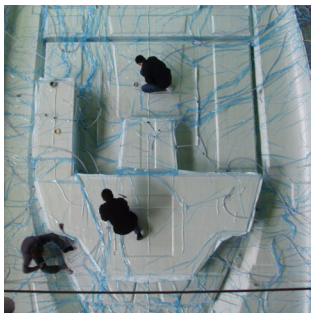
resoltech 1800 ECO

Hardeners 1804 ECO, 1805 ECO & 1807 ECO

Biobased infusion epoxy system



- **Up to 36% of biobased carbons on the mix**
- **Very low viscosity and high wetting properties**
- **T_G up to 102°C (with 1805 ECO hardener)**
- **New fast hardener 1807 ECO**
- **Excellent mecanical properties**
- **Improved UV resistance with 1800 ECO UV version**

*Amount of biobased carbon atoms/total amount of carbon atoms

INTRODUCTION

RESOLTECH 1800 ECO is an advanced biobased infusion and injection epoxy resin system (from 33% to 36% biobased on the mix). It is suitable to manufacture structural composite parts **with any kind of reinforcements** : flax, hemp, glass, carbon, aramid...

The **low viscosity** and the excellent wetting properties make the 1800 ECO a premium choice for RTM applications : infusion, injection. Thanks to its outstanding adhesion properties, the resulting composites will show **excellent fatigue resistances**.

This system has high cross linking properties, **1804 ECO and 1807 ECO** enable to release parts from plugs & mould after **24h at 23°C**. Faster releases times may be obtained after a low temperature post curing of 5h at 40°C. **1805 ECO** needs a cure of **minimum 5h at 40°C** prior to releasing from plug/mould. Final thermo-mechanical properties will be obtained after a suitable post curing cycle.

Thanks to its high T_G (102°C with 1805 ECO hardener) it is suitable for both **tooling and parts manufacturing.** Tools can be used with a service temperature up to 80°C.

With its low coloration, 1800 ECO/1804 ECO is suitable to manufacture decorative parts.

It is **solvent free, does not contain any CMR components** and follows the latest EU regulation (CE) n° 453/2010.

1800 ECO UV version has specific **UV additives improving the resistance to the UV exposition**, and when used in conjunction with our Acrylic varnish offers a very good solution for critical applications such as the production of composite solar cells.

MIXING RATIO

The mixing ratio must be accurately followed. It is not possible to change the ratio, it would result in lower mechanical properties. The mixture should be thoroughly stirred to ensure full homogeneity.

System	1800 ECO/1804 ECO	1800 ECO/1805 ECO	1800ECO/1807 ECO
Mixing ratio by weight	100/26	100/17	100/15
Mixing ratio by volume	100/32	100/21	100/17
% of biobased carbon on the mix*	33%	36%	35%

*Amount of biobased carbon atoms/total amount of carbon atoms

APPLICATION

- Thermosetting products generate heat when curing. The amount of heat generated varies with the hardener used, the temperature and the quantity of resin mixed. It is therefore necessary to only mix the necessary amount usable within the given pot life.
- **Hardener 1805 ECO is sensitive to moisture, use quickly after opening.**
- Keeping the mixture in flat open containers reduces the risks of exothermic reaction as the mixture will heat up more in a mass than in a film. Automatic mixing and dispensing devices solve the exothermy problem by mixing at the required speed for the infusion.

- 1800 ECO resin can, under certain conditions, cristallize. 10h at 60°C in an oven will make th resin liquid again without consequences.
- RESOLTECH 1800 ECO/1804 ECO system is formulated for infusion and injection applications. It is recommended to infuse with a resin transfer medium onto the laminate or through the core when prepared with a special grooving for infusion.
- Controlling the resin temperature, workshop temperature and humidity is important. The reinforcements should not present any excessive moisture content as it may modify the infusion progress through the fibers.

PHYSICAL CHARACTERISTICS

1 Visual aspect

1800 ECO :
Opalescent neutral liquid

1804 ECO, 1805 ECO & 1807 ECO:
Clear colorless to orange liquids

Mix :
Clear to yellow liquids

2 Density

References	1800 ECO	1804 ECO	1805 ECO	1807 ECO
Density at 23°C	1.15	0.94	0.94	0.99
Mixed density at 23°C	-	1.10	1.11	1.13

ISO 1675, ± 0.05 tolerance

3 Viscosity

References	1800 ECO	1804 ECO	1805 ECO	1807 ECO
Viscosity at 23°C (mPa.s)	915	15	6	20
Mix viscosity at 23°C (mPa.s)	-	258	290	348

ISO 12058.2, ± 15% tolerance

REACTIVITIES

Systems	1800 ECO/1804 ECO	1800 ECO/ 1805 ECO	1800 ECO/ 1807 ECO
Gel time on 70mL at 23°C (4cm high mix)	4h53min	4h11min	42min
Time at exothermic peak on 70 mL at 23°C	3h25min	2h53min	41min
Temperature at exothermic peak on 70mL at 23°C	42°C	39°C	197°C
Gel time on 2mm thick film at 23°C	8h24min	8h57min	3h
Gel time on 500mL at 23°C	1h55min	1h37min	-

Reactivity measurements realized on Rheotech®

CURING AND POST-CURING

To avoid residual stress in the composite and possible shrinkage. The 1800 ECO/1804 ECO epoxy system should not be used at a temperature above 50°C.

In order to obtain the maximum thermo-mechanical properties, it is necessary to respect the recommended curing cycle. The table below shows the glass transition temperatures according to different curing cycles.

System		1800 ECO/1804 ECO	1800 ECO/1805 ECO	1800 ECO/1807 ECO
Demolding		24h at 23°C	5h at 40°C	24h at 23°C
14 days at 23°C	T_G	58°C	57°C	48°C
	Shore D hardness	88	86	88
8h at 40°C	T_G	63°C	64°C	63°C
	Shore D hardness	88	87	88
8h at 50°C	T_G	66°C	67°C	69°C
	Shore D hardness	88	88	88
6h at 60°C	T_G	73°C	75°C	78°C
	Shore D hardness	88	88	88
16h at 60°C	T_G	81°C	83°C	82°C
	Shore D hardness	90	89	90
3h at 50°C + 3h at 100°C	T_G	90°C/95°C(2nd pass.)	89°C/102°C (2nd pass.)	82°C/82°C(2nd pass.)
	Shore D hardness	91	90	90

T_G measured on DSC, 10°K/min, first pass
Hardness : ISO 868

MECHANICAL PROPERTIES

Système		1800 ECO/1804 ECO	1800 ECO/1805 ECO	1800 ECO/1807 ECO
14 days at 23°C	FLEXION Modulus Maximum strength Elongation at break	 3.06 GPa 50 MPa 1.7%	Fragile démoulable après 5h à 40°C	 3.03 GPa 80 MPa 2.9%
16h at 60°C	FLEXION Modulus Maximum strength Elongation at break	 2.95 GPa 79 MPa 3.0%	 3.02 GPa 85 MPa 3.2%	 2.89 GPa 82 MPa 3.5%
3h at 50°C + 3h at 100°C	FLEXION Modulus Maximum strength Elongation at break	 3.01 GPa 90 MPa 4.3%	 3.10 GPa 93 MPa 3.5%	 -
Water absorption		0.09%	0.15%	0.31%

Measurements on pure resin according to the following standard : ISO 178
Water absorption : ISO 62

PACKAGING

1800 ECO/1804 ECO :

- Plastic jerrycan kit of 1kg + 0.26kg
- Plastic jerrycan kit of 5kg + 1.3kg
- Plastic drum kit of 30kg + 7.8kg
- Drum kit of 200kg + 2 x 26kg

1800 ECO/1805 ECO :

- Plastic jerrycan kit of 1kg + 0.17kg
- Plastic jerrycan kit of 5kg + 0.85kg
- Plastic drum kit of 30kg + 3 x 1.7kg
- Drum kit of 200kg + 7 x 4.86kg

1800 ECO/1807 ECO :

- Plastic jerrycan kit of 1kg + 0.15kg
- Plastic jerrycan kit of 5kg + 0.75kg
- Plastic drum kit of 30kg + 4.5kg
- Drum kit of 200kg + 30kg

TRANSPORT & STORAGE

Keep containers sealed and away from heat and cold preferably between 10°C and 30°C in a well ventilated area. Our products are guaranteed in their original packaging (check expiry date on the label).

HEALTH & SAFETY

Skin contact must be avoided by wearing protective nitrile gloves & overalls or other protective clothing.
Eye protection should be worn to avoid risk of resin, hardener, solvent or dust entering the eyes. If this occurs flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.
Ensure adequate ventilation in work areas. Respiratory protection should be worn with ABEKP coded filters.
Resoltech issues full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work.

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