# National Institute of Standards & Technology

# Certificate of Analysis

## Standard Reference Material 179

### High-Silicon Steel

(In Cooperation with the American Society for Testing and Materials)

This Standard Reference Material (SRM) is in chip form for use in chemical analysis. It also is available in solid form as SRM 1135 primarily for application in optical emission and X-ray spectrometric methods of analysis.

| Element | Percent by wt. |
|---|---|
| Carbon | 0.027 |
| Manganese | 0.094 |
| Phosphorus | 0.006 |
| Sulfur | 0.026 |
| Silicon | 3.19 |
| Copper | 0.056 |
| Nickel | 0.050 |
| Chromium | 0.022 |
| Vanadium | <.01 |
| Molybdenum | 0.014 |
| Aluminum | 0.0028 |
| Tin | 0.004 |

**CERTIFICATION:** The value listed for an element is the *best estimate* of the "true" value based on the cooperative results. The value is not expected to deviate from the "true" value by more than ± 1 in the last significant figure reported.

The analytical program included the chemical analyses for certification of the solid-form material, SRM 1135, and the chemical analyses for intercomparisons of the results obtained on SRM 1135 with those obtained on this chip-form material, SRM 179. No analytically significant differences were observed between the two forms of material.

**PLANNING, PREPARATION, TESTING, ANALYSIS:** For many metal SRMs it is desirable to have the material in two forms: chips, primarily for chemical analysis, and solids, primarily for optical emission and X-ray spectrometric methods of analysis. Before SRM 1135 (solid form) was prepared, plans were made to provide the same material in chip form as SRM 179.

The material for this standard was prepared by the Armco Steel Corporation. A single ingot was pressed to a slab with one dimension of the cross section four times that of the other dimension. After cropping top and bottom, the slab was cut lengthwise and the center section, corresponding to about one-fourth of the original ingot, was discarded. About half of the slab material was rolled into rounds 127 mm (5 in) in diameter to be chipped at NIST for SRM 179. The remaining material was hot rolled to oversized rods, annealed, and centerless ground to final rod size for SRM 1135.

Gaithersburg, MD 20899
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(Revision of certificate dated 7-15-76)

Thomas E. Gills, Chief
Standard Reference Materials Program

(over)

Extensive homogeneity testing was performed at NIST and included metallographic studies by C.H. Brady, optical emission spectrometric analysis by D.M. Bouchette and J.L. Weber, Jr., X-ray spectrometric analysis by S.D. Rasberry and J. McKay, and chemical analysis by J.R. Baldwin and S.A. Wicks. The testing revealed the entire lot of material to be of high homogeneity.

The overall coordination of the technical measurements leading to the certification of SRM 179 was performed jointly by J.I. Shultz, Research Associate, ASTM/NIST Research Associate Program, and R.E. Michaelis. Revision of this SRM was coordinated through the Standard Reference Materials Program by P.A. Lundberg.

Chemical analyses for certification of the solid-form material, SRM 1135, were performed in the analytical laboratories of Armco Steel Corp., Research and Technology, Middletown, OH, M. Dannis and R.L. LeRoy, U.S. Steel Corp., Applied Research Lab., Monroeville, PA, W.R. Bandi and J.L. Lutz, Gary Steel Works, Gary, IN, E.H. Shipley, and Geneva Works, Geneva, UT, G.K. Stewart; and the NIST Analytical Chemistry Division, J.R. Baldwin, R.K. Bell, E.R. Deardorff, E.J. Maienthal, T.C. Rains, T.A. Rush, and S.A. Wicks.

Chemical analyses for intercomparisons of SRMs 1135 and 179, leading to the certification of this chip form material, SRM 179, were performed in the analytical laboratories of Armco Steel Corp., Research and Technology, M. Dannis and R.L. LeRoy.