U.S. Department of Commerce
Elliot L. Richardson,
Secretary

National Bureau of Standards
Ernest Ambler, Acting Director

National Bureau of Standards Certificate

Standard Reference Materials

Chemical Resistance (Durability) of Glass

622 - Soda-Lime-Silica Glass

623 - Borosilicate Glass

W. Capps and M. Cellarosi

These Standard Reference Materials are certified and designed to check test methods and to calibrate equipment for the determination of the Resistance of Glass Containers to Chemical Attack.

SRM	Type	ml of N/50 H_2SO_4
622	Soda-Lime-Silica Glass	7.67 ± 0.38
623	Borosilicate Glass	0.34 ± 0.05

These values represent the volume of fiftieth-normal sulfuric acid used to titrate to the methyl-red end point the alkaline extract from a crushed sample of glass after exposure to high-purity water [1] at 121°C (ASTM C225-73, Method P-W, with Mortar Crushing option [2]). This method of test is also specified in the U.S. Pharmacopeia [3] and in the National Formulary [4].

The indicated uncertainties are the 95 percent tolerance limits for coverage of 95 percent of measured values of these lots of glass samples. An example of the use of the statistical tolerance limit is given in NBS Monograph 148 (pp. 13-14). In brief, if all the samples were measured, 95 percent of the measured values would fall within the indicated tolerance limits 95% of the time.

The technical and support aspects involved in the preparation, certification, and issuance of these Standard Reference Materials were coordinated through the Office of Standard Reference Materials by R. E. Michaelis and C. L. Stanley.

Washington, D.C. 20234
March 19, 1976

J. Paul Cali, Chief
Office of Standard Reference Materials

(over)

SUPPLEMENTARY INFORMATION

These Standard Reference Materials are issued as cullet weighing about 2.2 kg each. The materials were prepared and furnished to NBS by Corning Glass Works, Corning, New York, and Owens-Illinois, Inc., Toledo, Ohio. Direction and coordination of the ASTM interlab comparison was given by Frank Bacon, Chairman, ASTM Subcommittee C-14.03 on Chemical Properties of Glass. The laboratories that cooperated in these measurements are:

Brockway Glass Co., Brockway, Pennsylvania
Corning Glass Works, Corning, New York
Eli Lilly Co., Indianapolis, Indiana
Emhart Corp., Hartford, Connecticut
Johns-Manville, Toledo, Ohio
Kerr Glass Corp., Lancaster, Pennsylvania
National Bureau of Standards, Washington, D.C.
Owens-Illinois, Inc., Kimble Division, Vineland, New Jersey
Owens-Illinois, Inc., Toledo, Ohio

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

The nominal compositions (wt. %) of these SRM's are offered for information only.

SRM 622 Soda-Lime-Silica Glass		SRM 623 Borosilicate Glass	
SiO_2	71.7	SiO_2	73
CaO	11.5	B_2O_3	10.7
Na_2O	14.0	Na_2O	6.4
Al_2O_3	1.8	Al_2O_3	6.3
K_2O	0.2	BaO	2.2
MgO	0.5	K_2O	0.6
SO_3	0.2	CaO	0.7
Fe_2O_3	0.04		

REFERENCES

[1] ASTM Method of Test, D1193-74, for Reagent Water, 1974 Book of ASTM Standards, Part 31.
[2] ASTM Method of Test, C225-73, for Resistance of Glass Containers to Chemical Attack, 1974 Book of ASTM Standards, Part 17.
[3] The United States Pharmacopeia, 19th Revision, Mack Printing Co., Easton, Pa., 1975, page 643.
[4] The National Formulary, 14th Edition, Mack Printing Co., Easton, Pa., 1975, page 878.