U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 1489

Poly(methyl methacrylate)

(115K 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 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, percent	Degrees of freedom	Expected limit of systematic error, percent
Number-average molecular weight, M_n, g/mol [(a)]	115×10^3	1.5	46	3
Limiting viscosity number, mL/g, at 25.0 °C in toluene [(b)]	37.4	0.33	33	1

(a) Determined by membrane osmometry in toluene at 25 °C.

(b) Determined by capillary viscometry at shear rates not exceeding 1800 s^{-1}.

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.

Since 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 in a weighing bottle was dried to constant weight in a vacuum oven at 60 °C for two days. The weighing bottle containing the dried sample was first weighed, most of the sample was then transferred rapidly from the bottle directly to a container in which the solution was made up, care being taken that all of the sample leaving the bottle was caught in the container; 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.

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 Polymers Division, Center for Materials Research.

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