



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 193

Potassium Nitrate

(In Cooperation with Commission of the European Communities, Joint Research Center, Ispra Establishment, Italy)

This Standard Reference Material (SRM) is a highly purified and homogeneous lot of crystalline potassium nitrate (KNO_3). It is intended primarily for use in the fertilizer industry as a working standard in the determination of potassium and nitrate nitrogen. It is also useful as a standard in the determination of potassium and/or nitrate in a wide variety of analyses. The potassium nitrate was dried at 110 °C for two hours before using. It is supplied in a unit of 90 g.

<u>Element</u>	<u>Percent by Weight</u>
Potassium	38.66 ± 0.01 ^a
Nitrogen	13.85 ^b

^a The uncertainty value for the potassium represents the 95 percent confidence limits calculated as ts/\sqrt{n} , where $t = 2.228$, $s = 0.01$, $n = 11$.

^b Calculated value believed to be accurate within ±0.01 percent based on an assessment of all possible errors (see SUPPLEMENTAL INFORMATION on this Certificate).

The certified values are based on eleven gravimetric assays of four random samples from the lot of material in which the potassium nitrate was converted to potassium sulfate and the purity was calculated from the weight difference. These measurements were made by W.P. Schmidt and corroborated by B.I. Diamondstone of the NIST Analytical Chemistry Division.

The overall coordination of the technical work leading to certification was under the chairmanship of J.K. Taylor of the NIST Analytical Chemistry Division.

The technical and support aspects involved in the revision, update, and issuance of this Standard Reference Material were coordinated through the Standard Reference Materials Program by J.C. Colbert. The original coordination of certification efforts was performed by R.E. Michaelis and C.L. Stanley.

This certificate 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 value or any technical data presented in this certificate.

Gaithersburg, MD 20899
November 5, 1991
(Revision of certificate dated 3-6-74)

William P. Reed, Chief
Standard Reference Materials Program

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Drying Instructions:

This SRM should be dried at 110 °C for two hours before using.

The potassium nitrate was obtained from the J.T. Baker Chemical Company, Phillipsburg, New Jersey. It was examined and found to meet all the specifications for reagent grade potassium nitrate as given in Reagent Chemicals, 4th edition, published by the American Chemical Society.

Flame emission spectrometric analysis gave the following results in ppm by weight: sodium - 17 ± 1 , rubidium - 13.1 ± 0.3 , strontium - 4.3 ± 0.2 , calcium - 1.0 ± 0.2 , barium - < 2 and lithium - < 0.2 . Atomic absorption analysis indicated magnesium at 0.20 ± 0.04 ppm. Analysts - T.C. Rains and T.A. Rush.

A spectrochemical survey for other trace contaminants indicated the presence of copper, iron, magnesium, lead, and silicon, at levels of less than 0.001 percent. Analyst - M.M. Darr.

From the assessment of all the available analyses and possible experimental errors, this material may be considered to be essentially pure, with the exception of a slight amount of occluded moisture. A purity of 99.96 ± 0.02 percent was calculated based on the potassium determination. The uncertainty represents the 95 percent confidence limit of the average. The potassium and nitrate ions are believed to be stoichiometric within the experimental limits.

SUPPLEMENTAL INFORMATION

The Joint Research Center, Research Establishment, CCR, Ispra, Italy, collaborated with NIST in the measurement of this Standard Reference Material. The work on potassium, nitrogen, rubidium, and cesium reported below was coordinated by Dr. G. Rossi and performed by Dr. G. Serrini and Dr. A. Columbo, all at the above Establishment. Analyses involving different methods and varying sample sizes gave the following results:

Potassium			
<u>Method</u>	<u>Average</u>	<u>Standard Deviation</u>	<u>Number of Determinations</u>
Potassium tetrphenylborate	38.68	0.02	12
Potassium perchlorate	38.69	0.04	12
Nitrogen			
Kjeldahl	13.85	0.03	15
Elemental microanalysis	13.57	0.10	9

Flame photometric determinations showed the material contained rubidium at 14 ppm and cesium ≤ 4 ppm.

For the Ispra analyses the samples were gently crushed in an agate mortar and kept for at least 24 hours in a dessicator.