



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material<sup>®</sup> 919a

#### Sodium Chloride

#### (Clinical Standard)

This Standard Reference Material (SRM) is intended primarily for the production of saline solutions of accurately known concentrations as well as in the calibration of instrumentation and standardization of procedures used in the determination of sodium and chloride ions in clinical analyses. A unit of SRM 919a consists of approximately 30 g of sodium chloride.

Certified Purity: 99.89 %  $\pm$  0.03 % (mass fraction)

Chloride was determined on 12 dried samples by a modified method of Marinenko and Taylor [1] and indicated a purity of 99.89 % mass fraction, based on stoichiometric sodium chloride (NaCl). Stoichiometry of the SRM was corroborated by gravimetric assay of the sodium as sodium sulfate following ion exchange separation of the sodium. The gravimetric assays and analyses for specific impurities indicate that the only impurity present at a level above 100  $\mu$ g/g is occluded water.

The certified purity, listed above, is based on drying a sample for 3 h at 110 °C. The uncertainty is the half-width of a 95 % confidence interval for the certified purity of this material. Dried samples should be stored over anhydrous magnesium perchlorate before use. Two samples ignited at 650 °C for 2 h and assayed coulometrically indicated a purity of 100.01 % mass fraction. This increase results from the elimination of occluded moisture, which is not quantitatively eliminated by drying or ignition at lower temperatures.

**Expiration of Certification:** This certification will be valid for five years from the date of shipment.

#### NOTICE AND WARNING TO USERS

**Storage:** SRM 919a should be stored in the tightly closed original bottle under normal laboratory conditions.

#### INSTRUCTIONS FOR USE

At room temperature, sodium chloride is hygroscopic above 60 % relative humidity. The absorbed water can be removed, however, by drying for 3 h at 110 °C and storing over freshly exposed phosphorus pentoxide (P<sub>2</sub>O<sub>5</sub>) or magnesium perchlorate (Mg(ClO<sub>4</sub>)<sub>2</sub>). It is recommended that weighing and other manipulations not be made when the relative humidity exceeds 60 percent.

#### SRM 919a IS INTENDED FOR “IN VITRO” DIAGNOSTIC USE ONLY!

Analyses were performed in the Inorganic Analytical Research Division by K.W. Pratt, T.A. Rush, T.W. Vetter, and Zhen Xu, Guest Scientist.

The overall direction and coordination of technical measurements leading to the certification were under the chairmanship of K.W. Pratt of the NIST Analytical Chemistry Division.

Statistical analysis of the data was made by S.B. Schiller of the NIST Statistical Engineering Division.

Willie E. May, Chief  
Analytical Chemistry Division

Robert L. Watters, Jr., Acting Chief  
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Gaithersburg, MD 20899  
Certificate Issue Date: 23 April 2004  
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The technical and support aspects concerning the issuance of this SRM were coordinated through the NIST Standard Reference Materials Program by B.S. MacDonald of the NIST Measurement Services Division.

This material was examined for compliance with the specifications for reagent grade sodium chloride as given in Reagent Chemicals, 7th ed., (1987) published by the American Chemical Society, Washington, DC. The material meets or exceeds the minimum requirements in every respect.

A semiquantitative survey for trace elements by flame atomic emission spectrometry indicated the presence of potassium 9 µg/g, and calcium 6 µg/g.

The estimated uncertainty for each of these mass fractions is 20 %. This survey also indicated less than 20 µg/g cesium (Cs), less than 0.03 µg/g lithium (Li), and less than 0.5 µg/g rubidium (Rb). Magnesium (Mg) was determined to be less than 0.05 µg/g by flame atomic absorption spectrometry. In addition, barium (Ba) was determined to be less than 5 µg/g by direct current (DC) arc, atomic emission spectroscopy.

**Preparation of Standard Solution:** A standard solution of 100.0 mmol of NaCl per liter may be prepared by weighing 5.851 g of SRM 919a (dried at 110 °C for 3 h, into a one-liter volumetric flask and adding 3 mL of concentrated nitric acid (HNO<sub>3</sub>) (ACS reagent grade or equivalent) and 100 mL of deionized water. After the NaCl is dissolved, dilute to the mark with deionized water. The concentration required for the analytical procedure may be prepared by accurate dilution of the standard solution with deionized water. Solutions of SRM 919a are stable indefinitely when stored in a well-stoppered, all-glass container. All such solutions should be clear and display no turbidity.

#### REFERENCES

- [1] Marinenko, G.; Taylor, J.K.; *Precise Coulometric Titrations of Halides*; J. Res. Natl. Bur. Stand. (U.S.). Vol. 67A, pp. 31-35 (1963).
- [2] *Clinical Chemistry: Principles and Techniques*; Henry, R.J.; Cannon, D.J.; Winkelman, J., Eds.; Harper and Row: New York, pp. 56-57, pp. 713-714 (1974).
- [3] Tietz, N.W.; *Textbook of Clinical Chemistry*; W.B. Saunders Co.: Philadelphia, PA, pp. 1177-1184 (1986).

**Certificate Revision History:** 23 April 2004 (This revision reports editorial changes); 19 February 1991 (Original certificate date).

*Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail [srminfo@nist.gov](mailto:srminfo@nist.gov); or via the Internet at <http://www.nist.gov/srm>.*