U.S. Department of Commerce
Juanita M. Kreps
Secretary

al Bureau of Standards
st Ambler, Director

National Bureau of Standards Certificate of Analysis

Standard Reference Material 937

Iron Metal

(Clinical Standard)

This Standard Reference Material is certified as a material of known purity for use as an assay standard for iron. It is intended primarily for the calibration of instrumentation and standardization of procedures employed in clinical analysis and for the routine evaluation of daily working standards used in these procedures.

Assay 99.90 ± 0.02 percent by weight

The assay shown is based on dissolution of representative samples in hydrochloric acid followed by reduction of the iron with stannous chloride and oxidation of the excess stannous chloride with mercuric chloride. Most of the iron was oxidized with a known weight of potassium dichromate and the remaining iron was titrated with potassium dichromate solution. The estimated uncertainty shown is based on judgment and includes allowances for known sources of possible error.

SRM 937 is electrolytic grade iron. Chemical analyses made on representative samples showed the presence of the following elements at the indicated concentrations in percent by weight: nickel, 0.041%; silicon, 0.008%; carbon, chromium, and cobalt, each 0.007%; copper, manganese, oxygen, and sulfur, each 0.006%; molybdenum, 0.005%; phosphorous, 0.003%; germanium and nitrogen, each 0.001%; with the total of all other elements <0.003%.

The iron content, by difference, is 99.89+%, which is in agreement with the assay value.

The chemical assay was performed by B. I. Diamondstone; the elemental determinations by R. Alvarez, J. R. Baldwin, E. Belkas, B. S. Carpenter, M. M. Darr, E. R. Deardorff, T. E. Gills, L. A. Machlan, E. J. Maienthal, L. J. Moore, C. W. Mueller, T. J. Murphy, P. J. Paulsen, K. M.Sappenfield, B. A. Thompson, and S. A. Wicks.

The overall direction and coordination of the technical measurements leading to certification were under the chairmanship of I. L. Barnes.

The technical and support aspects concerning preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. Alvarez.

Washington, D.C. 20234
June 9, 1978

J. P. Cali, Chief
Office of Standard Reference Materials

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This Standard Reference Material is intended for "in vitro" diagnostic use only.

This material is intended for use as a standard for iron determination in clinical chemistry.

Preparation of stock iron standard solution (0.02 mmol/mL)

Weigh approximately 1 g of SRM 937 to the nearest 0.1 mg and transfer it to a one-liter volumetric flask. Dissolve the metal in 100 mL of 6 mol/L HCl and dilute to one liter with water

The exact concentration of this stock solution, in mmol/mL, is expressed by:

$$\frac{\text{mg (SRM 937)} \times 0.999}{55.847 \times 1000}$$

Preparation of working stock iron standard solution (0.2 μmol/mL)

Transfer 10 mL of the stock iron standard solution to a one-liter volumetric flask and add 0.2 mol/L HCl to the graduation line.

Preparation of working iron standard solutions

Prepare more dilute solutions by pipetting known volumes of the working stock iron standard solution into volumetric flasks and diluting to the graduation line with 0.2 mol/L HCl. These solutions should be prepared daily. [Note: In the preparation of very dilute solutions, the 0.2 mol/L HCl may contain sufficient iron, as an impurity, to affect the calculated iron concentrations of these dilute solutions.]

Precautions: All volumetric glassware used should conform to the specifications for Class A glassware and, for highest accuracy, should be individually calibrated and used at the calibration temperature [1]. All glassware should be cleaned in hot dilute HCl and rinsed in distilled water.

This SRM should be stored in the tightly closed original bottle under normal laboratory conditions.

Reference:

[1] J. Lembeck, The calibration of small volumetric laboratory glassware, NBSIR 74-461, National Bureau of Standards, Washington, D.C. 20234.

The date of issuance and certification of this Standard Reference Material was June 9, 1978.