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ERM
European Reference Materials

CERTIFICATE OF ANALYSIS

ERM®-FA002

POLYSTYRENE		
Molar mass M_w [1]	Weight averaged molar mass M_w	
	Certified value [3] [g mol^{-1}]	Uncertainty [4] [g mol^{-1}]
	205600	3075
Viscosity [2]	Intrinsic viscosity [η]	
	Certified value [3] [mL g^{-1}]	Uncertainty [4] [mL g^{-1}]
	68.38	0.79

1) obtained by laser light scattering

2) obtained by viscometry using an UBBELOHDE viscometer according to DIN 51562 – 1

3) Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory. The certified value is traceable to the International System of units (SI).

4) The certified uncertainty is the expanded uncertainty estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM) with a coverage factor k = 2, corresponding to a level of confidence of about 95 %. The certified uncertainty value is traceable to the International System of units (SI).

This certificate is valid for two years after purchase.

Sales date:

The minimum amount of sample to be used is 10 mg.

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Indicative Values

Molar masses[1)]	Weight-averaged molar mass M_w	
	Indicative value [2)] [g mol^{-1}]	Uncertainty [3)] [g mol^{-1}]
	180070	1010
	Number-averaged molar mass M_n	
	Indicative value [2)] [g mol^{-1}]	Uncertainty [3)] [g mol^{-1}]
	83010	1370
	Molar mass at peak maximum M_p	
	Indicative value [2)] [g mol^{-1}]	Uncertainty [3)] [g mol^{-1}]
	149830	1400

1) obtained by Size Exclusion Chromatography (SEC) according to DIN 55672

2) Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory.

3) The certified uncertainty is the expanded uncertainty estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM) with a coverage factor k = 2, corresponding to a level of confidence of about 95 %.

Additional Material Information

Glass transition temperature T_g	103.0 °C [1)]
Density	1.03 g mL^{-1} [2)]
Melt flow index	9.5 g 10 min^{-1}

1) obtained by Differential Scanning Calorimetry (DSC)

2) at 25°C according to DIN EN ISO 1183-1

3) 5 kg at 200°C according to DIN EN ISO 1133

NOTE

European Reference Material ERM®-FA002 was originally certified as BAM-P02. It was produced and certified under the responsibility of Bundesanstalt für Materialforschung und –prüfung (BAM) according to the principles laid down in the technical guidelines of the European Reference Materials® co-operation agreement between BAM-LGC-IRMM. Information on these guidelines is available on the Internet (http://www.erm-crm.org).

DESCRIPTION OF THE SAMPLE

The material was synthesised by different polymerization procedures and purified by dissolution and precipitation. A detailed homogeneity study was performed. The material identity was confirmed by Proton Nuclear Magnetic Resonance (NMR) and Infrared (IR) Spectroscopy. The sample consists of a transparent granulate. It was bottled in glass vials with a unit size from 1 to 10 g.

ANALYTICAL METHOD USED FOR CERTIFICATION

- Size Exclusion Chromatography according to DIN 55 672 – 1 (GPC using tetrahydrofurane as eluent)
- Laser Light Scattering
- Viscometry according to DIN 51 562 – 1 (Viscometry: Determination of kinematic viscosity using a Ubbelohde – Viscometer, Part1: Design and realisation of measurements

Details on the procedure for analysis can be found in the corresponding certification report.

PARTICIPANTS

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SAFETY INFORMATION

Specific safety information are not known

INSTRUCTIONS FOR USE

Before withdrawing a sample the bottle has to reach room temperature. After use, the bottle has to be closed and stored at the recommended temperature.

STORAGE

Samples have to be stored at 5 ± 2°C.

However, BAM cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

LEGAL NOTICE

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NOTE

A detailed technical report describing the production, characterisation as well as the analytical procedures applied and the treatment of the analytical data used to certify ERM®-FA002 is available on request from BAM.

Supply of Reference Materials by Bundesanstalt für Materialforschung und –prüfung:
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