

*Even Being The Best Is Sometimes Not Enough. Therefore We Try Harder. Resinex, The Best Distributor Of Plastics And Rubber In Europe.*



## Bioplastics – A Current and growing trend

**Today a bioplastic alternative exists for almost every conventional plastic material and the corresponding application.**



There are two main forces driving the increased demand for bioplastics;

- ♻ Increased societal awareness of Climate Change and Pollution
- ♻ Rising Costs of Fossil Fuels

Many existing plastic product restrictions are supported by legislation (e.g. Compulsory charges on single use plastic bags). Some leading companies have taken this a step

further by implementing voluntary initiatives to reduce a products carbon footprint and meet customer's requirements.

- ♻ Car manufacturers have been increasing usage of recycled plastics
- ♻ Companies such as Coca-Cola, Danone, Ikea, Samsung, Procter and Gamble, Heinz and many others have already begun to incorporate bioplastics into their products and packaging.

♻ Lego pledged to use sustainable materials in all of its products and packaging by 2030

♻ Supermarket chain 'Iceland' has publicly promised to find alternatives to plastic packaging for all of their own brands. 'Tesco' have also vowed to switch to only recyclable packaging.

The trend towards alternative to conventional plastics is thus significantly accelerated and the demand for bioplastics and recycled plastics is considerably increasing.

### What exactly is a bioplastic?

What is the difference between biodegradable plastic and biobased plastic?

**Bioplastic** is a general designation for biodegradable plastics, plastics made from renewable sources, or both. They have the same properties as conventional plastics, but offer the additional benefit of being more ecologically friendly.

**Biodegradable plastic** is plastic, which, under appropriate conditions due to the action of natural microorganisms, breaks down into naturally occurring substances.

**Biobased plastic** – plastic made from renewable sources, such as corn, sugar cane, soya beans, etc.

Another important group of plastics that can positively contribute to the reduction of carbon footprint is **recycled plastics**.

With its comprehensive bioplastics portfolio, RESINEX is a leader in the market for environmentally sustainable products. We supply bioplastics and high quality recycled plastics for applications from the automotive industry through 3D print to blown containers or foils.

## Biodegradable and biobased plastics



### PLA Ingeo™

PLA Ingeo™ (polylactic acid) by Natureworks is made by polymerizing lactic acid obtained by fermentation of maize plant sugars. Using Ingeo™ reduces greenhouse gas emissions by up to 75% compared to conventional plastics such as PS or PET.

#### The main advantages of PLA material are:

- ♻️ Excellent gloss and clarity
- ♻️ Easy shaping
- ♻️ Printing and embossing
- ♻️ High rigidity
- ♻️ Great barrier properties

It is mainly used in the packaging industry, for the production of plastic cutlery, kitchen trays or 3D filaments.

### BioBatch

PLA Compounds for Film Extrusion  
BioBatch biodegradable PLA compounds are



made from biopolymers and special additives approved according to DIN EN 13432 as well as DIN CERTCO D 6400.

They are a response to the current trend and new legislation to limit usage of disposable shopping bags from conventional plastics.

#### Typical applications are:

- ♻️ Shopping bags
- ♻️ Garden and agricultural films
- ♻️ Waste bags
- ♻️ Hygienic and packaging foils

## Biobased plastics



### I'm green™ PE

I'm green™ Polyethylene by Braskem is a biopolymer made from sugar cane ethanol. It has the same properties, great application versatility and processing as a classic polyethylene and is as recyclable as standard PE.

#### I'm green™ Polyethylene portfolio includes:

- ♻️ LDPE
- ♻️ LLDPE
- ♻️ HDPE

I'm green™ PE is especially suitable for the production of rigid and flexible packaging (food and beverages, detergents and cosmetics), toys and cans or plastic bags.



To identify products that have I'm green™ Polyethylene in its composition, and to help the consumers to recognize them, Braskem created the I'm green™ seal. For use of the I'm green™ seal, products must follow certain criteria established by Braskem.

### PA 4.10 EcoPaXX®

PA 4.10 EcoPaXX® by DSM is made from 70% castor oil obtained from castor seeds. Its thermal and mechanical properties reach values like PA66, but it has a 30% lower absorption capacity.

#### Main EcoPaXX® features:

- ♻️ Excellent chemical resistance
- ♻️ Low water absorption - a suitable alternative to PA66 if the part is in contact with water / glycol
- ♻️ High melting point up to 250°C - the highest of all biopolymers
- ♻️ High crystallisation speed like PA66 and PA6 for fast and easy processing

### TPC Arnitel® ECO

TPC (TPE-E) Arnitel® ECO is thermoplastic copolyester made from 50% of renewable sources based on rapeseed oil.

#### The main advantages of Arnitel® ECO are:

- ♻️ Excellent fatigue resistance
- ♻️ High temperature resistance
- ♻️ High impact resistance
- ♻️ High wear and abrasion resistance
- ♻️ Good chemical and weather resistance

### PA 6.10 Technyl® eXten

Polyamide 6.10 Technyl® eXten is made from at least 60% of renewable sources.

#### Main benefits of Technyl® eXten:

- ♻️ Excellent chemical resistance to salts (ZnCl<sub>2</sub>), oils, hot water, steam and fuel
- ♻️ Excellent gas barrier (O<sub>2</sub>, CO<sub>2</sub>)
- ♻️ Very good barrier to fuel
- ♻️ High temperature resistance
- ♻️ High adhesion to metals - coating of metallic surfaces as protection against corrosion and oxidation

Thanks to its exceptional chemical resistance to salts, as well as steam and hot water, and low water absorption, Technyl® eXten is

a cost-effective alternative to longer carbon chain polyamides such as PA12.

#### PA11 Rilsan®

PA11 Rilsan® is a unique high performance polyamide by Arkema, made from 100% of renewable source - castor oil.

- ✱ Resistance to high as well as very low temperatures
- ✱ Resistance to oils, hydraulic fluids and fuel
- ✱ Low water absorption
- ✱ Very good abrasion resistance
- ✱ Excellent toughness even at low temperature

#### PA Rilsan® CLEAR

RILSAN® CLEAR is a transparent PA with high performance properties that enables innovative design options for injection-molded parts, especially for sports and leisure activities.

#### TPE-A Pebax® Rnew®

TPE-A Pebax® Rnew® high performance thermoplastic elastomer is based on bioplastic Rilsan® PA11.

#### TPE-A Pebax® Rnew® advantages are:

- ✱ Low density
- ✱ Easy processability
- ✱ UV resistance
- ✱ Excellent elastic properties
- ✱ High heat resistance

## High quality recycled plastics

The use of recycled plastics is also a response to the requirement to reduce CO<sub>2</sub> emissions, environmental sustainability and related legislative requirements.

Many manufacturers (OEM) across different industrial segments have targets for using a certain part of recycled plastic in their products. Clear evidence is, for example, the automotive industry, where the use of recycled plastics is often conditioned not only by the financial aspect of their usage.

#### PA6.6 Technyl® 4earth®



PA6.6 Technyl® 4earth® is made by the breakthrough patented technology with a stable source of post-industrial technical textiles, such as automobile airbags. This unique technology offers an environmentally friendly product while retaining the same properties as the standard Technyl® polyamides that are used for demanding applications.

- ✱ Similar viscosity to traditional polyamides
- ✱ Hot runner moldable
- ✱ Excellent mechanical properties
- ✱ Good resistance to aging

## High quality recycled plastics RAVAGO

Ravago, an expert in plastics compounding, has developed a wide portfolio of industrial grade polymers that have strictly monitored and controlled quality. Industrial quality plastics are typically used for highly demanding, non-visual applications that require good mechanical properties and favorable price.

Ravago's technical experts are in contact with individual car makers such as VW, Škoda, Daimler, BMW, Ford, Jaguar Land Rover and others. Ravago materials are thus developed to meet the exact specifications of each OEM.

#### An overview of RAVAGO high quality recycled polymers:

PA6, PA66  
PP Compounds  
PP Compounds  
PC/ABS  
ABS  
PC  
PE  
PS

Ravamid®  
Mafill®  
Ravaplen®  
Mablex®  
Sicoflex®  
Sicoklar®  
Ravalene®  
Sicostirolo®





# Bioplastics and sustainable solutions.



## Biobased plastics

- LD PE, LLD PE, HD PE I'm green™
- PA 4.10 EcoPaXX®
- TPC Arnitel® ECO
- PA 6.10 Technyl® eXten
- PA11 Rilsan®
- PA Rilsan® CLEAR
- TPE-A Pebax® Rnew®



## Plastic

Renewable source  
Carbon reduction

## Biodegradable plastics

- PLA Ingeo™
- PLA compounds BioBatch



naturally advanced materials by NatureWorks



## High quality recycled plastics

- PA 6.6 Technyl® 4earth®
- PA 6, PA 66 Ravamid®
- PP compounds Mafill®
- PP compounds Ravaplen®
- PC/ABS Mablex®
- ABS Sicoflex®
- PC Sicoklar®
- PE Ravalene®
- PS Sicostirolo®

