



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 999a

Potassium Chloride (Primary Chemical)

This Standard Reference Material (SRM) is intended for use as an analytical standard of known potassium (K) and chloride (Cl) content. This lot of potassium chloride (KCl) was prepared to ensure a material of high-purity and homogeneity and has been assayed for chloride after ignition at 500 °C. SRM 999a is supplied in crystalline form as a 60 g unit.

Certified Purity

Potassium Chloride, mass fraction	99.9817 (± 0.0084) %
Potassium, mass fraction	52.4354 (± 0.0044) %
Chloride, mass fraction	47.5463 (± 0.0040) %

This certified value is based on the results of independent coulometric assays of chloride as described below. Each uncertainty interval represents the expanded uncertainty, U , calculated according to the ISO Guide [1] with a coverage factor of 2 and represents the 95% level of confidence. The percent K and percent Cl are calculated by multiplying the KCl assay by the mass relationship (gravimetric factors for K to KCl and Cl to KCl). The factors are calculated from the 1991 IUPAC [2] recommended relative atomic masses: potassium 39.0983, chlorine 35.4527.

Expiration of Certification: This certification is valid for 5 years from the date of shipment from NIST. Periodic reanalysis of representative samples from this SRM lot will be performed, and if significant changes are observed within the five-year period, the purchaser will be notified by NIST. Please return the enclosed registration card to facilitate notification.

Coordination of the analyses was performed by J.R. Moody of the NIST Analytical Chemistry Division.

Coulometric analyses were performed in the NIST Analytical Chemistry Division by K.W. Pratt. Trace element (ICP-MS) analyses were performed in the NIST Analytical Chemistry Division by E.S. Beary and P.J. Paulsen.

Statistical analysis of the experimental data was performed by L.M. Oakley of the NIST Statistical Engineering Division.

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by J.C. Colbert.

Gaithersburg, MD 20899
April 17, 1995

Thomas E. Gills, Chief
Standard Reference Materials Program

NOTICE AND WARNINGS TO USERS

Stability and Storage: Solutions prepared from SRM 999a. Potassium Chloride, are stable indefinitely when stored in a glass-stoppered bottle, excepting concentration changes due to evaporation. All such solutions should be clear and display no turbidity. This SRM should be stored in the well-closed original container under normal laboratory conditions. It is recommended that weighing and other manipulations of the solid SRM not be made when the relative humidity exceeds 75%. It must be tightly re-capped after use and protected from moisture and light.

Homogeneity: This SRM was homogeneous within the uncertainty limits for the 380-mg sample size used for the coulometric assays. Samples less than 380 mg are not recommended in order to avoid possible inhomogeneities with smaller sample sizes.

INSTRUCTIONS FOR USE

Drying Instructions: Ignite for 4 h at 500 °C in platinum or Vycor¹ (Pyrex is unsatisfactory) vessels.

Source of Material: The KCl used for this SRM was obtained from the Aithaca Chemical Co., Uniondale, NY. The material was examined for compliance with the specification for reagent grade KCl as specified by the American Chemical Society [3]. The material was found to meet or exceed the minimum requirements in every respect.

Coulometric Assay: The assay value for this material was obtained by automated coulometric titration [4] of weighed KCl samples with coulometrically generated Ag⁺ and amperometric detection of the endpoint. The certified value represents the average result of thirteen such titrations of samples from ten randomly selected bottles from the entire lot of SRM 999a.

Trace Metal Analyses: Semiquantitative inductively-coupled plasma mass spectrometry analyses for general information on impurities indicate that the only species present in this SRM at a level greater than 20 µg/g are Bromine at 130 µg/g, Rubidium at 30 µg/g, and Sodium at ≤ 50 µg/g (detection limit).

REFERENCES

- [1] "Guide to the Expression of Uncertainty in Measurement", ISBN 92-67-10188-9, 1st Ed., ISO, Geneva, Switzerland, (1993).
- [2] De Laeter, J.R., et al., *Pure & Applied Chemistry*, **63** (7), 975-990, (1991).
- [3] *Reagent Chemicals*, 8th Ed., American Chemical Society, Washington, DC, (1993).
- [4] Pratt, K.W., *Anal. Chim. Acta*, **289**, 125-134, (1994).

¹Certain commercial materials are identified on this certificate to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards & Technology, nor does it imply that the materials identified are necessarily the best available for the purpose.