

Certificate of Analysis

Standard Reference Material 483

Fe-3Si Alloy Microprobe Standard^c

This standard is characterized for chemical homogeneity of iron and silicon at the micrometer level of spatial resolution and is satisfactory for use as a homogeneous material for electron probe microanalysis.

SRM	Silicon	Iron (by difference)
	Weight, percent	
483	3.22 ^b ± 0.02 ^c	96.7 - 96.8

^aSize: 3 mm × 3 mm × 0.28 mm thick. The material is from coarse-grained sheet stock having the so-called Goss orientation in which a [110] grain is parallel to the surface and [001] is the rolling direction. Each sample is supplied HF etched and ready for metallographic mounting and polishing.

^bDetermination of silicon involved 49 samples of SRM 483. SRM 125b, certified at 2.89 wt. % Si, was used as a control standard and 2.90 wt. % Si was found.

Method: One gram samples were dissolved in hydrochloric and nitric acids. A double dehydration of the silicon with perchloric acid was made with an intervening filtration. The weight of silicon present was determined from the loss resulting from treatment with hydrofluoric acid. Analyst - R. A. Paulson, NBS Analytical Chemistry Division.

^cStandard deviation of a single determination based on results obtained on SRM's 483 and 125b, but also including similar method error estimations from previous determinations.

HOMOGENEITY TESTING AND QUANTITATIVE ANALYSIS BY ELECTRON PROBE MICROANALYSIS

Homogeneity was checked by means of quantitative raster scanning in which a square matrix (1.1 mm × 1.1 mm) of individual points is analyzed by the microprobe. Each matrix represents 400 separate analyses. Six selected matrices were run for iron and silicon with three of these rerun. The coefficient of variation for both the iron and silicon is less than one percent. Analysts - H. Yakowitz, NBS Metallurgy Division, and C. E. Fiori, NBS Analytical Chemistry Division.

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Quantitative microprobe analysis of this alloy gave a silicon content of 3.14 wt. % and an iron content of 96.9%. Analyst - H. Yakowitz, NBS Metallurgy Division.

Details of the microprobe testing and analyses, as well as the sample preparation, are given in NBS Special Publication 260-22, Standard Reference Materials: Homogeneity Characterization of Fe-3Si Alloy, H. Yakowitz, C. E. Fiori, and R. E. Michaelis, Feb. 1971.

The technical and support aspects involved in the preparation, certification, and issuance of this standard were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.

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J. Paul Cali, Chief
Office of Standard Reference Materials