U. S. Department of Commerce
John T. Connor, Secretary
National Bureau of Standards
A. V. Astin, Director

Certificate of Analysis

Standard Reference Material 152A

Basic Open-Hearth Steel 0.5% Carbon

(Tin-Bearing)

ANALYST	C	Mn	P	S	Si	Cu	Ni	Cr	V	Mo	Sn	
	Direct combustion	Persulfate-Arsenite	Photometric	Combustion Iodate titration	Perchloric acid dehydration	Photometric	Weighed as nickel dimethylglyoxime	$FeSO_4$–$KMnO_4$ titration		Photometric		
1	0.484	0.714	[a]0.012	[b]0.030	[c]0.202	[d]0.025	[e]0.057	[f]0.047	[g]0.001	0.035	[b]0.035	
2	.486	[i].718	[j].012	[i].030 / [k].030	[c].205	[l].022	.055	[m].046	[n]<.001	.039	[h].031	
3	.488	[i].716	[j].012	[i].031	[c].204	[o].021	[e].058	[p].049	[q]<.001	.037	.031	
4	[r].484	.720	[j].012	.030	.203	[o].024	.052	.041	[n].001	.036	[h].033	
5	.491	[s].72	.012	.028	.198	[t].023	[e].054			.037		
6	.485	.714	[j].013	[i].031	.202	[t].021	[e].057	[p].048	[n].003	.033	.031	
Average	0.486	0.717	0.012	0.030	0.202	0.023	0.056	0.046	0.001	0.036	0.032	

[a] Molybdenum-blue photometric method. See J. Res. NBS **26**, 405 (1941) RP 1386.

[b] 1-g sample burned in oxygen at 1425 °C and sulfur dioxide absorbed in starch-iodide solution. Iodine is liberated from iodide by titration, during the combustion, with standard KIO_3 solution. Titer is based on 93 percent of the theoretical factor.

[c] Double dehydration with intervening filtration.

[d] Diethyldithiocarbamate photometric method. See J. Res. NBS **47**, 380 (1951) RP2265.

[e] Dimethylglyoxime photometric method.

[f] Chromium separated from the bulk of the iron in a 10-g sample by hydrolytic precipitation with $NaHCO_3$, oxidized with persulfate, and titrated potentiometrically with ferrous ammonium sulfate.

[g] Vanadium separated as in (f), oxidized with HNO_3, and titrated potentiometrically with ferrous ammonium sulfate.

[h] Sulfide-iodine method. See BS. J. Res. **8**, 309 (1932) RP415.

[i] Titrating solution standardized by use of a standard steel.

[j] Alkali-molybdate method.

[k] Gravimetric method. Sulfate precipitated with $BaCl_2$, ignited to $BaSO_4$ and weighed.

[l] H_2S-electrolytic method.

[m] Sodium bicarbonate hydrolysis-persulfate oxidation.

[n] Sodium bicarbonate hydrolysis-$FeSO_4$-$(NH_4)_2S_2O_8$-$KMnO_4$.

[o] Copper-ammonia complex photometric method.

[p] Diphenylcarbazide photometric method.

[q] Spectrographic method.

[r] Gasometric method.

[s] KIO_4 photometric method.

[t] Diethyldithiocarbamate photometric method.

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The steel for the preparation of this standard was furnished by the United States Steel Corporation.

October 11, 1965

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