U.S. Department of Commerce
Juanita M. Kreps
Secretary

National Bureau of Standards
Ernest Ambler, Acting Director

National Bureau of Standards

Certificate

Standard Reference Material 624

Lead-Silica Glass for dc Volume Resistivity

M. J. Cellarosi

This Standard Reference Material is in the form of a block of fine annealed lead-silica glass approximately 5 cm square by 2.5 cm thick (about 0.2 kg) from which several specimens can be cut. It is certified and designed to check test methods and to calibrate equipment for determination of the dc volume resistivity of glass in accordance with ASTM C 657-72(1).

Using vacuum-evaporated gold electrodes and a dc voltage of 100 V, the volume resistivity is:

Temperature	Log_{10} Electrical Volume Resistivity
250 °C	11.07 ± 0.03 Ω·cm
300	9.88 ± .04
350	8.88 ± .05

The indicated uncertainties are the 95 percent tolerance limits for coverage of at least 95 percent of these specimens (see NBS Mono 148, pp. 13-14). In brief, if all specimens were measured, 95 percent of the measured values would fall within the indicated tolerance limits 95 percent of the time. Included in this uncertainty are possible specimen inhomogeneities, preparation of specimens, and measurement errors.

The dependence of the resistivity, ρ, on temperature, t, within the range 200 °C to 375 °C can be expressed as

$$\log_{10}\rho = \frac{7139}{t + 273.15} - 2.577.$$

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. K. Kirby.

Washington, D.C. 20234
October 25, 1977

J. Paul Cali, Chief
Office of Standard Reference Materials

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SUPPLEMENTARY INFORMATION

Direction and coordination of the ASTM interlaboratory comparisons were given by Henry E. Hagy, Chairman, ASTM Subcommittee C-14.04 on Physical and Mechanical Properties of Glass. The laboratories that cooperated in these measurements are:

Corning Glass Works, Corning, New York
General Electric Co., Richmond Hts., Ohio
Motorola Inc., Phoenix, Arizona
National Bureau of Standards, Washington, D.C.
Ontario Research Foundation, Mississauga, Ontario, Canada
Owens-Illinois, Inc., Toledo, Ohio
PPG Industries, Creighton, Pennsylvania
Rensselaer Polytechnic Institute, Troy, New York

Statistical analysis of the data leading to certification was performed by H. H. Ku, National Bureau of Standards.

The nominal composition of this SRM is offered for information only:

SiO_2	46.0 wt. %
PbO	45.3
K_2O	5.6
Na_2O	2.5
R_2O_3	0.6

This glass was annealed at 440 °C and cooled at a rate of about 1 °C/hour.

References:

(1) ASTM Method of Test, C657-72, for D-C Volume Resistivity of Glass, 1977 Book of ASTM Standards, Part 17.