

Provisional Product Data Sheet

Mirel™ P4001

Sheet Extrusion

Mirel™ P4001 is a general purpose, high melt strength material suitable for cast sheet extrusion. Mirel™ P4001 is designed for a wide range of sheet applications including gift cards, promotional materials, indoor/outdoor signage, plant pots and plant tags.

Mirel™ P4001 can be processed on conventional extrusion equipment with either an up-stack or down-stack roll configuration.

Provisional Material Properties*

	ASTM Method	P4001
General Description		General Purpose
Physical Properties		
Apparent Melt Viscosity (180°C, 100 sec ⁻¹)	D3835	1200 Pa-s
Specific Gravity	D792	1.4
Mechanical Properties		
Tensile Strength at Yield	D638	20 MPa (2900 psi)
Tensile Elongation at Break	D638	5%
Flexural Modulus	D790 A	1.9 GPa (275 kpsi)
Notched Izod	D256 A	37 J/m (0.7 ft-lbs/in)
Thermal Properties		
Heat Distortion Temperature	D648 B D648 B	110°C (230°F)@0.45 MPa (66 psi) 57°C (135°F)@1.82 MPa (264 psi)
Vicat Softening Point	D1525 B10	133°C (273°F)

*Properties are not to be regarded as specifications.

Processing Recommendations*

Equipment Recommendations	
Screw Profile	Low compression ratio (<3). Any mixing sections should be low shear design.
Material Preparation	
Moisture Content	<0.1%
Drying Conditions	4 hours @ 80°C (176°F)
Processing Temperatures	
Melt	165°C-170°C (330°F-340°F)
Extruder Temperature Profile	Reverse Temperature Profile
Rear	175°C (350°F)
Middle	170°C (340°F)
Front	165°C (330°F)
Die – Center Zone	165°C (330°F)
Die – Edge Zones	165°C (330°F)
A-roll (Top roll of a down-stack)	<32°C (90°F)
B-roll (Middle roll)	50°C-65°C (120°F-150°F)
C-roll (Bottom roll of a down-stack)	65°C (150°F)

* Typical conditions are not to be regarded as specifications.

About Mirel Biopolymers

Mirel is a family of biopolymer materials that have comparable physical properties of petroleum-based resins, but are biobased and biodegradable in natural soil and water environments, in home composting systems, and in industrial composting facilities where such facilities are available. The rate and extent of Mirel's biodegradability will depend on the size and shape of the articles made from it. However, like nearly all bioplastics and organic matter, Mirel biopolymers are not designed to biodegrade in conventional landfills.

NOTICE: Customer assumes all risk and liability for any use or handling of Mirel biopolymer beyond Metabolix's direct control. Customer is responsible for obtaining any licenses or other rights necessary to make, use or sell products containing Mirel. Customer should consult its legal counsel to determine whether its label for products made with Mirel biopolymers are in compliance with applicable laws and regulations. Metabolix shall not be responsible for any consequential, special or incidental damages, and liability for breach of warranty, negligence or other claims is limited to the purchase price of material purchased. The information contained herein is believed to be reliable, however Metabolix makes NO REPRESENTATIONS, GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.