

# Product Data Sheet

## Luminy® L175

|                       |              |
|-----------------------|--------------|
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| Version & language    | 6/0974 - EN  |
| Product availability  | Global       |
| Product status        | Commercial   |

### PRODUCT DATA SHEET LUMINY® L175

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#### DESCRIPTION

PLA is a biobased polymer derived from natural resources and offers a significant reduction in carbon footprint compared to oil-based plastics. Luminy® L175 is a high heat, high viscosity, PLA homopolymer suitable for film extrusion, thermoforming or fiber spinning. Compared to standard PLA, these PLA homopolymers have higher melting points and an increased rate of crystallization. As a result, compounds containing PLA homopolymers are suitable for the production of semicrystalline parts, which exhibit a higher temperature resistance.

#### TYPICAL PROPERTIES<sup>1</sup>

| Physical properties                            | Method                       | Typical value             |
|--|------------------------------|---------------------------|
| Density  | Literature value             | 1.24 g/cm <sup>3</sup>    |
| Melt flow index                                | ISO 1133-A (210°C/2.16kg)    | 8 g/10 min                |
| Melt flow index                                | ISO 1133-A (190°C/2.16kg)    | 3 g/10 min                |
| Stereochemical purity                          | TotalEnergies Corbion method | ≥ 99% (L-isomer)          |
| Appearance                                     | Visual                       | Crystalline white pellets |
| Residual monomer                               | TotalEnergies Corbion method | ≤ 0.3%                    |
| Water / moisture                               | Coulometric Karl-Fischer     | ≤ 400 ppm                 |
| Melting temperature                            | DSC                          | 175°C                     |
| Glass transition temperature                   | DSC                          | 60°C                      |
| Mechanical properties                          | Method                       | Typical value             |
| Tensile modulus                                | ISO 527-1                    | 3500 MPa                  |
| Tensile strength                               | ISO 527-1                    | 50 MPa                    |
| Elongation at break                            | ISO 527-1                    | ≤ 5%                      |
| Charpy notched impact, 23°C                    | ISO 179-1eA                  | ≤ 5 kJ/m <sup>2</sup>     |
| Heat deflection temp, amorphous <sup>2</sup>   | ISO 75-1                     | 60°C                      |
| Heat deflection temp, crystalline <sup>2</sup> | ISO 75-1                     | 105°C                     |

<sup>1</sup> Typical properties, not to be interpreted as specifications

<sup>2</sup> HDT B, 0.45MPa flatwise. HDT depends on processing conditions. For crystalline resins, formulation included 3-7% nucleating agent (Luminy® D070) and molding took place in a 90-100°C tool.

#### PROCESSING INFORMATION & RECOMMENDATIONS

PLA homopolymers can be processed on conventional extrusion equipment and can be used as neat resin or as part of a compound to further optimize overall material properties. It is recommended to use a general purpose screw with L/D ratios between 24 and 32. Pre-drying of the resin is recommended.

##### Start-up and shutdown

1. Purge the system with a polyolefin or a purging compound (e.g. Dyna-Purge, Clean LDPE) at its recommended temperature settings.
2. Reset the temperature settings to the recommended PLA temperature profile.
3. Purge with PLA resin or PLA compound until stable processing is obtained free of contaminants.
4. Reset the temperature settings to the recommended purging compound temperature profile.
5. Purge with a polyolefin or a purging compound for 5 times the average residence time.

##### Processing recommendations

|                      |                    |
|----------------------|--------------------|
| Predrying            | 4-6 hours at 100°C |
| Feed zone            | 20-40°C            |
| Melt zone            | 180-190°C          |
| Mixing & conveying   | 190-210°C          |
| Die head temperature | 190-210°C          |

*Typical settings, may require optimization*



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After completion of the run, PLA must be removed from the whole system. PLA can degrade into lactic acid causing corrosion of the equipment (e.g. die plates).

### MOISTURE & PRE-DRYING

It is recommended to dry Luminy® L175 from the packaging for 4-6 hours at 100°C. Drying of semi-crystalline PLA homopolymer can be performed in a desiccant hot air dryer, with a dew point of -40°C or less. It is recommended to reduce the moisture content before melt processing to a level less than 250ppm and preferably less than 100 ppm, measured by e.g. Karl-Fischer or Brabender aquatrac method. Predrying is in particular important prior to injection molding, film and sheet production. Moisture causes hydrolysis of the PLA homopolymer during melt processing, resulting in reduced mechanical performance in the final part.

### PACKAGING & STORAGE CONDITIONS

Luminy® L175 is available in 1250 kg form-stable aluminum-lined big bags and 25 kg sample bags (moisture level not guaranteed for sample bags). It is recommended to store PLA polymer in its closed, original moisture-barrier packaging at temperatures below 50°C. Storage in direct sunlight should be avoided. The supplied PLA polymer pellets are typically semi-crystalline, unless otherwise stated.

### COMPOSTABILITY

Composting of organic waste helps to divert organic waste from landfill or incineration. Composting is a biological process in which organic wastes are degraded by microorganisms into carbon dioxide, water and humus, a soil nutrient. Luminy® PLA polymers are in compliance with the EN-13432 standard. Luminy® L175 has been certified compostable by TUV Austria (OK Compost S478) and by European Bioplastics (Seedling 7W2030) up to a thickness of 2.3 mm. As the compostability of the end product is also dependent on the geometry of product, it is the responsibility of the manufacturer of the end product to ensure compliance with the regulations.



### BIOBASED CONTENT

Luminy® L175 has a biobased content of 100% (confidence level 1) and a biobased carbon content of 100% according to EN16785-1 under certificate number DIC-00001. Luminy® L175 is certified 100% biobased according to ASTM D6866 under the USDA Biopreferred program.



### FOOD CONTACT STATUS

In the European Union, Luminy® PLA polymers are compliant with EU commission regulation 10/2011 of 14 January 2011 (and amendments) on plastic materials and articles intended to come into contact with food. Lactic acid is considered a dual use substance, since lactic acid is approved as a food additive (additive number E270). There are no SMLs or SML(T)s for the ingredients used to produce Luminy® PLA. The regulation does include an migration limit of 10 mg/dm<sup>2</sup> on the overall migration from finished plastic articles into food. It is the responsibility of the manufacturer of the final product, when intended as a food contact product, to determine that the use of the product is safe and also suitable for the intended application. While it is TotalEnergies Corbion's conclusion that the above mentioned polymers are permitted, it is the final product which must meet the given regulations and the manufacturer should take responsibility to check if the final product is in compliance with these regulations.

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In the United States of America, Luminy® PLA as supplied by TotalEnergies Corbion has been evaluated and was found to be suitable for use in food contact applications. On 30 November 2018, FCN 001926 as applied for by TotalEnergies Corbion to the FDA became effective. It is included in the list of effective notifications for FCNs on the website of the FDA. The evaluation performed was in line with the requirements of Section 201(s) and Section 409 of the Federal, Drug and Cosmetic Act, and Parts 182, 184 and 186 of the Food Additive Regulations. Luminy® PLA neat resin is approved for all food types and conditions of use B through H.

### NOTICE REGARDING USE RESTRICTIONS

Unless specifically agreed to in writing, TotalEnergies Corbion will not knowingly market any product into any of the following commercial or developmental applications: (1) bottles or preforms, unless specific arrangements on recycling and end-of-life are in place, (2) microbeads used in personal care products, including without limitation, cosmetics or over-the-counter drugs, (3) components of products intended for human or animal consumption or (4) any application that is intended to be used inside the human body.



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