

Mobius Sustainable Resins™ Polystyrene Natural Pellets Specification Data Sheet

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Resin Grade Mobius Sustainable Resins™ PS Pellets

Resin Origin The Polystyrene Pellets are processed from certified, post-consumer plastic clothes hangers.

Melt Flow Index: Testing was conducted per ASTM D1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer. Samples were tested as received. A 7 minute preheat cycle was utilized. Melt flow index testing was conducted on a Goettfert Melt Indexer, Model # MI-4, and Serial #10000245. Barrel diameter is 9.5320 mm, Die length is 8.015 mm, Orifice diameter is 2.09 mm.

Melt Flow Index Results:

Test Conditions (Temp. °C / Load kg.) 200°C / 5.00 kg.	Melt Flow Rate (grams / 10 min.) 7.70 +/- 3.0 g/10min Standard deviation @ 0.41
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Specific Gravity: Specific gravity testing was conducted on an Ohaus Analytical Plus Electronic Balance with an Ohaus Density Determination Kit P/N 77402-00. The immersion liquid used was 2-Propanol.

Specific Gravity Results:

Specific Gravity (grams/cm ³) 1.0381 Standard deviation @ 0.0005

Melt Point Determination using DSC:

Testing was performed per ASTM D3418-03 Standard test Method for Transition Temperatures of Polymers by Thermal Analysis. Differential scanning Calorimetry is performed on a Perkin Elmer Pyris 1, with DSC samples were cut from molded parts with a razor blade.

Heat Cycle: **Initial heat:** Heat from 50°C to 300°C at 20°C/min.

Cool: Cool from 300°C to 50°C at 20°C/min.

Heat: Heat from 50°C to 300°C at 20°C/min.

DSC Results: The Differential Scanning Calorimetry Chart results are available on request. The DSC data shows two peak temperatures, 97.6°C and 101.3 C. As Polystyrene is amorphous and does not demonstrate a distinctive melt point. Both of these temperatures are in the normal range for Polystyrene.

Three-Point Flexural: Testing was conducted on an MTS Sintech 2/S unit with Test Works software using the principles of ASTM D 790, Procedure A – Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials, Procedure A.

Sample	Thickness (In)	Width (In)	Modulus (PSI)	Peak Stress (PSI)	Percent Strain (%)
Average	0.125	0.495	355405	7557	4.65

Notched Izod Impact: Testing was conducted on a Ceast Resil 25 Digital Pendulum Unit, Model 6545 per ASTM D256: Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics, Method A.

Sample	Thickness (mm)	Windage (J)	Energy Absorbed (J)	Impact Resistance (J/m)	Impact Resistance ft.lb./in.	Type of Failure
Average	3.158	0.032	0.182	47.63	0.860	Complete
Std. Dev.	0.004	0	0.002	0.715	0.013	

Tensile Test: Testing was performed on an MTS Sintech 2/S unit with Test Works software applying principles from ASTM D638 Tensile Properties of Plastics. A 10kN load cell was used and a DXL extensometer was used for measuring elongation. Five injection molded ASTM Type I Dog Bones with 2.0 inch lengths were used for samples with a Crosshead speed of 2.0 inches/minute. The 5 test specimens have been retained, and are available for inspection on request.

Specimen #	Modulus (PSI)	Yield Stress (PSI)	Elongation @ Yield (%)	Break Stress (PSI)	Elongation @ Break (%)	Peak Stress (PSI)	Elongation @ Peak (%)
1	380685	4037	1.2	4037	1.2	4991	1.2
2	377380	4045	1.2	4045	1.2	5009	1.2
3	367684	3927	1.3	3927	1.3	5027	1.3
4	392643	4036	1.2	4036	1.2	5034	1.2
5	367700	3954	1.3	3954	1.3	4996	1.3
Average	377219	4000	1.3	4000	1.3	5011	1.3
Std. Dev.	10386	55	0.04	55.1	0.01	19	0.0

Heat Deflection Test: Testing was conducted on a Ceast HDT 6 Vicat, Model 692.00 unit with WINHDT6-1996 software per ASTM D648-00a Standard Test Method for Deflection Temperature of Plastics Under Flexural Load. The following test conditions were utilized:

Stress Tested = 66 psi (455 kPa) Specimen Support = 100mm Immersion Bath = Dow Corning 200/100 Fluid
 Heat Rate = 2°C/min Deflection = 0.25 mm

The Average HDT results at 66 psi – 83.8°C

The Average HDT results at 264 psi – 72.1°C

