

UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON

National Bureau of Standards

Certificate of Analyses

Spectrographic Standard Samples 405A and 805A

Medium Manganese Steel

ANALYST	Mn		Si	Cu	Ni	Cr	Mo	Al	
	Bismuthate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Sulfuric acid dehydration	H ₂ S-CuS-CuO	Weighed as nickel dimethylglyoxime	FeSO ₄ -KMnO ₄ titration	Colorimetric	Total	
405A									
1		^a 1.89	^b 0.269	^c 0.033	^d 0.064	^e 0.036	0.005	^f 0.057	
2	1.89		^b .274	.029	.065	.037	.004	^g .053	
3	1.89	^h 1.89	^{b,i} .279	^j .034	^{b,k} .065	.038	.005	^l .059	
Average	1.89		0.274	0.032	0.065	0.037	0.005	0.056	
805A									
1		^a 1.90	^b 0.273	^c 0.032	^d 0.064	^e 0.036	0.005	^f 0.057	
2	1.91		^b .272	.029	.065	.036	.004	^g .053	
3	1.89	^h 1.90	^{b,i} .279	^j .034	^{b,k} .065	.039	.005	^l .058	
Average	1.90		0.275	0.032	0.065	0.037	0.005	0.056	

The 400 series of spectrographic standards are rods $\frac{3}{32}$ in. in diameter and 4 in. long; the 800 series are rods $\frac{1}{2}$ in. in diameter and 2 in. long. The steel for these standards was specially selected and prepared by excluding the ingot center-line region to minimize the possibility of segregation of manganese. The standards were examined by the Spectrographic Standards Laboratory, National Bureau of Standards, C. H. Corliss in charge, to insure radial and longitudinal homogeneity suitable for use in spectrographic methods of analysis. The homogeneity tests were made by J. C. Ballinger and J. H. Campbell.

^a Potentiometric titration, standardization on high-purity manganese metal.

^b Double dehydration with intervening filtration.

^c Diethyldithiocarbamate photometric method. See J. Research NBS 47 (1951) RP2265.

^d Ether extraction, dimethylglyoxime precipitation, 10-g sample.

^e Chromium separated by hydrolytic precipitation with NaHCO₃ from a 10-g sample, oxidized with persulfate and titrated potentiometrically with ferrous ammonium sulfate.

^f NaHCO₃-H₂S-NaOH-Al₂O₃. See ASTM method E30-47.

^g NaHCO₃-NaOH-8-hydroxyquinoline-bromate titration using a 20-g sample.

^h Titrating solution standardized by use of standard steels.

ⁱ Perchloric acid dehydration.

^j H₂S-NaOH-electrolytic deposition.

^k Dimethylglyoxime-KCN titration.

^l SO₂ hydrolysis-NaOH-8-hydroxyquinoline-bromate titration, using a 5-g sample.

List of Analysts

1. Ferrous Laboratory, National Bureau of Standards, John L. Hague in charge; analysis by J. I. Shultz and C. Litsey.
2. H. J. Wolthorn, United States Steel Co., Ohio Works, Youngstown, Ohio.
3. Edward J. Dunn, United States Steel Co., Duquesne Works, Duquesne, Pa.

The steel for these standards was furnished in rod-form by the United States Steel Company, Pittsburgh, Pa.

WASHINGTON, D. C., November 15, 1951.

A. V. ASTIN, *Director*.