



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material<sup>®</sup> 914a

#### Creatinine

This Standard Reference Material (SRM) is certified as a chemical of known purity. It is intended primarily for use in the calibration and standardization of procedures used for determination of creatinine concentration and for routine evaluations of daily working standards used in these procedures.

The certified purity for this SRM is shown below. The estimated uncertainty of the purity is based upon scientific judgment and statistical analysis of the numerous analytical tests applied to the material in the certification process.

$$99.7 \pm 0.3 \%$$

**Expiration of Certification:** The certification of **SRM 914a** is valid for 5 years from the date of shipment from NIST, within the measurement uncertainty specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Handling, Storage, and Use"). The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

**Maintenance of SRM Certification:** NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet or register online) will facilitate notification.

Contributions to the certification and characterization of this SRM were made by A. Cohen, B. Coxon, S.A. Margolis, and E. White V of the former NIST Organic Analytical Research Division and M. Knoerdel, W.F. Koch, G. Marinenko, and S.F. Stone of the former NIST Inorganic Analytical Research Division.

Overall direction and coordination of the technical measurements leading to the certification were provided by R. Schaffer of the former NIST Organic Analytical Research Division.

Statistical consultation and analyses were provided by R.C. Paule, formerly of NIST.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

*This Certificate of Analysis has undergone editorial revision to reflect program and organizational changes at NIST and at the Department of Commerce. No attempt was made to reevaluate the certificate values or any technical data presented on this certificate.*

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Chemical Sciences Division

Gaithersburg, MD 20899  
Certificate Issue Date: 16 December 2015  
*Certificate Revision History on Last Page*

Robert L. Watters, Jr., Director  
Office of Reference Materials

## NOTICE AND WARNINGS TO USERS

SRM 914a IS INTENDED FOR RESEARCH USE.

## INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

**Storage:** This SRM should be stored tightly closed, preferably in its original container, at room temperature (30 °C or less). It should not be subjected to heat or direct sunlight during storage. Refrigerated storage is recommended.

**Use:** We do not recommend heat and/or vacuum treatment for reducing the water content of the material. A "stock" standard solution containing 1 mg/mL of creatinine may be prepared by weighing 0.1003 g of SRM 914a into a 100 mL volumetric flask, filling the flask nearly to the mark with 0.1 mol/L hydrochloric acid, agitating until dissolution of the creatinine is achieved, followed by filling the flask to the mark with 0.1 mol/L hydrochloric acid. This solution should be stored in a refrigerator. A "working" standard containing 20 µg/mL of creatinine may be prepared by diluting 2.0 mL of the "stock" standard solution to 100 mL with distilled water in a volumetric flask [1]. This "working" standard solution should be prepared daily.

**Stability of Prepared Solutions:** The "stock" standard solution containing 1 mg/mL, prepared as described above, is stable indefinitely when stored in a refrigerator at 4 °C in a well-stoppered, all-glass container. The dilute "working" standard solution should be prepared daily from the "stock" standard solution [2].

## PREPARATION AND ANALYSIS<sup>(1)</sup>

The homogeneity of the SRM was measured by acidimetric titration. Purity of the SRM was determined by an evaluation of both the results of acidimetric titration and the results of a number of analytical procedures to detect and measure potential impurities in the SRM. A number of additional analyses, which provide values of components of the material were performed to characterize the material. These are described below and are provided for informational purposes only.

The following values are not certified but are provided as they may be of interest to the user of this SRM. Moisture was determined by Karl Fischer titration to be 0.07 % by weight. The total ash of the material was 0.002 %. Insoluble matter upon dissolution in water was 0.005 %. Soluble chloride by ion chromatography was 0.0014 %; total chloride by neutron activation analysis was approximately 0.002 %. Nuclear magnetic resonance spectroscopy detected no impurities except methanol at 0.003 %. Elemental analysis by neutron activation analysis indicates, in addition to chloride, the presence of the following elements at the indicated approximate levels: Na, 0.4 µmol/mole; Mg, 3 µmol/mole; Al, 0.4 µmol/mole; K, 4 µmol/mole; Mn, 0.02 µmol/mole; Cu, 0.4 µmol/mole; Cr, 0.1 µmol/mole; Fe, 1.5 µmol/mole; Co, 0.2 µmol/mole; and Zn, 0.2 µmol/mole.

## REFERENCES

- [1] Tietz, N.W., *Fundamentals of Clinical Chemistry*, W.B. Saunders Co., Philadelphia, PA, pp. 722-726 (1970).
- [2] Henry, R.D., *Clinical Chemistry, Principles and Techniques*, Hoeber Medical Division, Harper & Row, New York, NY, pp. 292-302 (1967)

<b>Certificate Revision History:</b> 16 December 2015 (Editorial changes); 08 February 1994 (Editorial changes); 01 October 1984 (Original certificate issue date).
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*Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srminfo@nist.gov](mailto:srminfo@nist.gov); or via the Internet at <http://www.nist.gov/srm>.*

<sup>(1)</sup> Certain commercial equipment, instruments, or materials are identified in this certificate to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.