

DEPARTMENT OF COMMERCE
Bureau of Standards
Certificate of Analyses
 OF
 STANDARD SAMPLE NO. 65a
ACID ELECTRIC STEEL

| ANALYST* | C | Mn | | P | | S | | Si | Cu | Ni | MnO | V | MnO ₂ | As |
|-----------------------|-----------------------------|---|-------|---|-------------------|---|-------------------|---------------------------------------|------------------------------------|--|---|--------------------|---------------------------|--------------------|
| | CARBON Direct combustion | MANGANESE 1. Bismuthate (FeSO ₄ -KMnO ₄) 2. Persulphate Arsenite | | PHOSPHORUS 1. Alkali-Molybdate 2. Gravimetric (Weighed as Mg ₂ P ₂ O ₇ after removal of arsenic) | | SULPHUR 1. Sulphur (Direct oxidation and final precipitation in reduced solution) 2. Sulphur (Extraction with HCl (1:1) ZnS-Iodine (theoretical sulphur titre ^b)) | | SILICON Sulphuric acid dehydration | COPPER H ₂ S-CuS-CuO | NICKEL Weighed as nickel dimethylglyoxime | MANGANESE FeSO ₄ -KMnO ₄ titration | VANADIUM | MANGANESE Colorimetric | ARSENIC |
| 1..... | 0.256 | 0.750 | 0.752 | 0.034 | 0.034 | 0.050 | 0.050 | 0.453 | 0.182 ^c | 0.243 | 0.173 ^d | 0.007 ^a | 0.003 | 0.012 ^e |
| 2..... | .252 | .744 | .744 | .037 | .037 | .051 ^f | .051 ^g | .451 ^h | .167 ⁱ | .228 ^j | .190 | | | |
| 3..... | .261 | .747 | .742 | .037 | .036 ^k | .048 | .048 | .441 | .168 | .237 | .177 | | .005 | |
| 4..... | .260 | .740 | .740 | .037 | | | .048 ^l | .434 ^l | .186 ^l | .245 | .190 | | | |
| 5..... | .263 | .755 | .749 | .038 ^m | .037 | .050 | .051 ⁿ | .434 | .180 | .237 | .168 | | | |
| 6..... | .254 | .754 | .744 | .036 | .034 | .046 | .047 | .436 | .172 ⁿ | .248 | .173 | .005 | .006 | |
| 7..... | .254 | .743 | .743 | .038 ^m | | .047 | .048 ^o | .441 | | .23 | .187 | | | |
| | .264 | .748 | .748 | .036 | | .049 | .048 ^o | .439 | .182 | .252 | | | | |
| 9..... | .255 | .743 | .743 | .038 | .037 | .047 ^f | .049 ^q | .439 | .182 | | | | | |
| 10..... | .258 | .750 | .750 | .039 | .040 | | .048 | .448 | .168 ^c | | | | | |
| 11..... | .253 | .744 | .744 | .036 | | | .048 | .435 ^o | .181 ^c | .244 | .172 | | | |
| 12..... | .259 | .751 | .745 | .038 | | | .048 | .440 | .174 | .257 | .176 | | | |
| 13..... | .260 | .740 | .740 | .037 ^p | .036 | .048 | .049 | .440 | .175 | .240 | | | | |
| Averages..... | .258 | .750 | .745 | .037 | .036 | .048 | .049 | .441 | .176 | .242 | .178 | .006 | .005 | .012 |
| General Averages..... | .258 | .748 | .745 | .036 | .036 | .048 | .048 | .441 | .176 | .242 | .178 | .006 | .005 | .012 |

* Precipitated at 40°C., washed with 1 per cent KNO₃ and titrated with alkali standardized against B. S. acid potassium phthalate, using the 2:1 ratio.
^b Value obtained by standardization of titrating solution against sodium oxalate through KMnO₄ and Na₂S₂O₃.
^c Finished by electrolysis.
^d Potentiometric titration.

^e Distillation as AsCl₃, precipitation as As₂S₃, conversion to Ag₂AsO₄ and titration with KCN.
^f Precipitated in FeCl₃ solution.
^g Absorbed in CdCl₂.
^h HCl-HNO₃ dehydration.
ⁱ Iodide method.
^j Solution of nickel dimethylglyoxime and KCN titration.

^k Weighed as ammonium phospho-molybdate.
^l H₂SO₄-HNO₃ method.
^m Titrating solution standardized against standard steel.
ⁿ Colorimetric method.
^o HClO₄ dehydration.
^p Titrating solution standardized against oxalic acid.

*** LIST OF ANALYSTS**

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| <ol style="list-style-type: none"> 1. Ferrous Laboratory Bureau of Standards, H. A. Bright in charge; analysis by R. M. Fowler and J. C. Redmond. 2. O. L. Van Valkenburgh, Halcomb Steel Co., Syracuse, N. Y. 3. G. G. Gingrich, Lebanon, Steel Foundry, Lebanon, Pa. 4. C. E. Farquhar, Fort Pitt Steel Casting Co., McKeesport, Pa. 5. T. W. Ellis, Mesta Machine Co., Pittsburgh, Pa. 6. John Disario, United States Steel Products Co., Columbia Department, Torrance, Calif. 7. J. L. Roeder and J. H. Tanquary, Sivy Steel Casting Co., Chicago, Ill. | <ol style="list-style-type: none"> 8. H. A. Burkhardt, E. C. Atkins & Co. (Inc.), Indianapolis, Ind. 9. F. W. Washburn, International Harvester Co., Wisconsin Steel Works, South Chicago, Ill. 10. J. W. Ivance, Chicago, Burlington & Quincy Railroad Co., Aurora, Ill. 11. W. G. Rinehart and R. J. Flanigan, American Chain Co., Research Department, Bridgeport, Conn. 12. O. R. Bartz, Sivy Steel Casting Co., Milwaukee, Wis. 13. F. C. Garner, Michigan Steel Casting Co., Detroit, Mich. |
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This standard is not recommended for colorimetric carbon determinations, because of uncertainty as to the condition of the carbon.

Washington, D. C.
 August 20, 1930

George K. Burgess
 Director.