

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE No. 16c

BASIC OPEN-HEARTH STEEL, 1.0% CARBON

ANALYST*	C	Mn		P		S		Si	COPPER FeS-CuS-CuO	NICKEL Weighed as nickel dimethylglyoxime	CHROMIUM FeSO ₄ -KMnO ₄ titration	VANADIUM	MOLYBDENUM	ARSENIC
	CARBON Direct combustion	MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄)	2. Other methods	PHOSPHORUS 1. Alkali-Molybdate ^a	2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after re- moval of arsenic)	1. SULPHUR (Direct oxidation and final precipitation in re- duced solution)	2. SULPHUR Evolution with HCl (1:1) ZnS-Iodine (theoretical sul- phur titre) ^b	SILICON Sulphuric acid dehydra- tion						
1	1.00	0.385		0.032	0.031	0.045	0.043	0.170	0.066	0.026	0.046 ^c	0.004 ^c	<.001	
2	1.02		0.391	.034			.043 ^d	.163	.056 ^e	.024 ^f	.046 ^g	.002	.001	
3	1.02		.392 ^h	.034 ^h	.033	.046	.045	.167	.056 ^e	.020	.044	.004		
4	1.02	.391		.034				.172	.065					
5	1.01		.394	.034	.033	.043	.044	.163 ⁱ	.064	.020	.048			
	1.02	.381	.389	.032		.044	.043	.164	.055	.024	.045			
7	1.01		.388	.034	.033	.043	.042	.170	.065	.022	.050	.002	.002	
8	1.01		.384	.032 ^h		.045	.042 ^d	.172	.056 ^j	.021	.040 ^k	.001	.003	
9	1.01	.385		.033 ^h	.031	.041	.039	.166	.060	.018	.038	<.001	.002	
10	1.01		.394	.035			.041	.172			.048	.002		
11	1.02		.394	.030	.031	.043	.042	.169 ^l	.059 ^e	.024 ^f	.046 ^g	.002		
12	1.02		.392	.033 ^h		.044	.044	.170		.03	.043			
13	1.02	.383		.029 ^m	.030	.045		.164	.063 ^e	.019	.046	.001	<.001	0.007 ⁿ
Averages	1.01	.385	.391	.033	.032	.044	.042	.168	.060	.023	.045	.002	.002	.007
Recommended values	1.01	.385		.032			.044	.168	.060	.023	.045	.003	.001	

(a) Precipitated at 40° C., washed with 1 percent KNO₃ and titrated with alkali standardized by the use of National Bureau of Standards Standard Acid Potassium Phthalate and the 23:1 ratio.

(b) Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₈.

(c) Potentiometric titration with FeSO₄ standardized

against recrystallized K₂Cr₂O₇.

(d) Absorbed in CdCl₂.

(e) Finished by electrolysis.

(f) Nickel dimethylglyoxime precipitate dissolved and titrated with KCN.

(g) Chromium oxidized with HClO₄.

(h) Titration solution standardized by means of National Bureau of Standards standard steel.

(i) Nitric-sulphuric method.

(j) Iodide method. Sodium thiosulphate titrating solution standardized against copper.

(k) Colorimetric method.

(l) HClO₄ dehydration.

(m) Molybdate reduced and titrated.

(n) Direct Gutzzeit.

* LIST OF ANALYSTS

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| 1. Ferrous Laboratory, National Bureau of Standards, H. A. Bright in charge; analysis by R. M. Fowler and J. W. Knowlton. | 7. W. F. Muehlberg, American Steel & Wire Co., Cleveland District Laboratory, Cleveland, Ohio. |
| 2. G. A. Hopkins, Carnegie Steel Co., Homestead Works, Homestead, Pa. | 8. J. C. Redmond, Battelle Memorial Institute, Columbus, Ohio. |
| 3. W. E. Steiner, Bethlehem Steel Co., Cambria Plant, Johnstown, Pa. | 9. L. P. Chase, Illinois Steel Co., South Works, Chicago, Ill. |
| 4. M. E. McDonnell, The Pennsylvania Railroad, Altoona, Pa. | 10. C. E. Nesbitt, Carnegie Steel Co., Edgar Thompson Works, Braddock, Pa. |
| 5. A. D. Beers, Illinois Steel Co., Gary Works, Gary, Ind. | 11. L. H. James, Reo Motor Car Co., Lansing, Mich. |
| 6. Grundner, The Lincoln Electric Co., Cleveland, Ohio. | 12. The Chemical Laboratory of the Timken Steel & Tube Co., Canton, Ohio. |
| | 13. P. J. Byler, Booth, Garrett & Blair, Philadelphia, Pa. |

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

Washington, D. C.

February 5, 1935

LYMAN J. BRIGGS,

Director.