

Certificate of Analysis

Standard Reference Material 163

CHROMIUM STEEL

ANALYST	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	N
	Direct combustion gravimetric	Persulfate-Arsenite	Alkali-Molybdate ^a	Combustion Iodate titration	Perchloric acid dehydration		Weighed as nickel dimethylglyoxime	FeSO ₄ -KMnO ₄ titration	Thiocyanate, Photometric	Distillation-Photometric
1-----	0.934	{ b0.898 } c.908	d0.007	e0.027	f0.487	g0.092	h0.083	i0.982	0.030	j0.009
2-----	.940	b.895	k.006	.026	.482	1.087	b.078	.980	.029	.009
3-----	.933	m.904	n.009	.026	.489	m.085	m.078	o.986	.027	.006
4-----	.938	b.902	.008	e.027	f.486	p.086	b.080	o.980	.030	.005
5-----	q.929	.895	.007	.029	f.487	p.088	.079	.980	r.027	.006
6-----	.937	b.890	s.007	{ t.028 } t.027	f.483	p.092	b.086	o.974	.028	.008
7-----	.929	b.898	d.006	.030	f.492	u.092	.081	o.988	.029	.008
8-----	.933	b.894	s.007	.028	.486	1.085	b.079	.988	.032	.005
9-----	.938	b.892	k.007	.026	.493	p.089	.084	.984	.030	-----
10-----	v.934	{ m.900 } .905	.007	.027	.485	{ 1.088 } m.088	m.088	.985	.036	.006
11-----	w.927	.889	.007	.027	.490	x.083	.081	.981	.026	y.006
12-----	w.932	.893	.009	.027	z.493	aa.084	.080	.976	bb.028	.008
13-----	w.929	-----	-----	.028	-----	-----	-----	-----	-----	-----
Average-----	0.933	0.897	0.007	0.027	0.488	0.087	0.081	0.982	0.029	0.007

a Precipitated at 40°C, washed with a 1-percent solution of KNO₃, and titrated with alkali standardized by the use of acid potassium phthalate and the ratio of 23NaOH:1P.
b Periodate photometric method.
c Potentiometric titration.
d Molybdenum-blue photometric method. See J. Research NBS 26, 405 (1941) RP1386.
e 1-g sample burned in oxygen at 1,425°C and sulfur dioxide absorbed in starch-iodide solution. Iodine is liberated from iodide by titration, during the combustion, with standard KIO₃ solution. Titer is based on 93 percent of the theoretical factor.
f Double dehydration with intervening filtration.

g 1-g sample dissolved in HCl-HNO₃-HClO₄. Iron removed with methyl-isobutylketone. Copper determined by atomic absorption method.
h Dimethylglyoxime photometric method.
i 0.5-g sample oxidized with persulfate, and titrated potentiometrically with ferrous ammonium sulfate.
j 0.5-g sample digested 4 hr. with sulfuric acid. See J. Research NBS 43, 201 (1949) RP2021.
k Molybdenum-blue photometric method. Color complex extracted with isobutyl alcohol.
l Diethylthiocarbamate photometric method.
m Atomic absorption method.
n Molybdo-vanadate photometric method. Color complex extracted with isobutyl alcohol.

o Potentiometric titration with ferrous ammonium sulfate.
p Neocuproine photometric method.
q Differential gasometric method.
r H₂S-MoS₃ - photometric method.
s Molybdenum-blue photometric method.
t Sulfate ions adsorbed on alumina column, eluted with NH₄OH, and sulfur determined gravimetrically as BaSO₄.
u 2,2' biquinoline photometric method.
v Conductometric method.
w Thermal conductivity method.
x CuCNS-KIO₃ titration method.
y Distillation-titration.
z Double dehydration with sulfuric acid.
aa H₂S-CuS-CuO.
bb H₂S-MoS₃-MoO₃.

List of Analysts

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The material for this Standard was prepared in powder form by argon atomization, followed by a hydrogen anneal, at the Hoeganaes Sponge Iron Corporation, Riverton, N.J. The material has been sized between 25 and 100 mesh sieves.

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Office of Standard Reference Materials