




# Stereocomplex PLA Compounds

A biobased replacement for PP, PA6, PA66 and PBT



-  Biobased
-  Reduced carbon footprint
-  Heat resistance better than glass filled PP and similar to glass filled PA & PBT

The global shift towards a biobased economy has placed pressure on plastic producers to seek alternatives to their oil-based products. Until now, PLA (Poly Lactic Acid) could not be used as a replacement for engineering plastics. However, Total Corbion PLA's breakthrough in stereocomplex PLA compound technology is changing the face of biobased plastics, offering plastic producers a biobased alternative to engineering plastics.

## Compounds based on full stereocomplex PLA technology

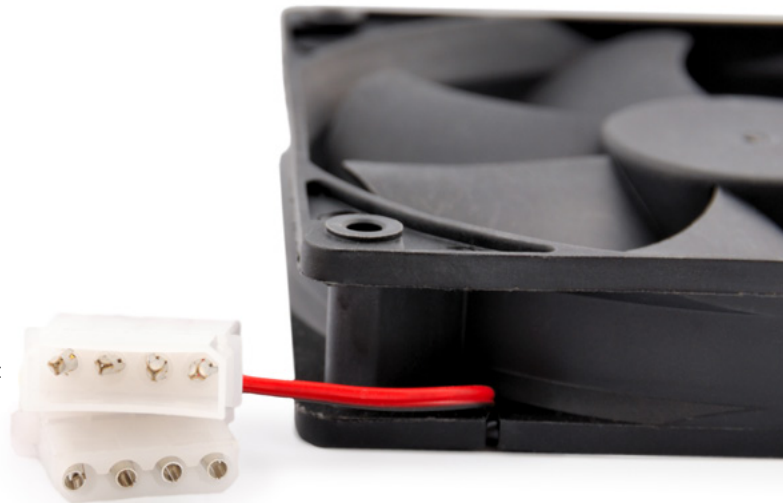
Engineering plastics are known for their excellent strength and heat resistance. Most PLA bioplastics of the past had the major drawback that they could not withstand increased temperatures. This challenge has now been conquered by the development of full stereocomplex PLA compounds technology. The proprietary technology will enable PLA applications able to withstand temperatures close to 200°C (HDT-A).

The benefits of full stereocomplex PLA have been studied by universities and R&D departments on a laboratory scale and now Total Corbion PLA is the first to scale up this technology and make it available for a broad range of industrial applications. The technology enables full stereocomplex morphology, not only in the lab environment but also in commercial production facilities.

Samples of full stereocomplex PLA marketing compounds will be available for customer evaluation. Total Corbion PLA is looking for brand owners, converters and compounders that wish to validate and capitalize on this new technology.

## About Total Corbion PLA

Total Corbion PLA is a global technology leader in Poly Lactic Acid (PLA) and lactide monomers. PLA is a biobased and biodegradable polymer made from annually renewable resources, offering a reduced carbon footprint versus many traditional plastics. The Luminy® PLA portfolio, which includes both high heat and standard PLA grades, is an innovative material that is used in a wide range of markets from packaging to consumer goods, fibers and automotive. Total Corbion PLA, headquartered in the Netherlands, will start up a new production plant in Thailand in the second half of 2018. The company is a 50/50 joint venture between Total and Corbion.



## A biobased alternative with comparable heat performance

Total Corbion PLA's full stereocomplex PLA technology can replace glass filled PP, PA and PBT type of materials in applications with high heat and demanding strength requirements. Glass fiber reinforced full stereocomplex PLA compounds have a HDT-A heat resistance close to 200°C, which is comparable to the properties of more traditional glass filled engineering plastics. The full stereocomplex PLA compounds can be used in demanding, durable applications like those in the automotive and electronics industries.

The figures and the table below show the typical results of compounds based on stereocomplex PLA technology in a number of marketing compounds:

- **Compound SC0:** a general purpose base compound to be used stand-alone or as base compound for glass fiber reinforcement.
- **Compound SC1:** a 20% glass fiber reinforced compound based on stereocomplex PLA.
- **Compound SC2:** a 40% glass fiber reinforced compound based on stereocomplex PLA.

## Processing information and recommendations

Please refer to the processing guide on 'Formulation and processing of full stereocomplex PLA compounds' for processing information.

Table 1. Typical properties of full stereocomplex PLA compounds <sup>1,2</sup>

Parameter	Method	Unit	PLA	SC0	SC1	SC2	PA6 GF20	PA66 GF20	PBT GF20
Glass fiber contents		%	0	0	20	40	20	20	20
Biobased content		%	100	98	78	58	0	0	0
Biobased carbon content		%	100	98	98	98	0	0	0
Flexural modulus	ISO 178	MPa	3500	3000	6000	13500	6000	7000	5500
Tensile strength	ISO 527	MPa	45	54	135	150	150	162	120
Tensile modulus	ISO 527	MPa	3500	2800	8300	13500	7000	7500	8000
Elongation at break	ISO 527	%	Max 5	2	2	1	4	4	2
Charpy notched impact, 23°C	ISO 179	kJ/m <sup>2</sup>	Max 5	4	10	10	9	9	8
Charpy unnotched impact, 23°C		kJ/m <sup>2</sup>		44	44	44	73	58	55
HDT-A (1.80 MPa)	ISO 75-1	°C	55-60	64	195	198	210	250	205
HDT-B (0.45 MPa)	ISO 75-1	°C	60	140	211	209	220	260	200
Melting temperature	DSC	°C	155	215	220	220	220	262	210

<sup>1</sup> Development grades, available for sampling, all data is preliminary. Total Corbion PLA does not commercially produce these compounds.

<sup>2</sup> Typical properties, not to be interpreted as specifications

Fig 1. Full stereocomplex PLA compounds have properties similar to traditional glass fiber reinforced engineering plastics

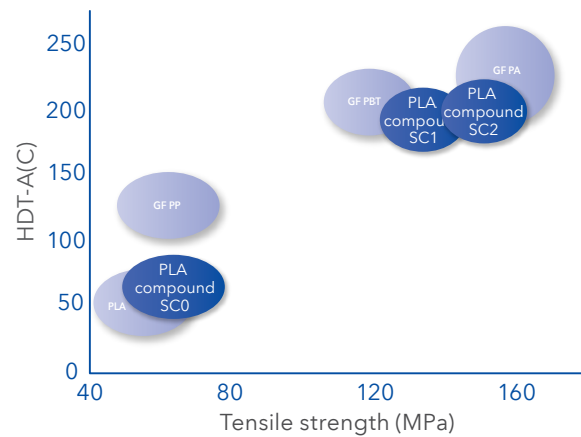


Fig 2. Adding glass fiber to full stereocomplex PLA compounds significantly increases the resulting heat resistance and mechanical properties

