



Mirel™ P1003 Data Sheet

Injection Molding Grade



Product Description

Mirel is a family of bioplastic materials with the physical properties of petroleum-based resins, yet with a unique combination of being biobased and biodegradable when disposed in natural soil and water environments, home composting systems, and industrial composting facilities (in areas 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 is not designed to biodegrade in conventional landfills. Mirel P1003 is a high performance, semi-crystalline polyester specifically engineered for high modulus injection molding applications. Mirel P1003 injection molding grade offers:

- Improved processability
- Improved flow
- Faster overall cycle times compared to other bioplastics
- An overall cycle time similar to traditional thermoplastics

Mirel PHA Resin Biodegradability Certifications

- BPI-certified to meet U.S. standard for compostable plastics according to ASTM D6400
- Vinçotte-certified as "OK Biodegradable Water" for natural freshwater environments
- Vinçotte-certified as "OK Biodegradable Soil" for natural soil environments
- Vinçotte-certified as "OK Compost" for biodegradability in an industrial composting unit to meet E.U. standard for compostable plastics according to EN 13432 / EN 14995
- Vinçotte-certified as "OK Compost Home" for biodegradability in a home composting system
- Meet the U.S. standard for non-floating biodegradable plastics in a marine environment according to ASTM D7081

Composition

Mirel P1003 consists of a proprietary blend of polyhydroxyalkanoate (PHA) base polymer, additives, and mineral fillers.

Mirel P1003 Compared to Other Bioplastics

- Biodegradable* in soil and marine environments
- High heat resistance
- Moisture resistance
- Mold surface replication, high or low gloss
- High modulus
- Shelf stability
- Easily colored with Telles recommended color concentrates

Potential Applications

The high performance characteristics of Mirel P1003 make it a suitable replacement for both polyolefin and styrenic polymers in a variety of applications including:

- **Consumer Retail:** personal care and cosmetic items, brushes, writing instruments, and handheld devices
- **Agriculture/Horticulture:** erosion control stakes, plant clips, plant pots, labels, disposable farm items
- **Business Equipment:** trays, cartridges, and laboratory supplies
- **Packaging:** consumer disposable and single use items, caps and closures



*When disposed of properly in home or industrial composting systems. Industrial composting facilities may not be available in all geographic areas.

Provisional Material Properties of Mirel P1003*

	ASTM		ISO	
	Value	Method	Value	Method
Physical Properties				
Mold Shrinkage	0.0125 - 0.0155 in/in	D955		
Density	1.4 g/cm ³	D792		
Apparent Viscosity (180°C, 100 sec ⁻¹)	950 Pa-s	D3835		
Mechanical Properties[§]				
Tensile Strength	26 MPa (3800 psi)	D638	26 MPa	527-1, -2
Tensile Modulus	3400 MPa (494,000 psi)	D638	3200 MPa	527-1, -2
Tensile Elongation @ Break	3%	D638	3%	527-1, -2
Flexural Strength	44 MPa (6390 psi)	D790 A	43 MPa@3.5% strain	178
Flexural Modulus	3170 MPa (460,000 psi)	D790 A	3180 MPa	178
Izod Impact Strength	26 J/m (0.5 ft-lbs/in)	D256 A	2.9 kJ/m ²	180 A
Thermal Properties[§]				
Melting Point	160°C-165°C (320°F-330°F)	NA†		
Heat Distortion Temperature	143°C (290°F)	D648 B (0.455 MPa)	132°C	75-1 Bf (0.45 MPa)
	78°C (172°F)	D648 B (1.82 MPa)	77°C	75-1 Af (1.80 MPa)
Vicat Softening Temperature	147°C (296°F)	D1525 B10	147°C	306 A120

* Properties are not to be regarded as specifications

§ Mechanical and Thermal properties measured after 21 days conditioning at room temperature

† Telles internal test method

General Processing Information

Mirel P1003 can be processed on conventional injection molding equipment. Different from petroleum based polymers, which are typically heated significantly above their melting point, Mirel P1003 should be processed near its melting point. Recommended melt temperatures are in the range of 160°C–175°C (320°F–350°F) with an absolute maximum of 190°C (375°F). A barrel volume to shot size ratio between 2 and 3 will produce the widest processing window and the optimum material properties of Mirel P1003.

More detailed equipment recommendations and processing requirements can be found in the Mirel P1003 Injection Molding Guide.

Chemical Resistance

For detailed information, please refer to the Mirel Chemical Resistance Technical Bulletin.

Safety Information

For the safe handling and disposal of Mirel resins, please refer to the MSDS.

Download these documents and learn more at

www.mirelplastics.com

For technical assistance, please contact: 1.866.916.4735 (1.866.91MIREL)

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