

FUTERRO POLY-LACTIDE

FIBER MELT SPINNING GRADE / *Futerro ref.*
 GENERAL PURPOSE POLYLACTIC ACID / *product name*

DESCRIPTION

Futerro® PLA polymer is a thermoplastic fiber-grade resin from annually renewable resources. Available in pellet form, it is designed for extrusion into mechanically drawn staple fibers or continuous filament, using conventional fiber spinning and drawing equipment. Futerro® PLA polymer is typically well suited for fiber processes where lower fiber shrinkage is desired: partially orientated yarn (POY), fully drawn yarn (FDY), staple fibers, and continuous filament. It can be converted into a broad range of fiber products

Potential applications for Futerro® PLA polymer include:

- Woven and knitted 100% continuous filament apparel
- Woven and knitted, intimate staple blend fabrics including blends with cotton, wool, and other fibers
- Woven and knitted fabrics and netting for civil engineering applications
- Home furnishings

PURITY

L-poly-Lactide content	% w/w	Min. 99
Water content	ppm	Max. 250
Free Lactide content	% w/w	Max. 0.4

PHYSICAL PROPERTIES PLA POLYMER

Specific Gravity @25°C		1.24	ISO 1183
Melt Density @230°C		1.08-1.12	
Melt Index @190°C/2.16kg	g/10 min	10 - 15	ISO 1133
Melt Index @210°C/2.16kg	g/10 min	15 - 30	ISO 1133
Haze (2 mm)	%	< 5	ISO 14782
Transmittance (2 mm)	%	> 90	ISO 14782
Glass Transition Temperature	°C	52-60°C	ISO 11357
Crystalline Melt Temperature	°C	145-175°C	ISO 11357

MECHANICAL PROPERTIES

Tensile Strength @ Break	MPa	55	ISO 527
Tensile Yield Strength	MPa	60	ISO 527
Tensile Modulus	MPa	3500	ISO 527
Tensile Elongation	%	6.0	ISO 527
Notched Izod Impact	kJ/m ²	3.5	ISO 180
Flexural yield Strength	MPa	90	ISO 178

(1) Typical properties; not to be construed as specifications.

Information contained in this publication is true and accurate at the time of publication and to the best of our knowledge. The nominal values stated herein are obtained using laboratory test specimens. Before using one of the products mentioned herein, customers and other users should take all care in determining the suitability of such product of the intended use. Unless specifically indicated, the products mentioned herein are not suitable for applications in the pharmaceutical or medical sector. The Companies within FUTERRO do not accept any liability whatsoever arising from the use, application or processing of any product described herein. No information contained in this publication can be considered as a suggestion to infringe patents. The Companies disclaim any liability that may be claimed for infringement or alleged infringement of patents.

Place d'Escauffles, 23 B-7760 Escauffles Tel. : +32 (0)69 45 22 76 Fax : +32 (0)69 45 22 97

E-mail : info@futerro.com Web Site : www.futerro.com

TVA : BE 0892 199 070 IBAN : BE12 0015 3245 4092 BIC : GEBABEBB



PROCESSING INFORMATION

Machine Configuration

Futerra® PLA polymer grade will process on conventional extrusion spinning and drawing equipment with thorough cleaning since PLA is not compatible with a wide variety of polymers.

General-purpose screws with L/D ratios of 24:1 to 30:1 and 3:1 compression ratios are recommended. However, screws with mixing sections or shallow metering channels may overheat the melt at high screw speeds. Typical melt spinning temperatures are 220 – 240°C. Like PET, Futerra® PLA polymer requires either high filament velocity or drawing and controlled heat setting to control shrinkage.

Startup and Shutdown

Futerra® PLA polymer is not compatible with a wide variety of commodity resins, and special purging sequences should be followed:

- 1. Clean machine and bring temperatures to steady state with low-viscosity, general-purpose polystyrene or polypropylene.
- 2. Vacuum out hopper system to avoid contamination.
- 3. Introduce PLA polymer into the machine at the operating conditions used in Step 1.
- 4. Once PLA polymer has purged, reduce barrel temperatures to desired set points.
- 5. At shutdown, purge machine with high-viscosity polystyrene or polypropylene.

Drying

In-line drying may be required. A moisture content of less than 0.010% (100 ppm) is recommended to prevent viscosity degradation better it is to reach 0.005% (50 ppm). Typical drying conditions for crystallized granules are 3 hours at 90°C or to a dew point of -40°C, airflow rate of greater than 1.7 m³/kg per hour of resin throughput. Drying time must be increased to 4 hours or more for a 50 ppm residual moisture target. The resin should not be exposed to atmospheric conditions after drying. Keep the package sealed until ready to use and promptly reseal any unused material. Pellets that have been exposed to the atmosphere for extended time periods will require additional drying time. Amorphous regrind must be crystallized prior to drying, to assure efficient and effective drying.

Typical processing Conditions

	T° Setting (°C)
Feed throat	25
Zone 1	200
Zone 2	220
Zone 3	230
Melt pump	235
Spin head	235

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Handling and storage

Futerra® PLA should be stored at ambient temperature and at atmospheric pressure in its original packaging bags. The product should be stored in dry, well-ventilated areas, and it is recommended to avoid prolonged storage under extreme temperatures, direct sunlight or other sources of radiation.

It is advisable to convert the product within 12 months after delivery, provided appropriate storage conditions are used.

Please refer to the Safety Data Sheet for further information.

REGISTRATION

CAS number	9051-89-2
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