





# Bioplastics - From Nature Back to Nature



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# About Torise

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Torise Biomaterials is a manufacturer of compostable and biodegradable products. Since August 2010, we have been developing an entire range of sustainable alternatives to traditional plastics. Our Torise products are naturally made from resins that are derived from plant starches, vegetable oils & compostable polymers that are simply consumed by microorganisms that live within our soils.

Our manufacturing capabilities include a variety of products: modified resins, shopping bags, garbage bags, dog poop bags, produce bags, garment bags, courier bags, gloves, aprons, zip lock bags, cutlery, PLA cups and tableware.

All our products have the international authorized certifications such as EN13432 (Din Certco), OK Compost, OK Compost HOME (TUV Austria), ASTM D6400 (BPI), AS4736 and AS5810(ABA).



# Sustainability

## Low Carbon Emission— Renewable Energy Sources

**Solar Energy:** Torise has installed 2MW solar energy, which can provide 70% of the annual electricity consumption.

**Wind Power:** The local area of Torise is China Wind Power Generation Center, which can provide the annual remaining electricity consumption.



## Pollution-free — Compostable & Biodegradable Products

Torise products are compostable & biodegradable, made from renewable resources and also can be turned into organic fertilizers and used in the growth of crops after composting.



## Emission-free— VOC Emission Control

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- All condensed water in our factory is recycled.
- The gas generated in the film-extrusion process is discharged after being handled with below measures:
  - Spray
  - Plasma
  - Photo-oxidation
  - Activated carbon adsorption
- The total VOC emissions of Torise is less than a small restaurant.



# Certifications

## Company Certifications



ISO9001/14001



BSCI



SEDEX

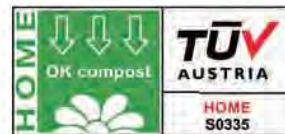


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## Products Certifications



OK COMPOST



OK COMPOST HOME



EN13432



ASTM D6400



AS4736



AS5810

# Compostable & Biodegradable Materials



## PBAT

CAS NO. : 55231-08-8

Appearance: Natural White Resin

Items	Standard	Unit	PBAT
Density	ISO 1183	g/cm <sup>3</sup>	1.22 ± 0.03
Melting Point	ISO 11357	°C	110~120
Melt Flow Index	ISO 1133	g/10min (190 °C, 2.16kg)	≤5
Tensile Strength at Break	ISO 527	MPa	18~21
Elongation at Break	ISO 527	%	≥500
Impact Resistance -Dart Test	ISO 180	KJ/M <sup>2</sup>	N.B
Moisture Content	ISO 15512	%	≤0.1
Shore D Hardness	ISO 7619	Hardness	39~41





## TRBF90

**Component:** Cornstarch, PBAT, PLA

**Appearance:** Light Yellow Resin

Items	Standard	Unit	TRBF90
Density	ISO 1183	g/cm <sup>3</sup>	1.15~1.2
Melting Point	DSC, 10°C/min	°C	120~130
Melt Flow Index	ISO 1133	g/10min (190°C, 2.16kg)	≤8
Tensile Strength (MD)	ISO 527	MPa	≥18
Tensile Strength (TD)	ISO 527	MPa	≥13
Elongation at Break (MD)	ISO 527	%	≥180
Elongation at Break (TD)	ISO 527	%	≥300
Elmendorf Tear (MD)	ISO 6383	mN	≥1000
Elmendorf Tear (TD)	ISO 6383	mN	≥2500

Items	Standard	Unit	TRBF95/96
Density	ISO 1183	g/cm <sup>3</sup>	1.18~1.23
Melting Point	DSC, 10°C/min	°C	130-140
Melt Flow Index	ISO 1133	g/10min (190 °C, 2.16kg)	≤10
Tensile Strength (MD)	ISO 527	MPa	≥25
Tensile Strength (TD)	ISO 527	MPa	≥15
Elongation at Break (MD)	ISO 527	%	≥120
Elongation at Break (TD)	ISO 527	%	≥200
Elmendorf Tear (MD)	ISO 6383	mN	≥750
Elmendorf Tear (TD)	ISO 6383	mN	≥1000

## TRBF95/96

**Component:** PBAT, PLA

**Appearance:** White Resin



# Compostable & Biodegradable Commercial Bags

T-shirt Shopping Bags



Die Cut Shopping Bags



Produce Bags for Vegetables & Fruits



C-fold Bin Liners





# Compostable & Biodegradable Commercial Bags

Domestic Bin Liners



Large Bin Liners



Drawstring Bags



Bin Liners with Handles







# Compostable & Biodegradable Other Products

Gloves



Drinking Straws



Disposable Injection Products



Zip Lock Bags



# Compostable & Biodegradable Other Products

Mulching Films



Seeding-raising Plates



Agricultural Applications





## What is a “biobased” plastic?

A biobased plastic is made from renewable resources instead of fossil fuels. Examples of renewable carbon resources include corn, potatoes, rice, soy, sugarcane, wheat, and vegetable oil.

### What is a “biodegradable” plastic?

A biodegradable plastic can degrade by naturally occurring microorganisms such as bacteria, fungi, and algae to yield water (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>) and/or methane (CH<sub>4</sub>), biomass, and inorganic compounds.

## What is a “Compostable” plastic?

A compostable plastic is biodegradable in a composting environment, yielding H<sub>2</sub>O, CO<sub>2</sub>, biomass, and inorganic compounds. The biodegradation during composting should be at a rate similar to other known compostable materials, and should not leave visual or toxic residue.

- Disintegration: No more than 10 percent of the original dry weight of a product must remain after 84 days in a controlled composting test.
- Biodegradation: 90 percent of the organic carbon in the test materials must be converted to carbon dioxide within 180 days.
- Nontoxic to plants: The product must have less than 50 percent of the maximum allowable concentrations of certain heavy metals regulated by biosolids (U.S. EPA 503). Compost must also be able to support germination of two different plant species at a rate at least 90 percent of that in a “control” sample.



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