

# Certificate of Analysis

## Standard Reference Material 339

### 17 Chromium-9 Nickel-0.2 Selenium Steel

ANALYST	C	Mn	P	S	Si	Cu	Ni	Cr	V	Mo	Co	Se
	Direct combustion	Persulfate-Arsenite	Photometric	Combustion Iodate titration	Perchloric acid dehydration	Photometric	Weighed as nickel dimethylglyoxime	FeSO <sub>4</sub> -KMnO <sub>4</sub> titration		Photometric		
1.....	0.052	<sup>a</sup> 0.732	<sup>b</sup> 0.135	<sup>c</sup> 0.013	<sup>d</sup> 0.652	<sup>e</sup> 0.201	8.87	<sup>f</sup> 17.41	<sup>g</sup> 0.058	0.247	<sup>h</sup> 0.099	<sup>i</sup> 0.248
2.....	{ .050 1.049 }	<sup>k</sup> 7.737	<sup>l</sup> 0.130	.014	<sup>m</sup> 6.646	<sup>n</sup> 1.197	8.92	<sup>o</sup> 17.43		.24	<sup>p</sup> 0.091	<sup>q</sup> 0.250
3.....	.052	<sup>r</sup> 7.732		.014	.64	<sup>s</sup> 0.195	8.88	<sup>t</sup> 17.46		.252	<sup>u</sup> 0.093	<sup>v</sup> 0.243
.....	{ .048 1.051 }	<sup>w</sup> 7.739	<sup>x</sup> 0.133	<sup>y</sup> 0.014	.665	<sup>z</sup> 0.198	8.93	<sup>aa</sup> 17.43	<sup>ab</sup> 0.063	.247	<sup>ac</sup> 0.100	<sup>ad</sup> 0.246
5.....	.056	<sup>ae</sup> 7.740	{ <sup>af</sup> 0.128 0.125 }	{ <sup>ag</sup> 0.011 0.013 }	<sup>ah</sup> 6.653	<sup>ai</sup> 0.198	8.87	<sup>aj</sup> 17.39	<sup>ak</sup> 0.061	.248	<sup>al</sup> 0.099	<sup>am</sup> 0.247
6.....	.057	<sup>an</sup> 7.745	<sup>ao</sup> 0.121	<sup>ap</sup> 0.015	<sup>aq</sup> 6.665	<sup>ar</sup> 0.204		17.42	<sup>as</sup> 0.052	.255		
Averages.....	0.052	0.738	0.129	0.013	0.654	0.199	8.89	17.42	0.058	0.248	0.096	0.247

<sup>a</sup> Chromium removed by precipitation with NaHCO<sub>3</sub>.  
<sup>b</sup> Molybdenum-blue photometric method. See J. Res. NBS 26, 405(1941) RP1386.  
<sup>c</sup> 1-g sample burned in oxygen at 1425 °C and sulfur dioxide absorbed in starch-iodide solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO<sub>3</sub> solution. Titer based on 93 percent of the theoretical factor.  
<sup>d</sup> Double dehydration with intervening filtration.  
<sup>e</sup> Diethyldithiocarbamate photometric method. See J. Res. NBS 47, 380 (1951) RP2265.  
<sup>f</sup> Persulfate oxidation, potentiometric titration with ferrous ammonium sulfate.  
<sup>g</sup> Nitric acid oxidation, potentiometric titration with ferrous ammonium sulfate.

<sup>h</sup> Nitroso-R photometric method.  
<sup>i</sup> Sulfurous Acid-Iodometric titration method. ASTM method E30-56.  
<sup>j</sup> Conductometric method.  
<sup>k</sup> Periodate photometric method.  
<sup>l</sup> 2,2' biquinoline photometric method.  
<sup>m</sup> Tetraphenylarsonium chloride-cobalt complex photometric method.  
<sup>n</sup> Selenium hydrolyzed with SO<sub>2</sub>, filtered and weighed.  
<sup>o</sup> Neocuproine photometric method.  
<sup>p</sup> Persulfate oxidation, titration with ferrous ammonium sulfate using diphenylamine sulfonate indicator.  
<sup>q</sup> Alkali-molybdate method.  
<sup>r</sup> Titrating solution standardized by the use of a standard steel.

<sup>s</sup> Diethyldithiocarbamate photometric method.  
<sup>t</sup> Vanadium oxidized with KBrO<sub>3</sub>, potentiometric titration with ferrous ammonium sulfate.  
<sup>u</sup> Gravimetric method (weighed as Mg<sub>2</sub>P<sub>2</sub>O<sub>7</sub>).  
<sup>v</sup> Gravimetric method (weighed as BaSO<sub>4</sub>).  
<sup>w</sup> H<sub>2</sub>S-electrolytic method.  
<sup>x</sup> Persulfate oxidation, potentiometric titration with FeSO<sub>4</sub>-K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>.  
<sup>y</sup> Phosphotungstovanadate photometric method.  
<sup>z</sup> Ion-exchange—Nitroso R photometric method.  
<sup>aa</sup> NaHCO<sub>3</sub>-NaBiO<sub>3</sub> oxidation-NaAsO<sub>2</sub> titration.  
<sup>ab</sup> H<sub>2</sub>S-CuS-CuO.  
<sup>ac</sup> Ether—FeSO<sub>4</sub>-(NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub>-KMnO<sub>4</sub>.

#### List of Analysts

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|--|---|
| <ol style="list-style-type: none"> <li>1. B. B. Bendigo and J. I. Shultz, Division of Analytical Chemistry, National Bureau of Standards.</li> <li>2. M. J. Noll and A. L. Sloan, Carpenter Steel Co., Reading, Pa.</li> <li>3. W. M. Gross and R. E. Hanson, General Dynamics-Convair, San Diego, Calif.</li> </ol> | <ol style="list-style-type: none"> <li>4. R. W. Bley, Inland Steel Co., East Chicago, Ind.</li> <li>5. M. D. Cooper, A. H. Jones, R. E. Kohn, W. R. Lee, R. B. Loranger, and H. E. Vergosen, General Motors Corp. Research Laboratories, Warren, Mich.</li> <li>6. A. C. Hale and D. R. Burrier, Copperweld Steel Co., Warren, Ohio.</li> </ol> |
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W. Wayne Meinke, Chief,  
 Office of Standard Reference Materials.