

National Bureau of Standards Certificate of Analyses

OF

STANDARD SAMPLE 13D

BASIC OPEN-HEARTH STEEL, 0.6% CARBON

| ANALYST* | C | Mn | | P | | S | | Si | COPPER H ₂ S-CuS-CuO | NICKEL Weighed as nickel dimethylglyoxime | CHROMIUM FeSO ₄ -KMnO ₄ titration | VANADIUM | MOLYBDENUM Colorimetric |
|--------------------|-------------------|--|---------------------|---|-------------------------------|--|--|------------|------------------------------------|--|--|----------|----------------------------|
| | Direct combustion | Bismuthate (FeSO ₄ -KMnO ₄) | Persulfate-Arsenite | Gravimetric (weighed as MgF ₂ O ₇ after removal of arsenic) | Alkali-Molybdate ^a | Gravimetric (direct oxidation and final precipitation in reduced solution) | Evolution with HCl (1-1) ZnS-Iodine (theoretical sulfur titre) | Combustion | | | | | |
| 1 | 0. 575 | 0. 923 | 0. 924 | 0. 015 ^c | 0. 016 | 0. 025 | 0. 026 | d 0. 265 | 0. 023 | 0. 010 | e 0. 023 | f 0. 002 | 0. 002 |
| 2 | . 580 | g. 926 | g. 913 | | g. 015 | | g. 026 | dh. 274 | i. 021 | i. 014 | . 026 | k. 002 | . 003 |
| 3 | . 573 | g. 921 | g. 928 | | g. 018 | | g. 027 | h. 268 | i. 021 | . 009 | l. 023 | k. 002 | . 003 |
| 4 | . 581 | m. 917 | | n. 018 | g. 018 | . 027 | . 027 | . 257 | . 019 | . 016 | . 021 | . 003 | . 004 |
| 5 | . 576 | m. 920 | | n. 015 | . 016 | . 025 | g. 026 | . 025 | o. 257 | . 023 | p. 006 | . 020 | . 001 |
| | . 570 | | g. 920 | | . 018 | | . 024 | . 273 | i. 027 | . 010 | . 025 | k. 002 | . 002 |
| 7 | . 587 | . 92 | . 92 | | g. 016 | . 025 | g. 025 | . 263 | | | | | |
| 8 | . 572 | | g. 922 | . 018 | g. 019 | . 025 | | . 025 | dh. 267 | . 020 | . 009 | . 023 | k. 003 |
| 9 | . 570 | . 922 | . 93 | | . 019 | | . 027 | do. 260 | . 030 | p. 010 | l. 020 | | . 002 |
| 10 | . 579 | | . 94 | | . 020 | . 027 | . 026 | . 268 | q. 020 | i. 012 | q. 026 | | |
| 11 | . 572 | | . 929 | . 016 | g. 017 | . 023 | . 023 | dh. 264 | . 020 | . 012 | . 024 | k. 004 | . 002 |
| 12 | . 573 | . 928 | | n. 016 | . 016 | | . 024 | do. 271 | q. 016 | . 012 | . 020 | . 002 | . 001 |
| 13 | . 586 | | g. 920 | . 016 | g. 017 | . 025 | . 026 | . 263 | i. 020 | i. 011 | . 024 | k. 002 | . 003 |
| Averages | . 576 | . 922 | . 925 | . 016 | . 017 | . 025 | . 026 | . 024 | . 265 | . 022 | . 010 | . 023 | . 002 |
| Recommended values | 0. 576 | 0. 924 | | 0. 016 | | 0. 025 | | 0. 265 | 0. 022 | 0. 010 | 0. 023 | 0. 002 | 0. 002 |

^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 23 NaOH:1 P.
^b Value obtained by standardizing the titrating solution by means of sodium oxalate through KMnO₄ and Na₂S₂O₃, and use of the ratio 2 I:1 S.
^c Colorimetric method. See J. Research NBS 26, 405 (1941) RP1386.
^d Double dehydration.

^e Persulfate oxidation, potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^f Nitric acid oxidation, potentiometric titration with ferrous ammonium sulfate solution standardized with recrystallized potassium dichromate.
^g Titrating solution standardized by use of a standard steel.
^h Perchloric acid dehydration.

ⁱ Finished by electrolysis.
^j Dimethylglyoxime colorimetric method.
^k Hydrogen peroxide colorimetric method.
^l Perchloric acid oxidation.
^m Titration with sodium arsenite.
ⁿ Weighed as ammonium phosphomolybdate.
^o Nitric-sulfuric acid dehydration.
^p Titration with KCN solution.
^q Colorimetric method.

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The steel for the preparation of this standard was furnished by the Carnegie-Illinois Steel Corporation.