Materials for Scientific and Industrial Research and Manufacturing

ME346314 Polylactic acid (PLA) granule

ME346314 (PLA) is a thermoplastic material derived from annually renewable resources and is specifically designed for injection moulding of clear transparent components.

Applications include: Cutlery, cups, plates, saucers, outdoor novelties and many more

Physical properties	Test method	Value	Units
Density	ASTM D792	1.24	g/cm³
Melt flow rate (MFR) 210°C, 2.16 kgs	ASTM D1238	14	g/10 min
Intrinsic viscosity	ASTM D5225	3.3	
Crystalline melt temperature	ASTM D3418	145-160	°C
Glass transition temperature	ASTM D3418	55-60	°C
Mechanical properties			
Tensile strength at yield	ASTM D638	62	MPa
Tensile elongation	ASTM D838	3.5	%
Izod impact strength, Notched	ASTM D256	16	J/m
Flexural strength	ASTM D790	108	MPa
Flexural modulus	ASTM D790	3.6	GPa
Heat distortion temperature	ASTM E2092	55	°C
Moulded liner shrinkage		0.3-0.5	%

Processing Information

This grade is stable in the molten state, provided that the drying procedures are followed. The mould flow is highly dependant on melt temperature. It is recommended to balance screw speed, back pressure, and process temperature to control melt temperature. Injection speed should be medium to fast.

Process Details Startup and Shutdown

As PLA is not compatible with a wide variety of commodity resins, special purging sequences should be followed:

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

→ www.goodfellow.com → info@goodfellow.com

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Goodfellow Cambridge Limited
Ermine Business Park
Huntingdon Cambridgeshire PE29 6WR UK

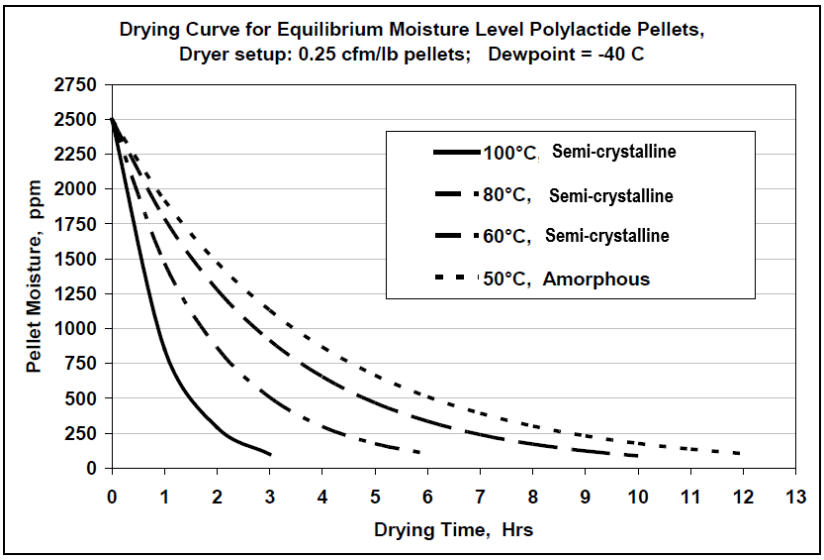
Tel: 0800 731 4653 (UK) or +44 (0) 1480 424 800
Fax: 0800 328 7689 (UK) or +44 (0) 1480 424 900

Processing temperature profile

Melt temperature	200°C
Feed throat	20°C
Feed temperature	165°C
Compression zone	195°C
Metering zone	205°C
Nozzle	205°C
Mould	25°C
Screw speed	100-175 rpm
Back pressure	3.5-6.9 bar

Drying

In-line drying is recommended. A moisture content of less than 0.025% (250 ppm) is recommended to prevent viscosity degradation. Typical drying conditions for crystallised granules are 2 hours at 90ºC or to a dew point of -40ºC, airflow rate of greater than 16 kgs/cm³ per hour of resin throughput. 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 crystallised prior to drying, to assure efficient and effective drying. Amorphous polymer must be dried below 50°C.



Properties shown are typical values, they are not absolute material properties, and should be used for guidance only. It is recommended that materials and components are tested for their suitability for a specific application. For more information and advice please discuss your application with our sales staff.

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