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# Recyclable Thermosetting Resin

Series





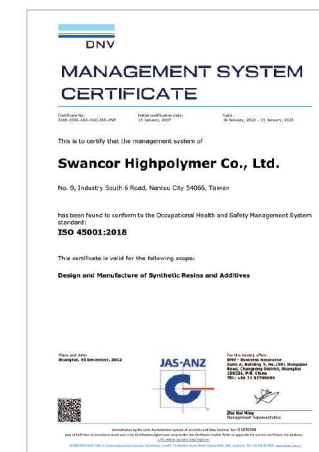
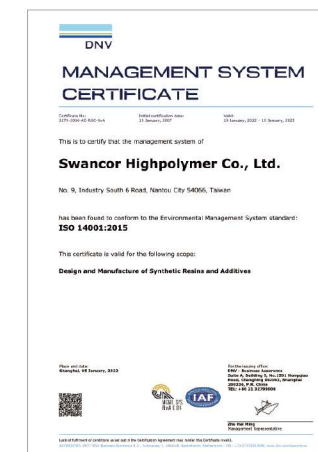
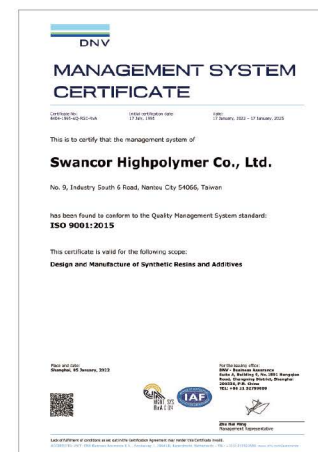
# ABOUT SWANCOR

Swancor was established in 1992, with plants in Shanghai, Tianjin, Jiangsu, Nantou and Malaysia.

Swancor products including environmentally friendly corrosion-resistant vinyl ester resins and special unsaturated polyester resins, wind turbine blade materials such as infusion resin, hand lay-up resin and adhesive, and high-performance fire retardant resins that can be used in railway and transportation application. In order to meet the trend of longer and lighter wind blade, Swancor also developed prepreg resin and pultrusion resin for carbon fiber spar caps.

Swancor is a technology-oriented company, focusing on innovative research and development, and provides customers with customized total solutions to help customers improve their competitiveness.

Swancor fully complies with global quality assurance standard, such as ISO9001, ISO14001 and ISO45001, to bring value to customers and partners, and also gets the certificates from Lloyd's and DNV. Swancor gains reputation from customers globally for providing good productions quality and technical service.





# SUSTAINABILITY MATERIALS

## EzCiclo / CleaVER

易可收<sup>®</sup>  
**EzCiclo**  
 Recyclable Thermosetting Resin



**Composite**  
 Made from EzCiclo and fibers

**Product**



**Degradation**

The resin and fiber are separated after degradation

**Product end-of-life**

Put FRP & CleaVER into the reactor after the product is disposed

**CleaVER 可立解<sup>®</sup>**



# ADVANTAGES AND FEATURES

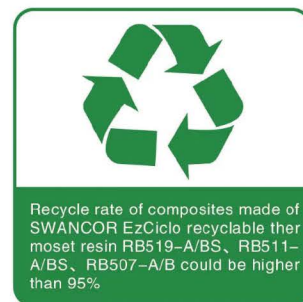
## Product Features

- Reduce the consumption of raw materials
- Long fiber recovery
- No need to change the existing production process and equipment
- No additional waste
- Equivalent mechanical properties and heat resistance properties performance to existing commercial resin
- No material property loss after recycling
- Reduce carbon footprint

## Certification



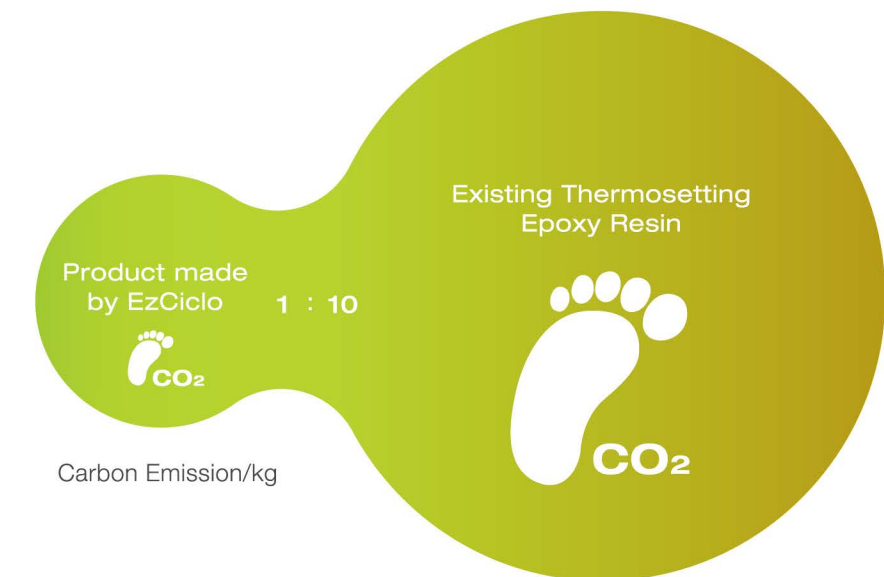
ISO14021 certification



- EzCiclo series products that have passed ISO 14021 certification include RB519, RB511, and RB507.
- The FRP made from EzCiclo, the recyclable thermosetting resin, the recovery rate of the FRP can reach ≥95%.

## Composite Recycle Methods Comparison

Method	Pyrolysis Method	Solvolytic Method	EzCiclo / CleaVER
Processing Cost	High	Medium	Low ✓
Added Value	Medium	Medium	High ✓
Environment Pollution	SOx, NOx, VOCs, dioxin	Waste solvent	x ✓
Recyclable Fiber	x	o	Recyclable ✓
Recyclable Resin	x	x	Recyclable ✓
Carbon Foot Print Produced	High	Medium	Low ✓



## Carbon Foot-print Comparison

	Thermosetting Resin	EzCiclo
Total Carbon Emission(kg-CO <sub>2</sub> e)	10,879	1,152
Product Carbon Emission/kg(kg-CO <sub>2</sub> e)	1.09	0.12

Carbon Footprint Calculation: According to the standard of Mandatory Greenhouse Gas Reporting System, Environmental Protection Administration, Executive Yuan, R.O.C. (Taiwan)

## Manufacturing Process

	Thermosetting Resin	EzCiclo
Steam (m <sup>3</sup> )	50	188
Electricity(Degree)	67	157
Diesel (L)	1.2	1.2
Carbon Emission (kg-CO <sub>2</sub> e)	179	617

Materials weight: 10 tons

## Waste Treatment Process

	Thermosetting Resin	EzCiclo
Treatment	Incineration	Recycling
Steam (m <sup>3</sup> )	----	156
Electricity(Degree)	----	179
Carbon Emission (kg-CO <sub>2</sub> e)	10,700	535

Waste weight: 10 tons

EzCiclo makes it a better world

# A TRUE SUSTAINABLE FUTURE

易可收  
**EzCiclo**®



**Wancor**



# RESIN SYSTEM

## Infusion / RTM Resin System

Item	EzCiclo RB260	EzCiclo RB519	EzCiclo RB511	EzCiclo RH512
Process	RTM	Infusion	Infusion	Infusion
Resin type	Epoxy	Epoxy	Epoxy	Free radical curing system
Viscosity (cps @25°C)	180-220	180-220	200-300	80~200
Tg (°C)	>76	>76	>75	---
HDT (°C)	---	---	>65	100-105
Barcol Hardness	---	---	---	35-45
Pot Life (hr @25°C)	>5	>5	---	---
Tensile Strength (MPa)	>65	>65	>65	75-95
Tensile Modulus (GPa)	>2.5	>2.5	>2.7	3.3~4.0
Tensile Elongation (%)	>4	>4	>5.5	3.0-8.0
Flexural Strength (MPa)	>110	>110	>105	135-165
Flexural Modulus (GPa)	>2.5	>2.5	>2.7	3.3~4.0

- RB260 is resin for general use with moderate viscosity and pot life.
- RB519 is resin for large scale parts, e.g. wind blade and marine.
- RB511 is resin for making wind blades with moderate viscosity and pot life.
- RH512 is free radical curing system with low viscosity and good heat resistance, and could be cured at room temperature.

## Pultrusion / Filament Winding / Hand Lay-up Resin System

Item	EzCiclo RB207	EzCiclo RB507	EzCiclo RB240	EzCiclo RH513-T3
Process	Pultrusion	Pultrusion	Filament Winding	Hand Lay-up
Resin type	Epoxy	Epoxy	Epoxy	Free radical curing system
Viscosity (cps @25°C)	900-1,500	800-1,500	800-1,200	400-800
Tg (°C)	>110	>110	>105	---
HDT (°C)	---	---	---	98-105
Gel Time (min @150°C)	1-1.5	1.2-1.6	---	---
Barcol Hardness	---	---	---	35-45
Pot Life (hr @25°C)	>4	>4	>8	---
Tensile Strength (MPa)	60-75	60-75	75-85	70-90
Tensile Modulus (GPa)	2.5-3	2.5-3	2.5-3.5	3.3-3.8
Tensile Elongation (%)	3-5	3-5	5-9	2.5-6.0
Flexural Strength (MPa)	100-120	100-120	125-135	140-170
Flexural Modulus (GPa)	2.5-3	2.5-3	2.5-3.5	3.4-4.0

- RB207 is resin for general use with moderate viscosity and pot life.
- RB507 is resin for wind blade carbon plates with longer pot life.
- RB240 is resin for pressure vessel with long pot life and curing at moderate temperature.
- RH513-T3 is free radical curing system designed for hand lay-up application.





# RESIN SYSTEM

## Prepreg Resin System

Item	EzCiclo RB553	EzCiclo RB564	EzCiclo RB556
Prepreg <sup>*1</sup>	FAW75/ RC37%	FAW100/ RC37%	FAW100/ RC37%
Resin type	Epoxy	Epoxy	Epoxy
0° Tensile Strength (MPa)	2,472	2,468	2,101
0° Tensile Modulus (GPa)	122	109	116
0° Compressive Strength (MPa)	1,192	898	1,161
0° Compressive Modulus (GPa)	117	105	114
90° Tensile Strength (MPa)	69	65	72
90° Tensile Modulus (GPa)	8	7	8
90° Compressive Strength (MPa)	160	174	180
90° Compressive Modulus (GPa)	9	8	9
ILSS (MPa)	81	89	95
Tg (°C)	>120	>120	>120

\*1 T700/TC36P/TR50S grade carbon fiber

- RB553 is resin for mandrel or roving process with higher resin flow, e.g. fishing rods...
- RB564 is resin for compression moulding process with medium resin flow, e.g. bicycle, golf club.
- RB556 is resin for compression moulding process with low resin flow, e.g. hockey stick...



# APPLICATION

## Product Made From EzCiclo



CFRP Bike  
Degradated via CleaVER

CFRP Bike	
Material	CF+RB564
Process	Compression Moulding



Carbon Plate  
Degradated via CleaVER

Carbon Plate	
Material	CF+RB507
Process	Pultrusion



Vessel  
Degradated via CleaVER

Vessel	
Material	CF+RB240
Process	Filament Winding



CFRP Hockey Stick

Material	CF+RB556
Process	Compression Moulding



Fishing Rod

Material	CF+RB553
Process	Roll Wrapping



Phone Case

Material	CF+RB564
Process	Compression Moulding

## Product Made From Recycle Carbon Fiber



Backpack Case

Process	BMC
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Bicycle Crankarm

Process	BMC
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Bicycle Bottle Cage

Process	Injection
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Battery Case

Process	BMC
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Wheelchair Pedal

Process	Compression Moulding
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Safety Shoe Toe Cap

Process	Compression Moulding
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# GLOBAL SUPPLY & TECHNICAL SERVICE



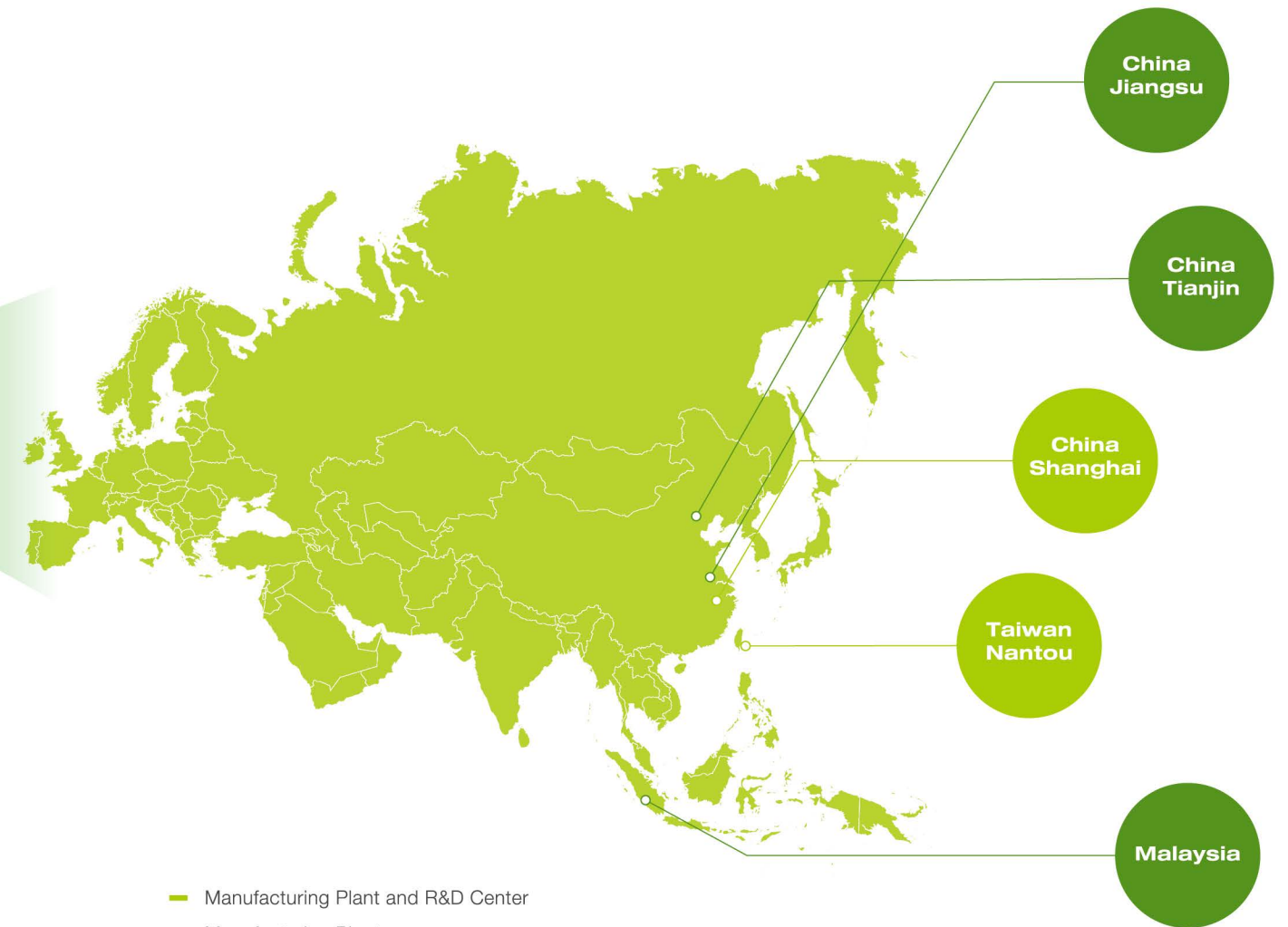
Swancor's customers on five continents

Swancor has an experienced technical service team, able to quickly respond to customer needs and provide solutions

## Manufacturing Plant and R&D Center

Data Collection : 2022

Capacity/Year	CHINA	TAIWAN	MALAYSIA
Resin (Ton)	97K	27K	7K
Carbon Plate (Meter)	8,200K	2,450K	



Manufacturing Plant and R&D Center

Manufacturing Plant