U.S. Department of Commerce
C. William Verity
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 1488

Poly(methyl methacrylate)

29 K Narrow Molecular Weight Distribution

This Standard Reference Material (SRM) is intended for use in the calibration and performance evaluation of instruments used in polymer technology and science for the determination of molecular weight and molecular weight distribution. It can also be used as a characterized sample for measurements of the limiting viscosity number of poly(methyl methacrylate). The SRM is supplied in the form of a powder. The ratio of weight-average to number-average molecular weight is estimated by size exclusion chromatography to be no greater than 1.1.

Property	Value	Standard deviation of the mean	Estimated limit of systematic error
Number-average molecular weight, M_n, g/mol[a]	29,300	90[c]	600
Limiting viscosity number, mL/g, at 25.0 °C in toluene[b]	15.8	0.1[d]	0.2

(a) Determined by membrane osmometry in toluene at 25 °C.
(b) Determined by capillary viscometry at shear rates not exceeding 1100 s^{-1}.
(c) Degrees of freedom: 28
(d) Degrees of freedom: 16

The variability of the viscosity values among a set of randomly selected samples from the lot of this SRM was no greater than that due to measurement variability alone. Hence there is no measurable evidence of heterogeneity.

Because the weight increase of a dried polymer sample on exposure to laboratory air was as much as 0.14 percent in 2 minutes, appropriate drying and weighing procedures should be employed to eliminate this source of error. The procedure followed for certification was: A desired amount of polymer sample was placed in a weighing bottle and dried to constant weight in a vacuum oven at 60 °C for two days. The weighing bottle containing the dried sample was weighed, then most of the sample was rapidly transferred from the bottle directly to the container in which the solution was to be made up, care being taken that all of the sample leaving the bottle was caught in the container. The weighing bottle was then reweighed; the difference in weight before and after the transfer represented the sample taken. For very small samples, the polymer powder was first compressed loosely into a disc before drying so that the transfer would be quantitative.

February 12, 1988
Gaithersburg, MD 20899

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

(over)

The technical coordination leading to certification was provided by F.W. Wang, with technical measurement and data interpretation provided by H.L. Wagner, C.M. Guttman, and P.H. Verdier, all of the NBS Polymers Division.

Contributions to the development and certification of this SRM were also provided in the following areas by: R.C. Paule, technical statistical assistance; F.L. McCrackin, programming and statistical analysis; D.L. Vanderhart, nuclear magnetic resonance; and B. Dickens, size exclusion chromatography.

The research and development leading to the certification of this SRM were supported in part by the David W. Taylor Naval Ship Research and Development Center.

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.L. McKenzie.