

National Bureau of Standards

Certificate of Analyses

OF
STANDARD SAMPLE 5H
CAST IRON

ANALYST*	C		Mn		P		S			Si	COPPER H ₂ S-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM
	Total	Graphitic	Bismuthate (FeSO ₄ -KMnO ₄)	Persulfate-Arsenite	Gravimetric (weighed as Mn ₂ P ₂ O ₇ after removal of arsenic)	Alkali-Molybdate ^a	Gravimetric (direct oxidation and final precipitation in reduced solution)	Evolution with HCl (sp. gr. 1.18) & ZnS-Iodine (theoretical sulfur titre) ^b	Combustion	Sulfuric acid dehydration				
1	2.95	2.25	0.604	0.604	0.260	^o 0.258	0.121	0.117	-----	^e 1.85	^f 1.46	^k 0.123	^l 0.021	0.019
2	2.95	2.20	.603	.604	-----	.262	.125	.119	-----	1.85	1.46	^h .126	.019	-----
3	2.96	2.20	-----	ⁱ .606	.267	ⁱ .261	.118	ⁱ .117	-----	^k 1.86	^j 1.48	.128	.021	-----
4	2.93	2.18	-----	.60	.264	.267	.124	.122	-----	^e 1.86	^m 1.45	^f .126	-----	-----
5	2.92	-----	.606	-----	.262	-----	.123	.121	-----	^e 1.84	^f 1.46	.124	ⁿ .018	.022
6	2.86	-----	.606	.605	.265	.262	.119	.117	-----	^e 1.86	^f 1.46	.124	^p .019	-----
7	2.90	2.16	-----	.600	.263	.269	.119	ⁱ .116	-----	^k 1.85	^f 1.43	.125	.021	-----
8	2.89	2.17	-----	ⁱ .60	.263	.263	.118	.117	-----	1.84	1.43	.11	.027	-----
9	2.91	2.16	-----	.604	-----	.262	.119	.119	-----	^k 1.87	^o 1.45	^o .123	^o .022	-----
10	2.86	-----	.602	-----	^p .262	ⁱ .262	-----	-----	^q .118	^e 1.85	1.40	.121	.018	.02
11	2.95	-----	ⁱ .608	-----	.262	^r .261	.119	^r .117	^s .119	^k 1.84	1.45	.131	.018	-----
12	2.90	-----	.603	-----	.264	^r .265	.114	.117	-----	^k 1.84	^f 1.44	^t .127	.020	-----
13	2.91	-----	.596	.60	.257	ⁱ .267	-----	^r .118	-----	^k 1.84	1.48	^t .125	^u .015	.015
Averages	2.91	2.19	0.603	0.603	0.263	0.263	0.120	0.118	0.119	1.85	1.45	0.124	0.020	0.019
Recommended values	2.91	2.19	0.603	-----	0.263	-----	0.120	-----	-----	1.85	1.45	0.124	0.020	0.019

^a Precipitated at 40° C, washed with a 1-percent solution of KNO₃ and titrated with alkali standardized by the use of National Bureau of Standards acid potassium phthalate and the ratio 23NaOH:1P.
^b Sample annealed by covering with a layer of graphite, and heating for 20 minutes at 685° C.
^c Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₈, and use of the ratio 2I:1S.
^d Colorimetric method. See J. Research NBS 26, 405 (1941) RP1386.
^e Double dehydration.
^f Finished by electrolysis.

^g Potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^h Weighed as NiO.
ⁱ Titrating solution standardized by use of a standard iron.
^j Dissolved in HCl (1+1).
^k Perchloric acid dehydration.
^l Copper precipitated as CuCNS. Precipitate dried at 105° C.
^m Copper precipitated with Na₂S₂O₈. Finished by electrolysis.

ⁿ Colorimetric method, using diphenylcarbazide.
^o Colorimetric method.
^p Weighed as ammonium phosphomolybdate.
^q Sulfur dioxide absorbed in H₂O₂ solution (pH5). Solution titrated with 0.01N NaOH to pH5.
^r Titrating solution standardized by use of a standard steel.
^s Products of combustion passed through neutral H₂O₂ solution. Titration with NaOH, using methyl red. Alkali standardized with a standard steel.
^t Glyoxime precipitate titrated with KCN.
^u Perchloric acid oxidation.

LIST OF ANALYSTS*

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Ferrous Laboratory, National Bureau of Standards; analysis by John L. Hague, Albert S. Johnson, and John P. Hewlett, Jr. 2. R. H. Elder and Roy E. Deas, American Cast Iron Pipe Co., Birmingham, Ala. 3. Lewis Graham and Reuben E. Dehart, Lynchburg Foundry Co., Radford, Va. 4. E. C. Raysor, Bethlehem Steel Co., Coatesville, Pa. 5. Jones and Laughlin Steel Corporation; H. E. Slocum, director of chemical laboratories. Analysis by Pittsburgh Works, J. D. Ritz, chief chemist.
 Jones and Laughlin Steel Corporation; H. E. Slocum, director of chemical laboratories. Analysis by Aliquippa Works, D. J. Hallisey, chief chemist. | <ol style="list-style-type: none"> 7. H. Bornstein, Deere and Co., Moline, Ill. 8. Charles O. Geyer, Inland Steel Co., East Chicago, Ind. 9. C. E. Nesbitt, Carnegie-Illinois Steel Corporation, Edgar Thomson Works, Braddock, Pa. 10. T. S. Woodward, Carnegie-Illinois Steel Corporation, Ohio Works, Youngstown, Ohio. 11. G. P. Burks, Carnegie-Illinois Steel Corporation, Gary Works, Gary, Ind. 12. L. P. Chase, Carnegie-Illinois Steel Corporation, South Works, Chicago, Ill. 13. W. D. Brown, Carnegie-Illinois Steel Corporation, Duquesne Works, Duquesne, Pa. |
|---|---|