

# National Bureau of Standards

## Certificate

### Standard Reference Material 773

#### Soda-Lime-Silica Glass for

#### Gradient-Furnace Liquidus Temperature

M. J. Cellarosi

This Standard Reference Material is a soda-lime-silica glass that is certified for its liquidus temperature and is for use in checking test methods and in calibrating equipment specified in the ASTM C 829-76 standard practices. Two methods are included in this ASTM standard, differing in the form of sample, apparatus, procedure for positioning the sample, and measurement of temperature gradient in the furnace.

Method A employs a trough-type platinum container (boat) in which small glass particles are fused together.

Method B employs a perforated platinum plate on which larger glass particles are individually positioned, one per hole, and are therefore melted separately from each other.

Certified values for the gradient-furnace liquidus temperature (allowing 24 hours to reach equilibrium) are:

| <u>Method</u>        | <u>Liquidus Temperature</u> |
|----------------------|-----------------------------|
| A (boat)             | $988 \pm 3$ °C              |
| B (perforated plate) | $991 \pm 5$ °C              |

The indicated uncertainties are the 95 percent tolerance limits for coverage of at least 95 percent of these specimens. 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.

Technical support involved with 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  
November 24, 1980

George A. Uriano, Chief  
Office of Standard Reference Materials

(over)

### SUPPLEMENTARY INFORMATION

The pieces of glass that are provided must be crushed with a clean mortar and pestle and sieved to the required particle size; i.e. finer than 0.85 mm (a No. 20 sieve) for Method A and between 1.70 and 2.36 mm (Nos. 12 and 8 sieves) for Method B.

An index-matching fluid with a refractive index of 1.52 was used to help in detecting the presence of crystals and thereby determine the position of the crystalline boundary in a known temperature gradient.

The interlaboratory comparison measurements leading to the certification were performed under the auspices of ASTM Subcommittee C-14.04 on Physical and Mechanical Properties of Glass, Henry E. Hagy, Chairman. The laboratories that cooperated in these measurements are:

Brockway Glass Co., Brockway, Pa.  
Corning Glass Works, Corning, N.Y.  
Emhart Corp., Hartford, Conn.  
Ford Motor Co., Lincoln Park, Mich.  
Johns-Manville Corp., Denver, Colo.  
Libbey-Owens-Ford Co., Toledo, Ohio  
National Bureau of Standards, Washington, D.C.  
Owens-Corning Fiberglas Corp., Granville, Ohio  
Owens-Illinois, Inc., Toledo, Ohio  
PPG Industries, Creighton, Pa.

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

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

|                                |       |       |
|--------------------------------|-------|-------|
| SiO <sub>2</sub>               | 73.1  | wt. % |
| Fe <sub>2</sub> O <sub>3</sub> | 0.12  |       |
| Al <sub>2</sub> O <sub>3</sub> | .15   |       |
| TiO <sub>2</sub>               | .012  |       |
| CaO                            | 8.58  |       |
| MgO                            | 3.93  |       |
| Na <sub>2</sub> O              | 13.84 |       |
| K <sub>2</sub> O               | 0.03  |       |
| SO <sub>3</sub>                | .27   |       |

This glass was furnished to NBS by Libbey-Owens-Ford Co., Toledo, Ohio, with the technical support of Howard R. Swift.