

DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 4c

CAST IRON

ANALYST*	C			Mn	P		S		Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dime thylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM	TITANIUM Determined colorimetrically in residue after HCl (sp. gr. 1.10) attack	ARSENIC
	CARBON 1. Total	2. Graphitic	3. Combined	MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄)	PHOSPHORUS 1. Alkali-Molybdate ^a	2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic)	1. SULPHUR Gravimetric (Direct oxidation and final precipitation in reduced solution)	2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sulphur titre ^b)	SILICON Sulphuric acid dehydration							
1-----	2.75	2.13	0.62	0.902	0.080	0.078	0.075	0.062	1.26	0.235	0.028	0.016	0.007 ^c	0.008	0.033	0.005 ^d
2-----	2.74	2.12	.62	.894	.081	.079	.076	.066	1.24	.24	.036	.013 ^e	.008 ^e	<.01	.032 ^f	.005 ^d
-----	2.76 ^g	2.12	.63	.889	.081	.081	.071	.065	1.26	.245					.035	
	2.75															
-----	2.72	2.12	.60	.899	.079	.080	.074	.061	1.27	.254	.032			.007	.035	.003
5-----	2.78	2.17	.61	.892	.082	.081	.072	.065	1.27	{ 234 ^h 228 }					.038	.009 ⁱ
6-----	2.76	2.11	.65	.905	.078	.080	.075	.065	1.27	.225 ^j		.021				
7-----	2.72	2.10	.62	.900	.082 ^k	.081	.072 ^l	.064	1.28	.225 ^m	.024	.013 ⁿ	.010 ^o		.037	
8-----	2.71	2.13	.58	.89	.082	.077	.070	.063	1.24	.23			.013		.029	
9-----	2.71	2.12	.59	.91	.079		.073		1.27	.236					.040	
10-----	{ 2.76 ^p 2.75 }	{ 2.13 ^p 2.11 }	{ .63 ^p .64 }	{ .89 ^q .90 }	{ .072 ^r .073 }		{ .072 ^r .073 }		1.26	.227	.034		.010 ^o			.006 ^t
Averages	2.74	2.12	.62	.897	.080	.080	.073	.064	1.26	.234	.031	.016	.010	<.01	.035	.006
General averages	2.74	2.12	.62	.897	.080		.073 ^s	.064	1.26	.234	.031	.016	.010	<.01	.035	.006

^a Precipitated at 40° C., washed with 1 per cent KNO₃ solution and titrated with alkali standardized by the use of B. S. benzoic acid and the 23:1 ratio.

^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₃.

^c Colorimetric.

^d Distillation as AsCl₃, precipitation as As₂S₃, conversion to Ag₃AsO₄ and titration with KCNS.

^e Electrometric titration.

^f 0.002 per cent Ti remained in solution after treatment with HCl (sp. gr. 1.10).

^g Weighed as BaCO₃.

^h Low's iodine method.

ⁱ Weighed as As₂S₃.

^j Precipitated by Na₂S₂O₃ then determined electrolytically.

^k KMnO₄ titration.

^l Same result obtained by Meineke's method.

^m Na₂S₂O₃; CuS; CuO.

ⁿ BaCO₃ precipitation and KMnO₄ titration.

^o Precipitated as lead vanadate.

^p CO₂ absorbed in Ba(OH)₂ and titrated with standard HCl.

^q Arsenite titration.

^r Meineke's method.

^s Recommended value 0.075. The evolution method if carried out as indicated will not yield all of the sulphur as H₂S, and the results given are only indicative of the performance of the method. Analyst No. 2 obtained 0.071 and analyst No. 6 obtained 0.075 per cent sulphur by annealing the sample at 750-850° C.

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