

# Bureau of Standards

## Certificate of Analyses

OF

STANDARD SAMPLE No. 107

### NICKEL-CHROMIUM-MOLYBDENUM CAST IRON

ANALYST*	C			Mn	P		S		Si	Ni	Cr	Mo	TITANIUM Determined colorimetrically in residue after HCl (sp. gr. 1.10) attack	ARSENIC		
	CARBON 1. Total	2. Graphitic	3. Combined	MANGANESE	PHOSPHORUS 1. Alkali-Molybdate <sup>a</sup>	2. Gravimetric (Weighed as Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub> after re- moval of arsenic)	1. SULPHUR Gravimetric (Direct oxidation and final precipitation in re- duced solution)	2. SULPHUR <sup>b</sup> Evolution with HCl ZnS-Iodine (theoreti- cal sulphur titre <sup>c</sup> )	SILICON Sulphuric acid dehydra- tion		COPPER H <sub>2</sub> S-CuS-CuO				NICKEL Weighed as nickel di- methylglyoxime	CHROMIUM FeSO <sub>4</sub> -KMnO <sub>4</sub> titration
1.....	2. 57	1. 85	0. 72	0. 712 <sup>d</sup>	0. 200	0. 190	0. 092	0. 084 <sup>e</sup>	2. 36	0. 076	0. 804	0. 457 <sup>f</sup>	0. 016 <sup>g</sup>	0. 682 <sup>h</sup>	0. 037	0. 007
2.....	2. 58	1. 88	. 70	. 697 <sup>h</sup>	. 201	. 197	. 088 <sup>i</sup>		2. 32	. 073 <sup>j</sup>	. 806	. 456 <sup>k</sup>		. 68 <sup>l</sup>		
3.....	2. 57	1. 87	. 70	. 71 <sup>h</sup>	. 200	. 196 <sup>l</sup>	. 090	. 088 <sup>e</sup>	2. 33 <sup>m</sup>	. 078	. 797	. 452		. 695 <sup>n</sup>		
4.....	2. 56	1. 84	. 72	. 705	. 200			. 080	2. 33 <sup>n</sup>	. 073	. 815	. 46	. 017	. 68 <sup>o</sup>	. 038	. 015
5.....	2. 57	1. 87	. 70	. 701 <sup>o</sup>				. 078	2. 34 <sup>n</sup>		. 812	. 45	. 016	. 692 <sup>p</sup>	. 035	. 008
6.....									2. 37		. 81 <sup>j</sup>	. 451		. 70 <sup>q</sup>		
7.....	2. 58	1. 87	. 71	. 70 <sup>h</sup>	. 206	. 195 <sup>l</sup>	. 089 <sup>r</sup>	. 084	2. 33 <sup>m</sup>	. 078 <sup>q</sup>	. 815 <sup>s</sup>	. 452		. 69 <sup>o</sup>		
8.....	2. 56			. 71 <sup>h</sup>	. 196								. 015 <sup>t</sup>	. 683 <sup>p</sup>		
9.....	2. 58	1. 87	. 71	. 706 <sup>d</sup>	. 209	. 208	. 090	. 080	2. 32	. 067 <sup>j</sup>	. 816	. 465		. 691 <sup>o</sup>		
10.....		1. 84		. 710 <sup>u</sup>	. 202		. 089		2. 34		. 811	. 456	. 011			
11.....	2. 56	1. 84	. 72	. 71 <sup>d</sup>	. 199		. 094		2. 33		. 79			. 676 <sup>o</sup>		
12.....	2. 59	1. 87	. 72	. 71 <sup>h</sup>	. 192		. 089		2. 33 <sup>m</sup>		. 80	. 446		. 687		
Averages.....	2. 57	1. 86	. 71	. 706	. 201	. 197	. 090	. 082	2. 34	. 074	. 807	. 455	. 015	. 687	. 037	. 01
Recommended Values.....	2. 57	1. 86	. 71	. 706	. 197		. 090		2. 34	. 074	. 807	. 455	. 015	. 687 <sup>t</sup>	. 037	. 01

† Analyst No. 1 reported 0.002 percent tungsten in this sample.

<sup>a</sup> Precipitated at 40° C., washed with a 1 percent solution of KNO<sub>3</sub> and titrated with alkali standardized by the use of Bureau of Standards acid potassium phthalate and the 28:1 ratio.

<sup>b</sup> Sample annealed by wrapping it in filter paper and heating for 20 minutes in a tightly covered porcelain crucible at a bright red heat.

<sup>c</sup> Value obtained by standardization of titrating solution against sodium oxalate through KMnO<sub>4</sub> and Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub>.

<sup>d</sup> Bismuthate (FeSO<sub>4</sub>-KMnO<sub>4</sub>).

<sup>e</sup> Sample covered by a layer of graphite in a tightly covered porcelain crucible and annealed by heating in an electric furnace for 30 minutes at 850° to 900° C. Dissolved in concentrated HCl.

<sup>f</sup> Electrometric titration.

<sup>g</sup> Molybdenum precipitated with α-benzoinoxime, ignited to MoO<sub>3</sub> and corrected for WO<sub>3</sub>, see B. S. Jour. Research, vol. 9, p. 1, 1932.

<sup>h</sup> Persulphate-arsenite.

<sup>i</sup> Dissolved in HClO<sub>4</sub> (60 percent), neutralized with NH<sub>4</sub>OH, and iron reduced with NH<sub>2</sub>OH.HCl in acetic acid solution.

<sup>j</sup> Finished by electrolysis.

<sup>k</sup> Perchloric acid oxidation.

<sup>l</sup> Weighed as (NH<sub>4</sub>)<sub>2</sub>PO<sub>4</sub>.12MoO<sub>3</sub>.

<sup>m</sup> Drown's method.

<sup>n</sup> Perchloric acid dehydration.

<sup>o</sup> HClO<sub>4</sub>-HF attack, ZnO separation, persulphate-arsenite titration.

<sup>p</sup> Precipitated with H<sub>2</sub>S, molybdenum sulphide ignited to MoO<sub>3</sub> and corrected for impurities.

<sup>q</sup> Colorimetric method.

<sup>r</sup> Precipitated in FeCl<sub>3</sub> solution.

<sup>s</sup> KCN titration method.

<sup>t</sup> Cain's method.

<sup>u</sup> Bismuthate-arsenite.

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