

OILES Biomass Plastic Bearings

Eco-friendly
plant-derived
plastic bearings

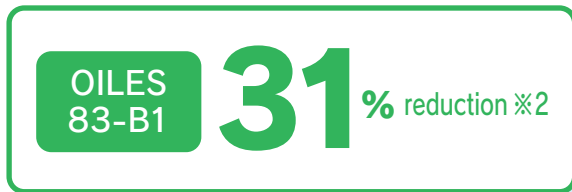


OILES Biomass Plastic Bearings

Eco-friendly plant-derived plastic bearings!

To achieve [Carbon Neutral by 2050] ※1, we have developed plant-derived biomass plastic bearings that are friendly to the global environment. Since 2019, We have been selling high-performance bearings with a high proportion of biomass plastic ahead of the industry.

Reduction of carbon dioxide (CO₂) emissions by plant-derived plastic raw materials.



About biomass plastics

Q >> What are biomass plastics?

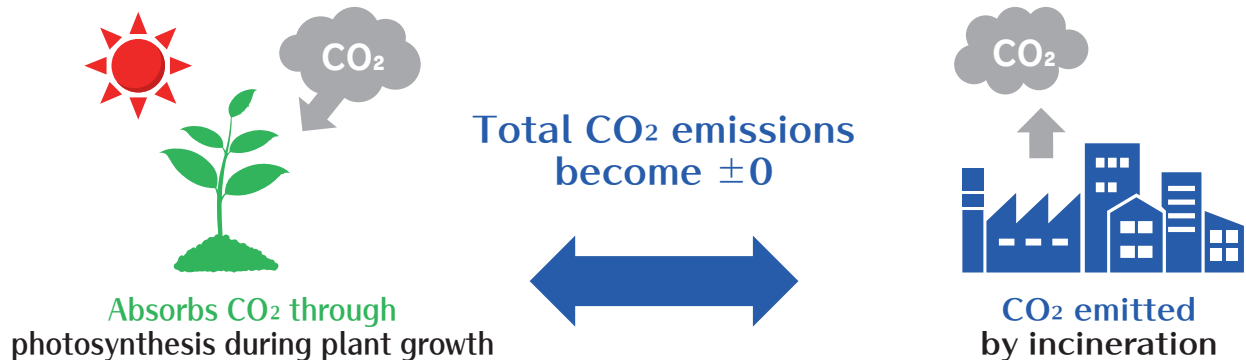
Biomass plastics are plastics made from plants such as sugar cane and corn, not petroleum. It is attracting attention as an earth-friendly material and is becoming popular and being used in many of industries.

Advantages of biomass plastics

- Contribution to prevention of global warming - Plants absorb CO₂ through photosynthesis during the growth process.
- Consumption control of exhaustible resources - Unlike petroleum, plants are renewable resources through cultivation.

Q >> About the connection between carbon neutrality and biomass plastics.

Carbon neutrality refers to an effort to achieve net zero emissions by offsetting greenhouse gas emissions and absorption. Even if biomass plastic is incinerated, the amount of CO₂ emitted is the same as the amount absorbed by plants as a raw material, and as a result, it has carbon neutrality that does not affect the increase or decrease of CO₂ in the atmosphere. Demand is expected to increase further in the future, with the aim of achieving [Carbon Neutral by 2050] ※1.

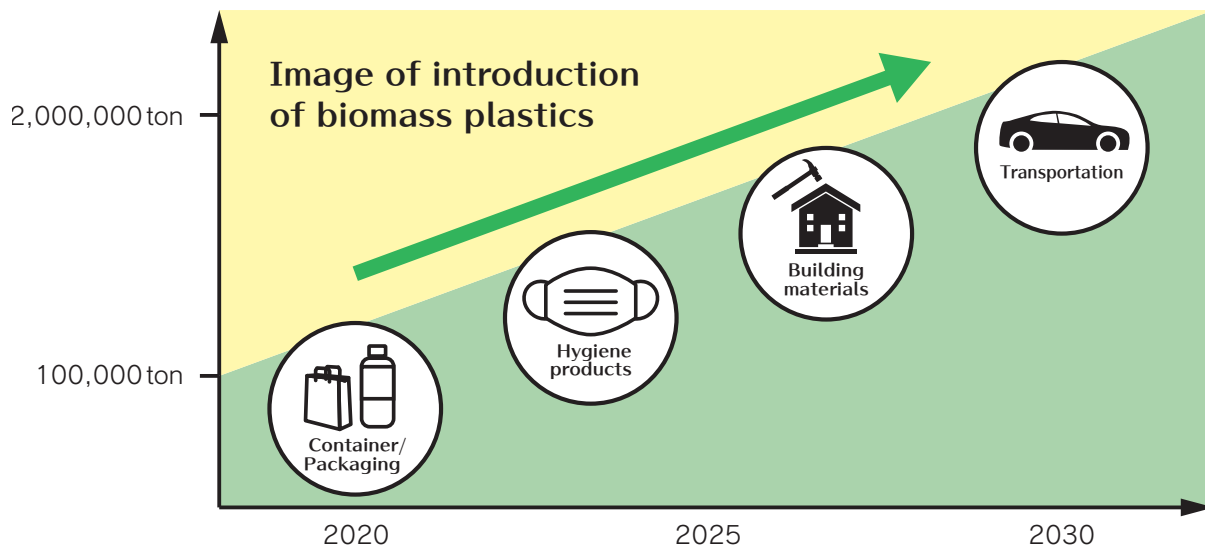


※ 1 An initiative announced by the Japanese government in January 2021 to reduce greenhouse gas emissions to zero by 2050.

※ 2 Value obtained by subtracting the amount of CO₂ absorbed during raw material production from the amount of CO₂ emitted during the manufacturing (raw materials) and disposal processes. (see page 3 for details)



Q » About Roadmap for Biomass plastics introduction.



The Japanese government sets a goal of introducing 2 million tons of biomass plastics by 2030.

Proactive transition from existing petroleum-derived plastic products to biomass plastic is expected in a variety of industries, ranging from hygiene products such as masks to building materials and automobiles.

Q » About OILES biomass plastics.

We have developed a high performance plastic bearings with high biomass content by adding fillers that improve friction performance to biomass plastics refined from sugarcane and castor beans.

Product	Appearance/Base material	Main raw material	CO ₂ emissions and reduction effect ※1
<p>Oiles 83-B1</p> <p>Weight ratio of biomass plastic 45% or more</p>	 <p>Polyamide (PA)</p>	 <p>Castor bean</p>	 <p>Oiles 83-B1: 4.4 Oiles 83 petroleum-derived PA bearing: 5.0 PA66 ※2: 6.4</p> <p>CO₂ emission(kg-CO₂/kg)</p>
<p>Oiles 81-B1</p> <p>Weight ratio of biomass plastic 90% or more</p>	 <p>Polyolefin (PO)</p>	 <p>Sugarcane</p>	 <p>Oiles 81-B1: 1.6 Oiles 81 petroleum-derived PO bearing: 4.4</p> <p>CO₂ emission(kg-CO₂/kg)</p>

※1 Value obtained by subtracting the amount of CO₂ absorbed during raw material production from the amount of CO₂ emitted during the manufacturing (raw materials) and disposal processes. ※2 Data refer from [Plastics Europe].

OILES Biomass Plastic Bearings

» Oiles 83-B1

Weight ratio of biomass plastic: 45% or more

- Serviceable without the lubrication.
- Superior dimensional stability due to the low swelling rate.
- It features wear resistance and low coefficient of friction under a various condition. It can be used as a substitute for polyacetal, which is widely used as a sliding material.
- Compared to Oiles 83 (petroleum-derived polyacetal bearing), it reduces CO₂ emissions and shows the same or better friction performance.



Service range

Lubrication condition	Dry
Service temperature range °C	-40 ~ +140
Allowable max. pressure P N/mm ² {kgf/cm ² }	19.5 {199}
Allowable max. velocity V m/s {m/min}	1.2 {72}
Allowable max. PV value N/mm ² · m/s {kgf/cm ² · m/min}	1.0 {612}

※ The value shown above are typical value, not the standard value.

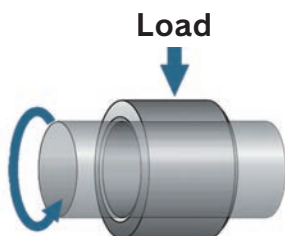
Mechanical properties

Specific gravity	ASTM D 792	-	1.12
Tensile strength	ASTM D 638	N/mm ²	58
Tensile elongation at break	ASTM D 628	%	6
Flexural property	ASTM D 790	N/mm ²	75
Flexural modulus	ASTM D 790	N/mm ²	1,800
Izod impact strength	ASTM D 256	J/m	26
Co-efficient of linear expansion	ASTM D 696	x10 ⁻⁵ °C ⁻¹	8
Swelling rate	ASTM D 570	23°C Rh50%	0.68
Melting point	DSC	°C	315

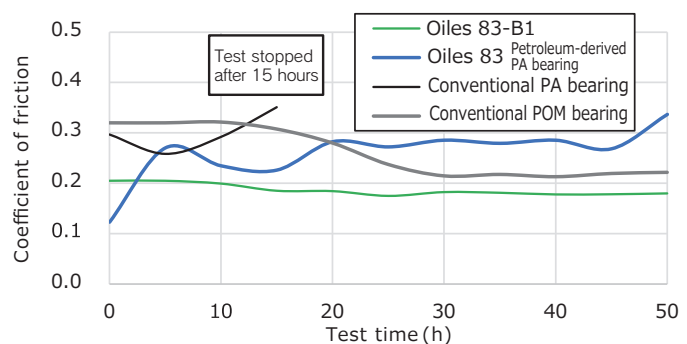
Test data

Comparison with conventional plastic bearings

Journal mating shaft rotation test

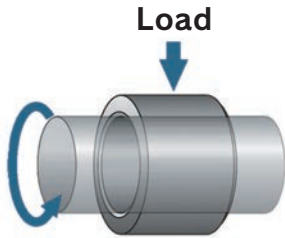


Mating material	SUJ2(Ra0.1)
Pressure	0.98N/mm ²
Velocity	0.17m/s
Rotating cycle	318rpm (Bearing I.D φ10)
Temperature	23°C
Lubrication	Dry
Test time	50h

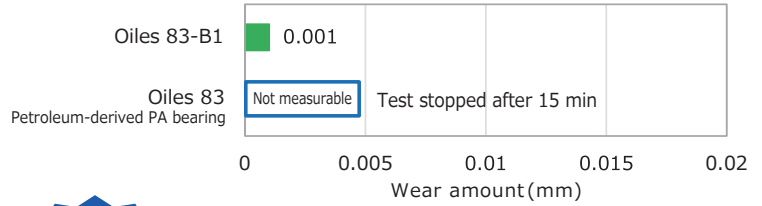
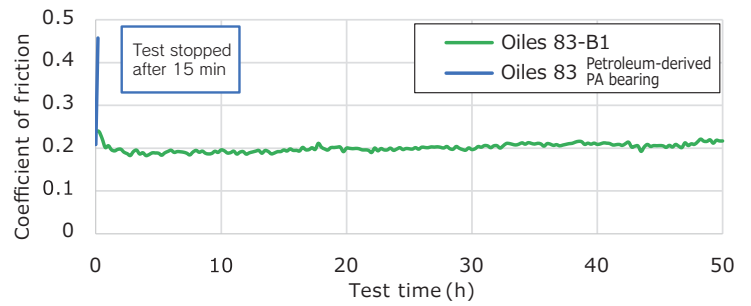


Low load, high velocity

Journal mating shaft rotation test



Mating material	SUJ2(Ra0.1)
Pressure	0.49N/mm ²
Velocity	0.83m/s
Rotating cycle	1592rpm (Bearing I.D φ10)
Temperature	23°C
Lubrication	Dry
Test time	50h



Excellent friction performance even under high velocity conditions

Allowable max. velocity

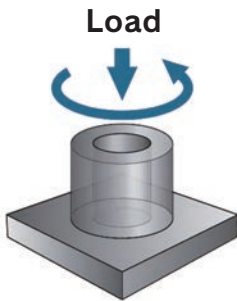
× 3.4

higher than our petroleum-derived PA bearing

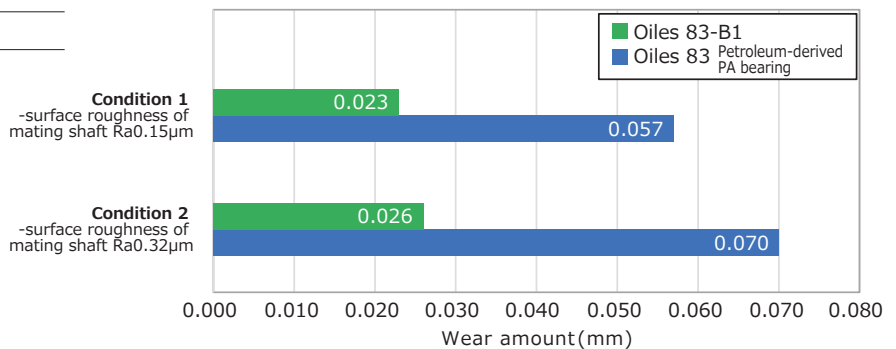
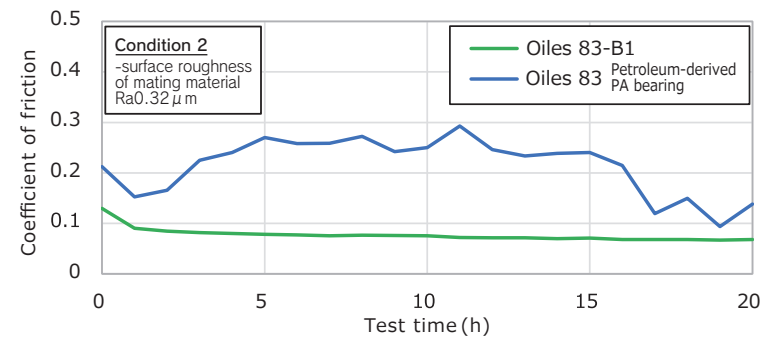
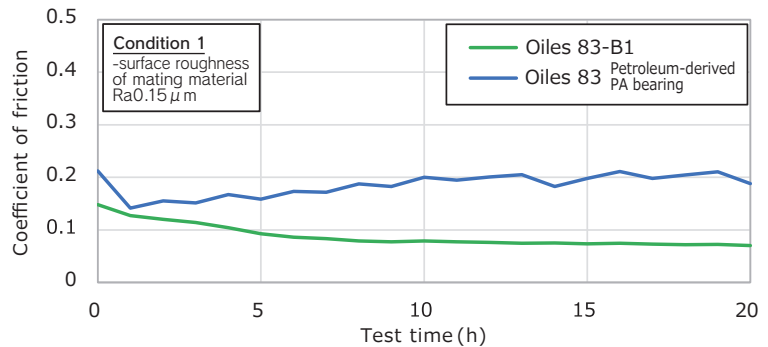
Oiles 83 Petroleum-derived PA bearing
Allowable maximum velocity: 0.35m/s

High load, low velocity

Thrust rotation test



Mating material	SUS304
Pressure	14.5N/mm ²
Velocity	0.036m/s
Temperature	23°C
Lubrication	Dry
Test time	20h



OILES Biomass Plastic Bearings

» Oiles 81-B1

Weight ratio of biomass plastic: 90% or more

- Serviceable without the lubrication.
- Features superior wear resistance in low load conditions.
- Compared to Oiles 81 (petroleum-derived polyolefin bearing), it reduces CO₂ emissions and shows the same or better friction performance.
- Features superior impact resistance performance.



Service range

Lubrication condition	Dry
Service temperature range °C	-60 ~ +60
Allowable max. pressure P N/mm ² {kgf/cm ² }	5.0 {51}
Allowable max. velocity V m/s {m/min}	0.5 {30}
Allowable max. PV value N/mm ² · m/s {kgf/cm ² · m/min}	0.50 {306}

※ The value shown above are typical value, not the standard value.

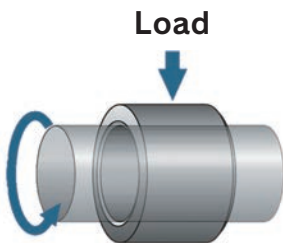
Mechanical properties

Specific gravity	ASTM D 792	-	0.91
Tensile strength	ASTM D 638	N/mm ²	16
Tensile elongation at break	ASTM D 638	%	> 400
Flexural property	ASTM D 790	N/mm ²	14
Flexural modulus	ASTM D 790	N/mm ²	500
Izod impact strength	ASTM D 256	J/m	87
Co-efficient of linear expansion	ASTM D 696	x10 ⁻⁵ °C ⁻¹	11
Melting point	DSC	°C	134

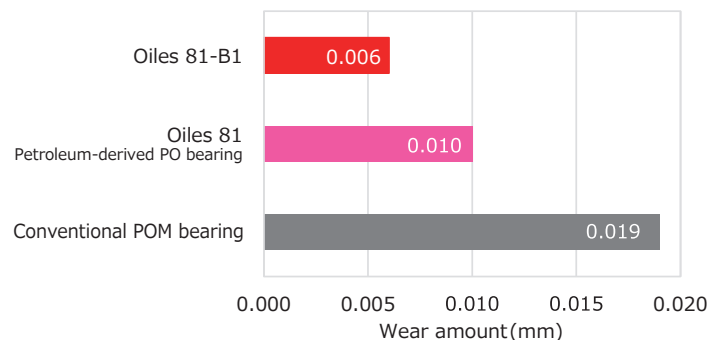
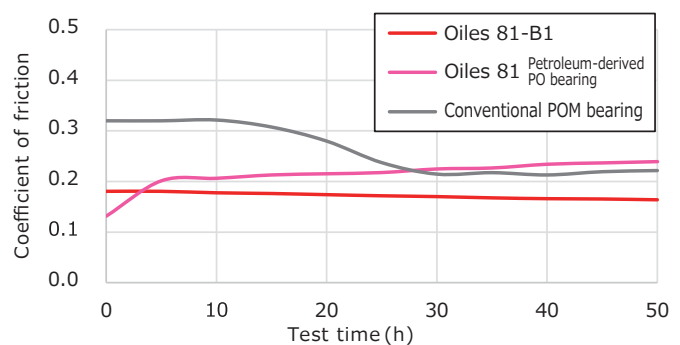
Test data

Comparison with similar products

Journal mating shaft rotation test



Mating material	SUJ2(Ra0.1)
Pressure	0.98N/mm ²
Velocity	0.17m/s
Rotating cycle	318rpm (Bearing I.D φ 10)
Temperature	23°C
Lubrication	Dry
Test time	50h





OILES BEARING

In addition to biomass plastic bearings, we have a lineup of bearings that can be applied to a wide range of applications.

- Plastic Bearings
- Multi-layer Bearings
- Metallic Bearings
- Air Bearings
- Slide Shifter, Guide Units
- Compact Floating Cutter



Contact

Product information can be found on our website. [<https://www.oiles.co.jp>]
Or please contact our sales office for details.

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