

National Bureau of Standards

Certificate

Standard Reference Material 2679a

Quartz on Filter Media

This Standard Reference Material (SRM) is intended primarily for use as an analytical standard for the determination of quartz in the workplace environment. SRM 2679a consists of mixtures of quartz and clay deposited on membrane filters. Only the quartz content of each filter is certified. The filters are packaged in individual plastic dishes, labeled A-1, B-1, C-1, and D-1. Each dish contains two filters which are separated by a blue spacer. An entire filter must be used for a quantitative measurement since the quartz is not uniformly distributed.

<u>Filter Identification</u>	<u>Quartz, $\mu\text{g}/\text{filter}$</u>	<u>Clay, $\mu\text{g}/\text{filter}$</u>
A-1	≤ 2	(370)
B-1	30.8 ± 3.4	(370)
C-1	80.2 ± 4.1	(370)
D-1	202.7 ± 8.7	(370)

The filters were prepared by a two-stage deposition process, described below.

For series A-1 filters, the certified upper limit given for the quartz value is based on the measurement of the residual quartz content of the clay by x-ray diffraction and an approximation of the combined SiO_2 content of the filter and the gum tragacanth suspension agent. For B-1, C-1, and D-1 filters, the certified values for quartz are based on the measurement of the silicon content of selected filters prior to the addition of clay by direct current plasma emission spectrometry.

The uncertainties are \pm two standard deviations for the individual filters. The uncertainties include variations in filter preparation and analytical measurements.

The filters were prepared by R.W. Burke and T.A. Butler, and silicon measurements were made by M.S. Epstein, Inorganic Analytical Research Division.

The statistical analysis was performed by R.C. Paule of the National Measurement Laboratory.

The overall direction and coordination of the technical measurements leading to certification were under the chairmanship of T.C. Rains of the Inorganic Analytical Research Division.

The technical and support aspects involved in the certification and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by T.E. Gills.

Preparation

This renewal Standard (SRM 2679a) was prepared very similarly to its predecessor, SRM 2679. Individual suspensions of quartz and clay were prepared in 0.5% aqueous gum tragacanth solutions. Aliquots of these suspensions were then pipetted sequentially onto mixed cellulose acetate membrane filters (47 mm diameter, 0.45 μm pore size) with a calibrated microliter pipette.

Filters were loaded in groups of 100. Initially, a quartz suspension was pipetted onto all 100 filters. Six filters were randomly selected for subsequent determination of their silicon content, and the remaining 94 were overcoated with the clay suspension. After drying, adjacent pairs of filters were placed in the plastic Petri dishes in which they are supplied. All of the loading and drying operations were carried out in a class 100 clean air area.

The quartz used for the preparation of these filters was SRM 1878, a respirable alpha quartz standard. For 95% of the mass of the material, the equivalent spherical diameters of the quartz particles are in the range of 0.3 to 5 micrometers. The clay used was SRM 97a, a flint clay. It was added to produce a simulated background of dust as might be collected in a typical field test operation. This clay contains 20% by weight of silicon, essentially all of which is present as soluble silicates.