



Certificate of Analysis

Standard Reference Material 8i

Bessemer Steel, 0.1% Carbon

(Revised May 5, 1965)

ANALYST	C	Mn	P		S		Si	Cu	Ni	Cr	V	Mo	N	
	Direct combustion	Persulfate-Arsenite	Gravimetric (weighed as Mg ₂ P ₂ O ₇ after removal of arsenic)	Alkali-Molybdate	Gravimetric (direct oxidation and precipitation after reduction of iron)	Combustion Iodate titration	Evolution with HCl (1+1) ZnS-Iodine (theoretical sulfur titer) ^b	Perchloric acid dehydration		Weighed as nickel dimethylglyoxime	FeSO ₄ -KMnO ₄ titration	Photometric	Distillation-Photometric	
1.....	0.076	^o 0.512	0.082	^o 0.079	0.063	^o 0.062	0.065	^o 0.020	^o 0.015	0.008	^o 0.007	^o 0.013	0.005	^o 0.017
2.....	.079	.508	.082	.082	.063	.063	.062	^{k,f} 0.022	^l 0.016	.008	^m 0.008	^d 0.014	.004	.017
3.....	ⁿ 0.072	^o 0.508		.081		.064		.022	^p 0.015	^q 0.012	^m 0.009	^r 0.012	.003	.018
4.....	.077	^s 0.510	.077	.077	.066	.065	^t 0.067	^f 0.014	^u 0.015	.005	^m 0.009	^v 0.006	.002	.018
5.....	.081	^w 0.520	.080	.082	.063	^x 0.063		^{k,f} 0.024	^y 0.020	.010	.010	^r 0.012	.003	.021
6.....	.077	^x 0.510 ^z 0.511	.081	^x 0.080	.062	^x 0.062		^f 0.017	^l 0.015	.010	.011	^z 0.015	.003	.018
7.....	.076	.507	.081	.080	.063	.064		^f 0.022	^z 0.015	.008	^m 0.007	^z 0.009	.003	.018
Average.....	0.077	0.511	0.081	0.080	0.063	0.063	0.065	0.020	0.016	0.009	0.009	0.012	0.003	0.018
General Average.....	0.077	0.511	0.080			0.064		0.020	0.016	0.009	0.009	0.012	0.003	0.018

^aPrecipitated 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 23NaOH:1P.

^bValue obtained by standardizing the titrating solution with sodium oxalate through KMnO₄ and Na₂S₂O₃ and the use of the ratio 2I:1S.

^cPotentiometric titration.

^dMolybdenum-blue photometric method. See J. Research NBS 26, 405 (1941) RP1386.

^e1-g sample burned in oxygen at 1,425°C and sulfur dioxide absorbed in starch-iodide solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO₃ solution. Titer based on 93 percent of the theoretical factor.

^fDouble dehydration with intervening filtration.

^gDiethyldithiocarbamate photometric method. See J. Research NBS 47, 380 (1951) RP2265.

^hChromium separated from the bulk of the iron in a 10-g sample by NaHCO₃ hydrolysis, oxidized with persulfate, and titrated potentiometrically with ferrous ammonium sulfate.

ⁱVanadium separated as in (h), oxidized with HNO₃ and titrated potentiometrically with ferrous ammonium sulfate.

^jSulfuric acid digestion for 4 hr of a 0.5-g sample. See J. Research NBS 43, 201 (1949) RP2021.

^kPerchloric acid dehydration.

^lH₂S-CuS-CuO.

^mDiphenylcarbazide photometric method.

ⁿDifferential gasometric method.

^oKIO₃ photometric method.

^pThioacetamide precipitation-diethyldithiocarbamate photometric method.

^qPhotometric method.

^rFeSO₄-(NH₄)₂S₂O₈-KMnO₄ method.

^sBismuthate-FeSO₄-KMnO₄.

^tSolution in diluted HCl (3+1), and sulfide absorbed in ammoniacal cadmium chloride solution.

^uNeocuproine photometric method.

^vNaHCO₃ hydrolysis followed by mercury cathode. Vanadium oxidized by the KMnO₄-nitrite-urea method and titrated with FeSO₄ using diphenylbenzidine sulfonate indicator.

^wPotentiometric titration with HgNO₃.

^xTitration solution standardized with a standard steel.

^yH₂S-electrolysis method.

^zOxidized with bismuthate.

^zVanadium coprecipitated with phosphomolybdate, reduced with H₂O₂ in fuming H₂SO₄, and titrated with KMnO₄.

^zCopper-ammonia complex photometric method.

^zVanadium separated by NaHCO₃ hydrolysis and determined photometrically with H₂O₂.

List of Analysts

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| <ol style="list-style-type: none"> 1. Ferrous Laboratory, National Bureau of Standards. J. I. Shultz, in charge. Analysis by E. June Maienthal, T. W. Freeman and E. R. Deardorff. 2. D. J. Hallisey, Jones & Laughlin Steel Corp., Aliquippa Works, Aliquippa, Pa. 3. W. W. Weber, Sheffield Division, Armco Steel Corp., Kansas City, Mo. 4. W. G. Rader, Republic Steel Corp., Buffalo District, Buffalo, N.Y. | <ol style="list-style-type: none"> 5. C. L. Abbott, Bethlehem Steel Co., Lackawanna Plant, Lackawanna, N.Y. 6. A. C. Hale and D. R. Burrier, Copperweld Steel Co., Steel Division, Warren, Ohio. 7. R. J. Ruff, A. M. Graham and A. L. Cheney, American Steel & Wire Division, United States Steel Corp., Donora Steel & Wire Works, Donora, Pa. |
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The steel for the preparation of this standard was furnished by the Jones & Laughlin Steel Corporation.

WASHINGTON, D. C. 20234
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 Office of Standard Reference Materials.