National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 3182

Anion Standard Solution

Chloride

Batch Code 490507

This Standard Reference Material (SRM) is intended for use in anion ion chromatography, or any other analytical technique that requires aqueous standard solutions for calibration or as control samples. SRM 3182 is a single component solution prepared gravimetrically to contain 1000 μg/g of chloride in solution. The certified value is based on gravimetric procedures, i.e. weight per weight composition of a high-purity salt dissolved in filtered (0.22 μm) 18 megohm water. The calculated concentration of chloride, based on the weights of KCl and the solution, and on the atomic weights of potassium and chlorine (39.0983 and 35.453, respectively) is 1000.0 μg/g. The value has been adjusted upward by 0.1% relative, based on estimated transpiration losses of solvent through the container walls of 0.2% relative for the certification period. To confirm the gravimetric value, samples were analyzed by ion chromatography. The density of the solution at 22 °C is 0.998 g/mL.

Component	Concentration (μg/g)	Source Purity, %
Chloride	1000 ± 5	SRM 999

The uncertainty in the certified value is calculated as

$$U = (2u_c + 0.001V) \text{ mg/mL}$$

where u_c is the "combined uncertainty" calculated according to the ISO Guide [1]. The value u_c is intended to represent, at the level of one standard deviation, the combined effect of uncertainty components associated with volumetric and gravimetric factors, as well as the purity of the chloride salt. The additional quantity, $0.001V$, is an allowance for transpiration of the solution through the container walls, which is estimated to be less than ± 0.1% of the certified value during the six-month period of validity of the certification.

The combined uncertainty consists of Type B components due to uncertainty in the balance reading and uncertainty in the material handling and dilution. Each component is derived from its corresponding uniform probability distribution by division by $\sqrt{3}$.

SRM 3182 was prepared by T.A. Butler and ion chromatographic measurements were made by K.W. Pratt of the NIST Inorganic Analytical Research 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.S. Kane.

Gaithersburg, MD 20899
August 12, 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

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Procedures for Use

Stability: This certificate is valid for one year from the shipping date provided the solutions are kept tightly capped and stored under normal laboratory conditions. NIST will monitor the stability of representative solutions from this SRM lot and if changes occur that invalidate this certification, NIST will notify purchasers.

Preparation of Working Standard Solutions: All solutions should be brought to 22 ± 1 °C before use and all glass or plastic surfaces coming into contact with the standard must have been previously cleaned. A working standard solution can be prepared from the SRM solution by serial dilution. Dilutions should be made with certified volumetric class A flasks and 5 or 10 mL class A pipets. All volumetric transfers of solutions should be performed using a proven analytical technique. Each dilution should be made with high-purity water to calibrated volume. To achieve the highest accuracy, the analyst should prepare daily working solutions from 100 μg/mL dilutions of the original SRM solution.

REFERENCE

[1] *"Guide to the Expression of Uncertainty in Measurement"*, ISBN 92-67-10188-9, 1st Ed. ISO, Switzerland, 1993.