The Pursuit of Excellence

KUREHA

High Performance Polyester

KUREDUX®

Polyglycolic acid (PGA) Resin

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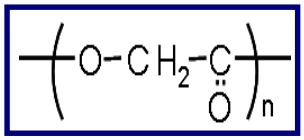
Kuredux® -Polyglycolic acid(PGA) -

Polyglycolic acid (PGA) is a biodegradable polyester resin that possesses several remarkable characteristics.

As the mass production was difficult, PGA resin had been used in the limited field as medical suture until 2010. Kureha Corporation's proprietary polymerization technology resulted in the world's first industrial scale PGA manufacturing facility, allowing the introduction and first commercial widespread use of Kuredux® as a new polymer offering to industry.



Molecular Structure of Polyglycolic acid

Biodegradability, Hydrolyzability

Characteristics of Kuredux®

High Strength and Modulus

High abrasion resistance

High solvent resistance

Biodegradability

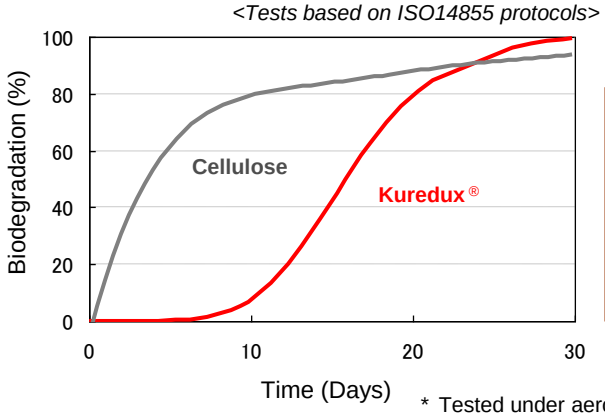
Kuredux® is a fully compostable plastic, satisfying the test protocols for ISO 14855 as well as ASTM D6400 and EN13432, and certified as a biodegradable plastic by TUV(EU) and JBPA/Biodegradable Plastics (Japan).

OK compost TÜV AUSTRIA INDUSTRIAL S0084

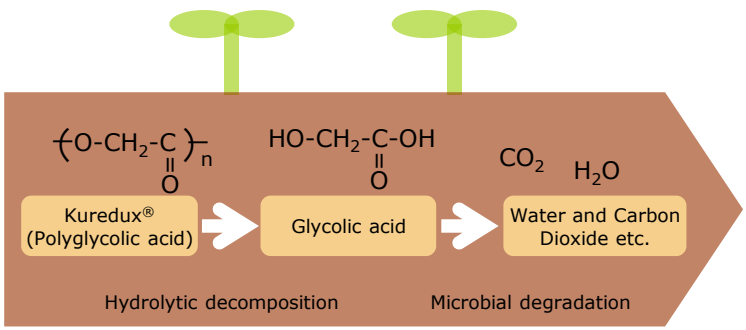
Biodegradable Plastics

(Registration number) No.1156
Kureha corporation

<Tests based on ISO14855 protocols>



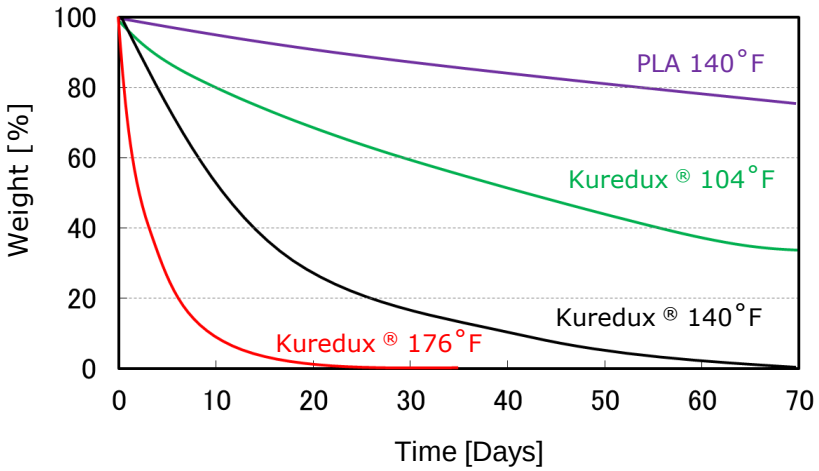
* Tested under aerobic conditions at 136.4°F in controlled compost



Kuredux® -Polyglycolic acid(PGA) -

Hydrolyzability

Kuredux® has the property of degradation on contact with water and its decomposition rate is higher than polylactic acid (PLA) which is also a degradable resin .

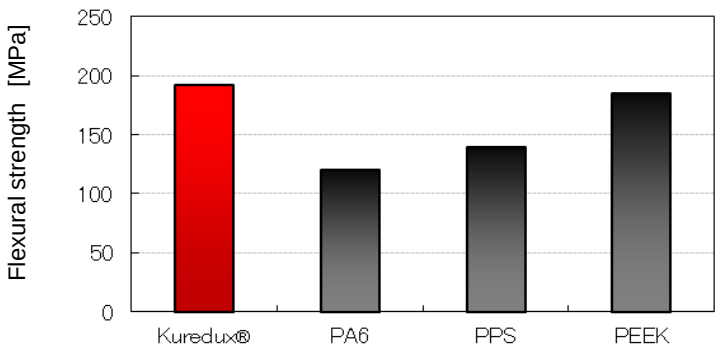


<Degradability test method>
A sample was added to Deionized water *so as to have a solid content concentration of 2 wt%. After the sample was left for a predetermined period in an oven set to an arbitrary temperature, the sample was filtered, dried, and then the solid content weight was measured.*

High strength and modulus

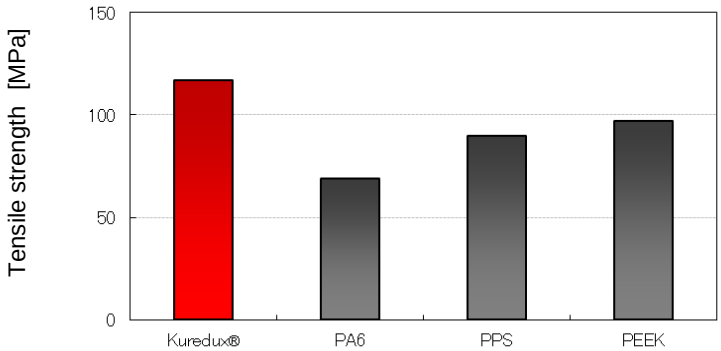
Kuredux® exhibits high mechanical strength, which is comparable to engineering plastics.

Flexural strength



<All data: tests based on ISO 178 protocols>

Tensile strength

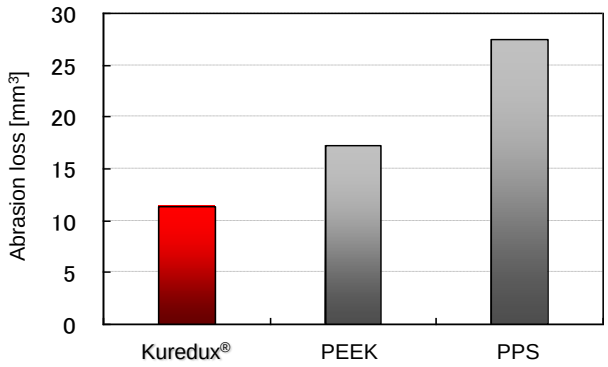


<Dada of Kuredux® and PPS: from tests based on ISO 527-1,2 protocols
Data of PA6 and PEEK: cited from Plastics Processing Databook, 2nd edition, The Japan Society for Technology of Plasticity>

Kuredux® -Polyglycolic acid(PGA) -

Abrasion resistance

Kuredux® exhibits high abrasion resistance, which is superior to engineering plastics such as Polyether ether ketone (PEEK) or Polyphenylene sulfide (PPS).



<Tests based on ISO 9352 protocols>

Solvent resistance

Kuredux® has high resistance against general organic solvents as shown in the table below.

Name	Evaluation	Name	Evaluation
Hexane	A	Chloroform	B
Toluene	A	Methylene chloride	C
Isopropyl alcohol	A	Methylethyl ketone	A
Ethanol	A	Acetone	C
Methanol	B	Tetrahydrofuran	B
Ethyl acetate	A	N,N-dimethylformamide	C

A: Weight change less than 0.1%
B: Weight change between 0.1～1%
C: Weight change over 1%

<Test method>
Kuredux® sheets (10x40x2mm) was immersed in organic solvents and stored at 73.4 ℉ for seven days, and then the weight change of the sheets was measured.

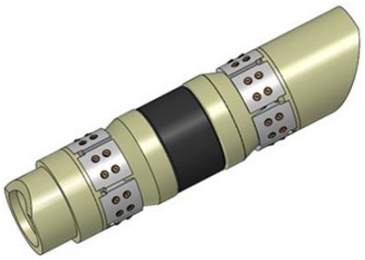
Processed products of Kuredux®

Kuredux® can be extrusion molded or injection molded with general equipment. It can also be compounded with other resins, and it can enhance the performance as a composite material.

Downhole tools

As Kuredux® has degradability and high mechanical strength, it can be used as a material for downhole tool in petroleum drilling field.

Application example: Frac plug, Frac ball

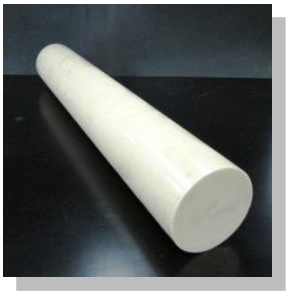


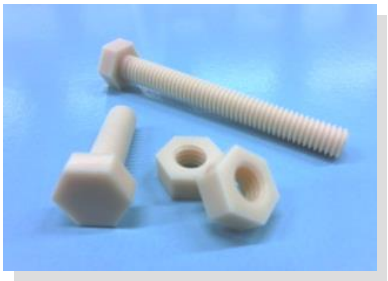
Industrial parts

Kuredux® extrusion molded articles can be easily shaped by machining or milling.

Machined parts of Kuredux® are suitable for the applications which need high mechanical strength and/or high abrasion resistance.

Application example: Various industrial parts



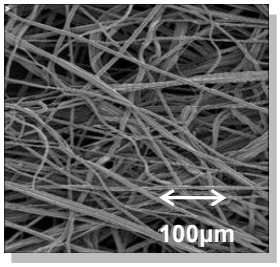


Processed products of Kuredux®

Nonwoven

The Kuredux® nonwoven can get rid of basic odors such as ammonia or amine compounds.

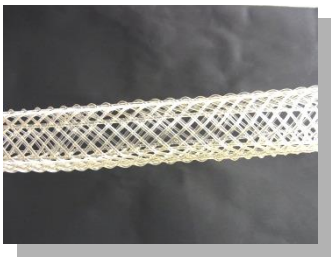
Application example: Filter, Hygiene and Clothing supplies



Cut fibers / Monofilament / Multifilament

Kuredux® fibers exhibit high mechanical strength and biodegradability.

Application example: Civil engineering, Agricultural materials



Kuredux® Data Sheet

		Test Method	Unit	Measured value
Specific Gravity		ISO 1183-1	-	1.50 ~1.60
Mechanical Properties				
Injection Molding	Tensile Modulus	ISO 527-1,2	GPa	7.4
	Tensile Strength	ISO 527-1,2	MPa	117
	Tensile Elongation	ISO 527-1,2	%	13
	Flexural Modulus	ISO 178	GPa	7.6
	Flexural Strength	ISO 178	MPa	195
	Charpy Impact Strength	ISO 179 Notched	kJ/m^2	2.2
	Izod Impact Strength	ISO 180 Notched	kJ/m^2	2.9
	Rockwell Hardness	ISO 2039-2 M-scale	-	111
Thermal Properties				
Crystal Melt Temperature		ISO 11357 <DSC> Heating rate: 68°F/min	°F	428
Glass Transition Temperature			°F	104
Coefficient of Linear Thermal Expansion		ISO 11359	1/K	5.4×10^{-5}
Heat Deflection Temperature		ISO 75 (1.82 MPa)	°F	334
Thermal Conductivity		ISO 8302	W/m·K	0.35
Electrical Properties				
Surface Resistance		IEC 60093	Ω/sq	10^{14}
Volume Resistance		IEC 60093	Ω・cm	10^{14}
Dielectric Constant 1MHz		IEC 60250	-	4.2
Dielectric Loss Tangent 1MHz		IEC 60250	-	0.012

- The figures presented in this bulletin are the results of our laboratory and not secured values. However, there are cases where data which is published in reliable literatures is described.
- Kuredux® is not intended for use in medical applications. For medical applications, contact your Kureha representative for information on Kuresurge® PGA.

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