

Provisional Product Data Sheet

Mirel™ P1004/ F1006

Injection Molding Grade

Mirel P1004 is a general purpose grade.

Mirel F1006 grade is FDA cleared for use in non-alcoholic food contact applications, from frozen food storage and microwave reheating to boiling water up to 212°F. FDA clearance includes products such as house-wares, cosmetics and medical packaging.

Mirel biopolymers are suitable for a wide range of injection molded food service and packaging applications including caps and closures, and disposable items such as forks, spoons, knives, tubs, trays, jars, and consumer product applications.

Provisional Material Properties*

	ASTM Method	P1004/F1006
General Description		General Purpose
		Higher Toughness
Physical Properties		
Mold Shrinkage	D955	1.25-1.55% (0.0125-0.0155 in/in)
Specific Gravity	D792	1.30
Mechanical Properties		
Tensile Strength	D638	24 MPa (3480 psi)
Tensile Modulus	D638	1600 MPa (232000 psi)
Tensile Elongation at Break	D638	7%
Flexural Strength	D790 A	33 MPa (4785 psi)
Flexural Modulus	D790 A	1300 MPa (188500 psi)
Notched Izod Impact Strength	D256 A	31 J/m (0.6 ft-lb/in)
Thermal Properties		
Heat Distortion Temperature	ASTM D648 B (0.455 MPa)	123°C (253 F)
	ASTM D648 B (1.82 MPa)	63°C (145 F)

*Properties are not to be regarded as specifications.

Processing Recommendations

Drying Conditions	(Desiccant) 2 to 4 hours @ 80°C (176°F)
Melt Temperature	160°C-165°C (320°F-329°F)

Equipment Recommendations	
Screw Profile	(Low Shear GP) 2.2:1 to 2.6:1
Non-Return Valve	Standard Check Ring

Processing Conditions	
Barrel Zone Settings	Reverse Temperature Profile
Rear	175°C-180°C (347°F-356°F)
Middle	170°C-175°C (338°F-347°F)
Front	165°C-170°C (329°F-338°F)
Nozzle	165°C-170°C (329°F-338°F)
Mold Temperature (A/B)	55°C-65°C (131°F-149°F)
Screw Speed (Slow)	< 200 rpm
Back Pressure (Low)	< 3.45 MPa (500 psi) Melt
2nd Stage Pressure (Low)	< 30% of 1st Stage Pressure

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.