National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1626a

Sulfur Dioxide Permeation Tube - 5 cm

This Standard Reference Material (SRM) is intended primary for the calibration of apparatus and standardization of procedures used in climate change and related chemical analyses. SRM 1626a is a 5 cm sulfur dioxide permeation tube that is individually certified according to NIST protocol and procedures.

Certified Value: This SRM mixture has been certified for sulfur dioxide permeation rate. The certified value, given below, applies to the identified NIST sample number.

SRM 1626a Tube No.:

Permeation Rate: nmol/min at (30.00 ± 0.01) °C

The uncertainty of the certified value includes the estimated uncertainties of the gravimetric permeation rate and the temperature. The uncertainty is expressed as an expanded uncertainty, $U = ku_c$, with u_c determined from experiment and a coverage $k = 2$. The true value for the permeation rate is asserted to lie within the interval defined by the certified value $\pm U$ with a level of confidence of approximately 95 % [1].

Expiration of Certification: This certification is valid within the measurement uncertainties specified, until the tube is empty, provided the SRM is handled and stored in accordance with the instructions given in this certificate. However, the certification will be nullified if the SRM is contaminated or modified.

Storage and Handling Information: NIST recommends that when not in use the tube life can be extended by refrigerator or freezer storage. During storage, the SRM should always be protected from moisture and kept at a relative humidity of 10 % or less. When removed from low temperature storage, the SRM should be equilibrated at the operating temperature for a minimum of 48 hours prior to use.

The analytical measurements leading to the certification of this SRM were performed by G.D. Mitchell of the NIST Analytical Chemistry Division.

The overall direction and coordination of the technical work required for certification of this SRM lot were performed by F.R. Guenther of the NIST Analytical Chemistry Division.

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

Willie E. May, Chief
Analytical Chemistry Division

Gaithersburg, MD 20899
Certificate Issue Date: 24 October 2001

John Rumble, Jr., Acting Chief
Standard Reference Materials Program

Preparation: The material comprising this SRM was prepared in accordance with NIST technical specifications by a commercial vendor under contract to NIST. The specifications stipulate that each SRM mixture be identical in permeation rate and stable with time.

Analytical Methods: The permeation rate of each tube was determined by monitoring the slope of the mass loss versus time curve at 30.00 °C. The SRM was placed in a thermostatic chamber suspended from one side of a recording microbalance. The chamber was equipped with water jacket, thermocouple and inlet and outlet ports for gas flow through the chamber. The system was automated, measuring time, temperature, and mass every 30 minutes.

Permeation Rate Value Assignment: The certified sulfur dioxide permeation rate for this SRM was computed from the slope of the line plot of mass loss (ng) versus time (minutes). The permeation rate is reported in units of nmol/min.

Stability: This tube can be expected to last for approximately nine months when used at 30 °C.

REFERENCES

[1] Taylor, B.N., "Guide for the Use of the International System of Units (SI)," NIST Special Publication 811, 1995 Ed., (April 1995).

[2] *Guide to the Expression of Uncertainty in Measurement*, ISBN 92-67-10188-9, 1st Ed. ISO, Geneva, Switzerland, (1993); see also Taylor, B.N. and Kuyatt, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1994); available at http://physics.nist.gov/Pubs/.

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; or via the Internet http://www.nist.gov/srm.