

Sulzer Polylactides (PLA)

The bio-based alternative to modern thermoplastics

Sulzer operates a fully continuous, 1,000 tons per year PLA production plant close to its headquarters in Switzerland. This modern facility allows production of various grades and qualities of polylactides at semi-industrial scale, based on Sulzer's PLA plant technology. The basis for PLA production with the Sulzer process is lactide, a dimer of lactic acid, synthesized by fermentation of sugar and consecutive dimerization.



Polylactide is a versatile biopolymer that can be tailored to fit many different applications, from biodegradable packaging to heat-resistant and mechanically resilient parts for the electronic or automobile industry. It has become a recognized alternative to traditional, fossil-based plastics in the global market.

Sulzer PLA Demonstration Plant

Since 2012, Sulzer owns and operates a PLA demonstration plant with a nameplate capacity of 1,000 tons per year. The plant is based on Sulzer's state-of-the-art PLA technology and can produce a wide range of PLA grades and qualities. The unit serves for the production of larger quantities of customer samples for application testing, of material batches for market development purposes as well as for toll production of customized formulations. Our customers appreciate the possibility of sourcing material from Sulzer for in-house testing, market acceptance surveys and product development. Sulzer also offers R&D services for the development of special products.

Sulzer Polylactide

Sulzer PLA is characterized by its high optical purity, its low level of residual monomer and a wide range of accessible molecular weights. Due to an extremely low level of racemization, Sulzer's PLA

process gives access to either pure PLLA, respectively PDLA, exhibiting very high degrees of crystallinity, or to PDLLA copolymers with precisely adjusted L/D-ratios. The yellowness index and polymer stability (avoiding monomer reformation during processing) are among the best in the market.

PLLA and PDLA may also be compounded to stereocomplex PLA (scPLA), exhibiting outstanding temperature stability (> 180 °C HDT-B).

As PLA is entirely based on renewable feedstock, it helps to improve the carbon footprint of plastic products and strongly supports the global drive to a greener environment.

Sulzer PLA Samples

Sulzer offers commercial sample quantities of its PLA ranging from a few kilograms to several tons. Typical PLA grades available from the Sulzer demonstration plant are described in the table overleaf. Should you require customized materials

or like to purchase larger quantities of PLA for production purposes, please contact us for further information.

To arrange a visit to the Sulzer PLA demonstration plant or to order sample material, please contact

Polymer Technology
Sulzer Chemtech Ltd
P.O. Box 65
8404 Winterthur, Switzerland

Phone +41 52 262 3749
pla.info@sulzer.com
www.sulzer.com

General Properties of Sulzer Polylactide ⁽¹⁾

<i>Physical Property</i>	<i>Specification</i>	<i>Unit</i>	<i>Test Method</i>
Shape	Round pellets		
Yellowness Index	< 10		ASTM D6290
Polymer Density	1.25 ± 10 %	g/ml	ISO 1183
Glass Transition Temperature	60 ± 5	°C	DSC
Residual Monomer	< 0.3	% w/w	Gas chromatography
Moisture Content	< 250	ppm	Karl-Fischer

Typical PLA Grades Available from Sulzer's PLA Demonstration Plant ⁽¹⁾

	<i>Grade Type</i>	<i>Typical Applications</i>	<i>MFI</i>	<i>D-isomer</i>	<i>T_m</i>	<i>Crystallinity</i>
			<i>2.16 kg/190 °C</i> <i>[g / 10 min]</i> <i>(ISO 1133-1)</i>	<i>[%]</i> <i>(by chiral GC)</i>	<i>[°C]</i> <i>(DSC, onset)</i>	<i>[%]</i> <i>(DSC)</i>
Sulzer PLA Grades - L Type	L100-HH	Extrusion, thermoforming, sheet, film, fiber	3 ± 1	< 0.3	180	45 - 55
	L100-H	Extrusion, thermoforming, sheet, film, fiber	6 - 7 ± 2	< 0.3	180	45 - 55
	L100-M	Injection molding, staple fiber	14 - 15 ± 5	< 0.3	180	45 - 55
	L99-L	Injection molding	30 ± 10	1	173	40 - 45
	L98-H	Continuous yarn	6 - 7 ± 2	2	165	35 - 40
	L97-HH	Oriented film, bi-axially stretched, blown films	4 ± 2	3	160	25 - 35
	L96-HH	Extruded sheet for thermoforming, extrusion	3 ± 1	4	157	20 - 30
	L96-H	Extruded sheet for thermoforming, extrusion	6 - 7 ± 2	4	157	20 - 30
	L95-M	Amorphous applications, injection molding	22 - 23 ± 7	5	153	20 - 25
	<i>Grade Type</i>	<i>Typical Applications</i>	<i>MFI</i>	<i>L-isomer</i>	<i>T_m</i>	<i>Crystallinity</i>
			<i>2.16 kg/190 °C</i> <i>[g / 10 min]</i> <i>(ISO 1133-1)</i>	<i>[%]</i> <i>(by chiral GC)</i>	<i>[°C]</i> <i>(DSC, onset)</i>	<i>[%]</i> <i>(DSC)</i>
Sulzer PLA Grades - D Type	D100-HH	Stereocomplex blends for sheet, film, fiber, thermoforming, extrusion	3 ± 1	< 0.3	175	40 - 50
	D100-H	Stereocomplex blends for sheet, film, fiber, thermoforming, extrusion	6 - 7 ± 2	< 0.3	175	40 - 50
	D100-M	Stereocomplex blends for injection molding and staple fiber	14 - 15 ± 5	< 0.3	175	40 - 50
	D100-LL	Nucleating agent	> 40	< 0.3	175	45 - 60

⁽¹⁾ All indicated values are measured target values and do not represent any guarantee or property for a specific application

Packaging	20 kg boxes or 600 kg octabins
Delivery Time	1 - 4 months depending on grade, EXW (Incoterms 2012)
Storage and Transport Conditions	Avoid direct sunlight, < 50 °C, keep packaging sealed until usage, once opened store under dry air or nitrogen to minimize moisture absorption
Special Instructions	Drying is recommended prior to processing (60 - 80 °C, 4 - 6 hours, dry air with dew point of -40 °C)