

Certificate of Analysis

STANDARD REFERENCE MATERIAL 178

O.4C Basic Oxygen Furnace Steel

ANALYST	C	Mn	P	S	Si	Cu	Ni	Cr	V	Mo
	Combustion-Gravimetric	Persulfate-Arsenite	Photometric	Combustion-titration	Perchloric acid dehydration	Photometric	Photometric			Photometric
1	0.398	{0.822 } {.825 ^a }	0.011 ^b	0.014 ^c	0.163 ^d	{0.031 } {.034 ^e }	0.012	{0.018 ^f } {.015 ^f }	{0.001 ^g } {.001 ^g }	0.003
2	.398	.827	.012 ^h	.014	.162	.032 ⁱ	.010	.015 ^j	.001 ^k	.003
3	.394 ^l	.817 ^m	.011 ⁿ	.012	.163 ^d	.033 ^o	.009	.014 ^e	.001 ^p	.002
4	{.396 ^l } {.392 }	.828	.013 ^h	.013	.160 ^d	{.030 } {.033 ^e }	{.011 } {.011 ^e }	{.015 ^q } {.020 ^e }	.002 ^r	.002
5	.394	.826	.011 ^h	.015	.167 ^d	.033 ^o	.010	.015 ^s	.001 ^t	.003
Average	0.395	0.824	0.012	0.014	0.163	0.032	0.010	0.016	0.001	0.003

^a Neutron activation analysis.

^b Molybdenum-blue photometric method. See J. Res. NBS 26, 405 (1941) RP1386.

^c 1-g sample burned in oxygen at 1450 °C and sulfur dioxide absorbed in starch-iodide solution. Iodine liberated from iodide by titration, during the combustion, with standard KIO₃ solution.

^d Double dehydration.

^e Atomic absorption method.

^f Chromium separated from the bulk of the iron in a 10-g sample by hydrolytic precipitation with NaHCO₃, oxidized with persulfate and titrated potentiometrically with ferrous ammonium sulfate solution.

^g Vanadium separated as in (f), oxidized with HNO₃ and titrated potentiometrically with ferrous ammonium sulfate solution.

^h Alkali-molybdate method.

ⁱ Cuprizone photometric method.

^j Oxidized chromium titrated amperometrically with ferrous ammonium sulfate solution.

^k Oxidized vanadium titrated amperometrically with ferrous ammonium sulfate solution.

^l Thermal conductivity method.

^m KIO₃ photometric method.

ⁿ Ammonium vanadate-phosphomolybdate photometric.

^o Neocuproine photometric method.

^p Flame emission spectroscopy.

^q Diphenylcarbazide photometric method.

^r Benzoyl phenylhydroxylamine photometric method.

^s Chromium oxidized with HClO₄-titration with FeSO₄-KMnO₄.

^t Vanadium precipitated with cupferron and determined by FeSO₄-(NH₄)₂S₂O₈-KMnO₄ method.

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