup> )	Mn-Cr										.0059
( <sup>4</sup> )	830	Ni-Cr-B										.019

<sup>1</sup> Sizes are: 400 series, rods 7/32 in. in diameter, 4 in. long; 800 series, rods 1/2 in. in diameter, 2 in. long.

<sup>2</sup> The carbon contents of these standards are between 0.1 and 0.9 percent.

<sup>3</sup> Dashes indicate elements not certified for spectrographic analysis.

<sup>4</sup> This standard is available only in one size.

NOTE: In addition to the standards covered by this certificate, other steel standards are issued with individual certificates.

WASHINGTON, D. C. 20234  
 May 5, 1965.

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

(OVER)

## NATIONAL BUREAU OF STANDARDS

### Notes on the Application of National Bureau of Standards Spectrographic Rod Standards

**PROPOSED USES OF THE STANDARDS:** The 400 series consists of rods  $7/32$  inch in diameter, 4 inches long, intended for the analysis of rod samples prepared in the same size and shape. The 800 series consists of rods  $1/2$  inch in diameter, 2 inches long, intended as standards for the analysis of extended surfaces in the point-to-plane technique and to serve also, by appropriate machining to size, for the analysis of samples in unusual shapes such as square rods. Either size of rod will serve as a source of millings and turnings, if compressed electrodes are to be employed in analysis. For application of the  $1/2$ -inch standards with a Petrey stand, the rods should be mounted so that the electrical discharge is directed to the flat end surface of the rod. A convenient adapter may be made from a steel disc  $2\frac{1}{2}$  inches in diameter,  $3/4$  inch thick, by drilling a series of holes near the outer edge to accommodate as many as 6 rods, each hole being fitted with a set screw for locking the rod in place. The cutting of the  $1/2$ -inch rods lengthwise in order to obtain a large flat surface is not recommended.

**DETERMINATION OF ALUMINUM:** The surfaces of the steel standards may be contaminated by small amounts of aluminum compounds introduced in fabrication. For application of the  $7/32$ -inch standards in the determination of small amounts of aluminum, the cylindrical surface near the end of the electrode rods should be removed to a depth of 0.002 inch. Alumina-base abrasives should be avoided in cleaning and shaping the rods.

May 5, 1965.