

CERTIFICATE OF ANALYSIS

ERM[®]-FA002

POLYSTYRENE		
Molar mass M_w ¹⁾	Weight averaged molar mass M_w	
	Certified value ³⁾ [g/mol]	Uncertainty ⁴⁾ [g/mol]
	205600	3075
Viscosity ²⁾	Intrinsic viscosity $[\eta]$	
	Certified value ³⁾ [mL/g]	Uncertainty ⁴⁾ [mL/g]
	68.38	0.79
<p>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).</p>		

This certificate is valid for five years after purchase. This validity may be extended as further evidence of stability becomes available.

Sales date:

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

Accepted as an ERM[®], Berlin,

Latest revision

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BAM Berlin
Department I
Analytical Chemistry;
Reference Materials
12200 Berlin, Germany

BAM Berlin
Division I.3
Structural Analysis
12200 Berlin, Germany

Dr. Franziska Emmerling
(Head of Department)

Dr. Steffen Weidner
(Study Director)

Indicative Values

Molar masses ¹⁾	Weight-averaged molar mass M_w	
	Indicative value ²⁾ [g/mol]	Uncertainty ³⁾ [g/mol]
	181200	1800
	Number-averaged molar mass M_n	
	Indicative value ²⁾ [g/mol]	Uncertainty ³⁾ [g/mol]
	81100	4900
	z-averaged molar mass M_z	
	Indicative value ²⁾ [g/mol]	Uncertainty ³⁾ [g/mol]
	331700	9800
	Molar mass at peak maximum M_p	
	Indicative value ²⁾ [g/mol]	Uncertainty ³⁾ [g/mol]
	145000	6200

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 ²⁾
Melt flow index	9.5 g / 10 min

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

Aventis, Frankfurt / M.
Bundesanstalt für Materialforschung und -prüfung, Berlin
Bayer AG, Uerdingen
Bayer AG, Leverkusen
Bundeskriminalamt, Wiesbaden
BMW, Dingolfing
Fraunhofer Institut für Angewandte Polymerforschung, Teltow
RWTH Aachen, Institut für Kunststoffverarbeitung
Institut für Lacke und Farben, Magdeburg
Institut für Polymerforschung, Dresden
Martin-Luther-Universität, Halle-Wittenberg
Max-Planck-Institut für Polymerforschung, Mainz
Polymer Standards Service GmbH, Mainz
Röhm GmbH, Darmstadt
RWTH Aachen, Institut für Textilchemie und Makromolekularen Chemie
Goldschmidt AG, Essen
Technische Universität Dresden
Universität Bayreuth
Universität Erlangen-Nürnberg
Universität Essen
Universität Freiburg
Universität Hamburg, Institut für Technische und Makromolekulare Chemie
Universität Leipzig
Johannes-Gutenberg-Universität Mainz, Institut für Makromolekulare Chemie
Johannes-Gutenberg-Universität Mainz, Institut für Physikalische Chemie
Universität Osnabrück
Universität Stuttgart, Institut für Technische Chemie
Universität Stuttgart, Institut für Textil- und Faserchemie
Universität Ulm
Universität - Gesamthochschule Siegen
Viscotek GmbH, Weingarten

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 $5 \pm 2^\circ\text{C}$.

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:
Richard-Willstätter-Straße 11, 12489 Berlin, Germany
Phone: +49 30 8104 2061 – Fax: +49 30 8104 72061
e-mail: sales.crm@bam.de – internet: www.bam.de