U. S. Department of Commerce
Malcolm Baldrige
Secretary
National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate

Standard Reference Material 1642b

Mercury in Water – ng/mL

This Standard Reference Material is intended for use in the primary standardization of instruments and techniques used for the determination of mercury in water. It is intended for use as received, without dilution or other alteration. The concentration of mercury in this Standard Reference Material is at, or near, the detection limit of most commercial instruments used for the determination of mercury in water. It is to be used for the primary standardization of these instruments near these detection limits where many analytical problems occur.

Mercury Concentration 1.49 ± 0.06 ng/mL

The estimated uncertainty, 0.06, includes the effects of the observed random variability and an upper bound estimate of possible systematic errors. The random variability expressed as two standard deviations of the certified value is ± 0.04 and reflects both internal and between-method variabilities for the NBS atomic absorption and neutron activation measurements. The upper bound estimate of possible systematic errors is ± 0.02.

Stability: Trace mercury solutions have been a constant problem when long-term storage is required. Below the μg/mL level, mineral acid stabilization is not sufficient. A stabilizing technique has been applied to this Standard Reference Material that allows for prolonged storage. Gold, as the tetrachloride, has been added in a concentration 10 times that of the mercury. The gold ion, in conjuction with the normal mineral acid, has proven to be an effective stabilizer. It is recommended that this Standard Reference Material not be used after ONE YEAR FROM DATE OF PURCHASE.

Precautions: Traces of mercury vapor are present in most laboratory situations. Therefore, contamination of reagents, equipment, and common laboratory materials is a severe problem. Apparatus for analyses at this level must be scrupulously cleaned immediately before use, and only the purest-grade reagents should be employed. After use, the bottle should be capped tightly and placed inside the aluminized bag, which should be folded and sealed with a sealing tape. This safeguard will assist in maintaining the integrity of the sample.

Analytical: Two independent techniques were used in the certification of this Standard Reference Material: atomic absorption spectroscopy and neutron activation analysis.

Use: This Standard Reference Material should be used, as received, without dilution. It may be carried through the chemical manipulations required for the analytical procedure normally used for the analysis of natural waters.

This Standard Reference Material was prepared by J.R. Moody. Atomic absorption analyses were performed by I.C. Rains and T.A. Butler and neutron-activation analyses were performed by R. Zeisler.

The overall direction and coordination of the technical measurements leading to the certification were performed under the chairmanship of E.L. Garner. The statistical evaluation was done by R.C. Paule.

The technical and support aspects involved in the 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
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George A. Uriano, Chief
Office of Standard Reference Materials