DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 20b

ACID OPEN-HEARTH STEEL, 0.4% CARBON

ANALYST.	CARBON.	SILICON.		PHOSPHORUS.		SULPHUR.		MANGANESE.		COPPER (H_2S–CuS–CuO).	NICKEL.	CHROMIUM.	VANADIUM.	ARSENIC.
	DIRECT COMBUSTION.	SULPHURIC ACID DEHYDRATION.	OTHER METHODS.	ALKALI MOLYBDATE.	GRAVIMETRIC (weighed as $Mg_2P_2O_7$).	GRAVIMETRIC DIRECT OXIDATION (final precipitation in reduced solution).	EVOLUTION ZnS–IODINE (theoretical sulphur titre.[a]).	BISMUTHATE ($FeSO_4$–$KMnO_4$).	OTHER METHODS.					
1	0.404	0.176		0.064	0.063	0.040	0.039	0.642		0.030	0.094[b]	0.027	<0.01	0.014[c]
2	.403	.174		.066	.062	.042	.041	.648		.034	.103[b]	.025[d]	.006[d]	
3	.405	.181	0.174[e]	.062		.039	.039	.644	0.641[f]	.04				
4	.408	.176		.063		.042	.041	.63	.64[g]	.04	.13[b] .13[h]	.03	None.	Trace.
5	.399[i] .398	.173	.174[e]	.062		.041	.040	.63	.625[f]	.031[j] .027		.025		
*	.40	.173			.063	.040[k]	.040	.64		.020	.11[b]		.008	.009[l]
7	.413		.165[e]	.062		.039[k]			.63[g]	.030[m]				
8	.399		.173[e]	.063		.039		.634	.630[f]	.027[j]				
9	.406	.182		.066		.038	.037	.630		.040	.131[b]	.027[d]	.009[d]	
10	.40	.178	.178[n]	.063		.043	.042	.64	.63[f]	.028[o]	.095[p]			
11	.399[q] .396	.172	.174[e]	.064		.040	.038	.652	.640[f]	.045				
AVERAGE	.402	.176	.173	.064	.063	040	.040	.639	.634	.033	.113	.027	.008	.012
GENERAL AVERAGE	.402	.175		.063		.040	.040	.637		.033	.113	.027	.008	.012

NOTE.—By the use of methods employing empirical titres for evolution sulphur, an average of 0.040% was obtained by five analysts.

[a] Value obtained by standardization of titrating solution against sodium oxalate through $KMnO_4$ and $Na_2S_2O_3$.
[b] Weighed as nickel dimethylglyoxime.
[c] Distillation as $AsCl_3$; precipitation as As_2S_3, conversion to Ag_3AsO_4 and titration with KCNS. Obtained 0.015% when weighed as As_2S_3.
[d] Electrometric titration.
[e] Drown's method.
[f] Persulphate-arsenite.
[g] Bismuthate-arsenite.
[h] Direct KCN titration.
[i] Weighed as $BaCO_3$.
[j] $Na_2S_2O_3$–CuS–CuO.
[k] Precipitation in $FeCl_3$ solution.
[l] Weighed as $Mg_2As_2O_7$.
[m] $Na_2S_2O_3$–CuS; finished with KI–$Na_2S_2O_3$ titration.
[n] HCl–H_2SO_4.
[o] Electrolysis.
[p] Precipitation as nickel dimethylglyoxime, solution of the precipitate and titration with KCN.
[q] Solution in $CuCl_2$. 2KCl.

INDEX TO ANALYSTS

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This standard is not recommended for colorimetric carbon determinations, because of uncertainty as to the condition of the carbon.

S. W. STRATTON,
Director.

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