

resoltech 1020 **ECO**

Hardeners 1023S to 1029S

Biobased multipurpose Epoxy Laminating System



- 35% biobased on resin part*
- Adjustable pot life from 13mn to 11h30mn
- Good elongation characteristics
- Little sensitivity to humidity during application
- Available in thixotropic version (1020T ECO)

*ratio of the number of biobased carbon atoms / the number of total carbon atoms

INTRODUCTION

RESOLTECH 1020 ECO is a room temperature epoxy **laminating biobased system** for wood-epoxy, concrete reinforcement and metal constructions that are inherently **moving structures**.

In boat building, it may be used for all woods types lamination, coating, scarfing and strip planking.

Thanks to its **low viscosity** and a wide range of hardeners (13 min to 11h30min), it allows applications in both traditional wet layup, vacuum bagging or under press. **A thixotropic version, the 1020T ECO** is available for vertical or overhanging applications prone to dripping.

The mixing ratio for all hardeners is 100:30 by weight. **All hardeners are compatible** and can be mixed in order to obtain intermediate reactivities.

The 1020 ECO **exceptional wettability** makes hand lamination easier to the workers while guaranteeing a safer work place due to the low toxicity of this system, it contains **no CMR components** and complies to the latest REACH European regulation.

The 1020 ECO resin system is also widely used in civil engineering applications on glass and carbon laminates where its little sensitivity to humidity during its application and good curing properties at ambient temperature are appreciated.

With 35% of biobased carbon atoms in the resin part, the use of 1020 ECO will reduce the carbon footprint of composites structures making no concessions on thermo-mechanical performances.

The 1020 ECO system is often used together with:

- 1010 ECO : Water based epoxy primer for porous supports
- 2040G ECO : Fillet joint adhesive paste
- 8050 ECO : Epoxy filler
- 3350 : Thixotropic adhesive

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.

Systems	1020 ECO 1023S	1020 ECO 1024S	1020 ECO 1025S	1020 ECO 1026S	1020 ECO 1028S	1020 ECO 1029S
Mixing ratio by weight	100/30					
Mixing ratio by volume	100/36	100/35	100/35	100/35	100/35	100/33

APPLICATION

- It is recommended to use products at a temperature close to 18-25°C in order to facilitate the mixing and the reinforcements impregnation.
- Lower temperatures will increase the viscosity of the mixture and the gel time, but the resin will not crystallize at low temperatures.
- On the contrary, a higher temperature will reduce the viscosity of the mixture as well as the pot life.

BIOBASED CARBON CONTENT

Reference or mix	1020 ECO	1020 ECO 1023S	1020 ECO 1024S	1020 ECO 1025S	1020 ECO 1026S	1020 ECO 1028S	1020 ECO 1029S
Biobased carbon mass content*	35%	28%	28%	28%	28%	27%	28%

*ratio of the number of biobased carbon atoms / the number of total carbon atoms

PHYSICAL CHARACTERISTICS

1 Visual aspect

1020 ECO :

Opalescent liquid

1023S to 1029S :

Neutral to limpid liquid

Mix :

Neutral to yellow opalescent liquid

2 Density

References	1020 ECO	1023S	1024S	1025S	1026S	1028S	1029S
Density at 23°C	1.12	0.94	0.96	0.96	0.97	0.97	1.02
Mix density at 23°C	-	1.07	1.08	1.08	1.08	1.08	1.10

ISO 1675, ± 0.05 tolerance

3 Viscosity

References	1020 ECO	1023S	1024S	1025S	1026S	1028S	1029S
Viscosity at 23°C (mPa.s)	800	14	20	24	47	117	216
Mix viscosity at 23°C (mPa.s)	-	205	263	289	305	387	457

ISO 12058.2, ± 15% tolerance

REACTIVITIES

Systems	1020 ECO 1023S	1020 ECO 1024S	1020 ECO 1025S	1020 ECO 1026S	1020 ECO 1028S	1020 ECO 1029S
Gel time on 70mL at 23°C (4cm high)	11h30min	3h23min	2h19min	46min	28min	13min
Time at exothermic peak on 70mL at 23°C	3h25min	3h06min	2h24min	44min	26min	11min
Temperature at exothermic peak on 70mL at 23°C	30.5°C	52.5°C	77.4°C	170.9°C	197.8°C	217.2°C
Gel time on 2mm film at 23°C	11h57min	6h39min	4h34min	3h18min	1h59min	1h17min

Reactivity measurements realized with Rheotech*

Indication on the choice of hardener according to ambient temperature conditions :

- For the whole year, the use of 1026S hardener is recommended ;
- For winter conditions, the use of 1028S is recommended ;
- For summer conditions, the use of 1025S hardener is recommended.

RETICULATION & POST-CURING

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 (DSC) according to different curing cycles.

Systems		1020 ECO 1023S	1020 ECO 1024S	1020 ECO 1025S	1020 ECO 1026S	1020 ECO 1028S	1020 ECO 1029S
14 days at 23°C	T _g	39	43	47	51	51	47
	Shore D Hardness	87	87	89	86	90	87
16h at 60°C	T _g	55	64	57	64	75	63
	Shore D Hardness	86	87	87	89	90	88

T_g measured by DSC, 10°C/min, inflexion point
Shore D hardness measured at 23°C according to ISO 868

Post-curing cycles previously presented were chosen in order to reach the maximum potential of each systems. Depending on piece size, oven performance and hardener used, shorter post-curing cycles could lead to fully cured parts.

Please contact our laboratory service for any help on post-curing cycles.

MECHANICAL PROPERTIES

Systems		1020 ECO 1023S	1020 ECO 1024S	1020 ECO 1025S	1020 ECO 1026S	1020 ECO 1028S	1020 ECO 1029S
14 days at 23°C	FLEXION Modulus	2.4 GPa	2.6 GPa	2.6 GPa	2.8 GPa	2.9 GPa	2.6 GPa
	Maximum strength	73.1 MPa	84.4 MPa	83.7 MPa	94.7 MPa	84.7 MPa	90.7 MPa
	Elongation at max strength	4.5%	4.7%	4.7%	5.2%	3.4%	5.3%
	Elongation at break	15.2%	11.4%	16.8%	5.0%	3.4%	11.2%
16h at 60°C	FLEXION Modulus	2.5 GPa	2.7 GPa	2.7 GPa	2.6 GPa	2.9 GPa	2.6 GPa
	Maximum strength	83.6 MPa	93.9 MPa	95.4 MPa	94.4 MPa	113.7 MPa	91.6 MPa
	Elongation at max strength	5.2%	5.5%	5.6%	5.6%	6.3%	6.1%
	Elongation at break	10.7%	11.9%	15.3%	9.4%	7.7%	10.6%

Flexion properties on pure resin according to ISO 178

PACKAGING

- Plastic jerrycan kit of 1kg + 0.3kg
- Plastic jerrycan kit of 5kg + 1.5kg
- Plastic drum kit of 25kg + 7.5kg
- Drum kit of 200kg + 2 x 30kg
or 3 x 200kg + 180kg

1020T ECO version is packaged in drums, stir before each use. Available on metal bucket of 10kg + 3kg.

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.



The data provided in this document is the result of tests and is believed to be accurate. We do not accept any responsibility over the mishandling of these products and our liability is limited strictly to the value of the products we manufacture and supply.



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