Technical Datasheet

IB2

Epoxy infusion bio resin

Description/Image

IB2 Epoxy Infusion Bio Resin is a low viscosity clear two-component epoxy resin system with ~38% resin plant derived content, this offers a lower environmental impact without compromising on performance.

Key Features

- Ideal for resin infusion
- Ultra low viscosity
- Outstanding wetting abilities
- Good mechanical properties
- Lower environmental impact

Description

IB2 Epoxy Infusion Bio Resin is low viscosity and optimized for high performance resin infusion applications, while it is compatible with all common fibre reinforcements it is particularly well paired with natural fibre reinforcements to provide composite parts with a significantly reduced environmental impact.

IB2 bio resin is not compromised in performance but simply derive the same chemicals from plant-based sources. A key component of epoxy, epichlorohydrin, is manufactured using renewable plant-based Glycerol in place of petroleum based propylene. The raw materials going into our bio resins are co-products or waste products of other industrially important processes which means they do not compete with food sources or displace food-based agriculture.

Typical Uses

- Sports/recreational equipment - skis, boards, canoes, archery
- Motorsport – panels, aerodynamic elements, structural members
- Marine – hulls, foils, masts
- Wind energy – masts, blades, nacelles

Specification

The table below shows the typical uncured properties:

Property	Unit	Resin	Hardener	Combined
Material	-	Epoxy Resin	Formulated Amine	Epoxy
Appearance	-	Clear Liquid	Light Yellow	Clear Liquid
Viscosity @20 °C	mPa.s.	1350	6	290
Density @20 °C	g/cm³	1.16	0.94	1.12

How to Use

IB2 is a chemical product for professional use. It is essential to read and understand the safety and technical information before use.

Follow the guidelines for safe use outlined in the SDS which include the use of appropriate hand and eye protection during mixing and use.

Mix Ratio

Mix Ratio 100:22 by Weight

IB2 Epoxy Laminating Resin should be mixed with its Hardener at a ratio of 100 parts of resin to 22 parts of hardener by weight. Failure to do so will result in a poor or only partial cure of the resin, greatly reduced mechanical properties and possibly other adverse effects. Under no circumstances add 'extra hardener' in an attempt to speed up the cure time; epoxies do not work in this way.

Mixing Instructions

IB2 is a highly reactive (fast curing) resin system. Only weigh out and mix as much resin as you can use within the pot life.

Weigh or measure the exact correct ratio of resin and hardener into a straight sided container. Using a suitable mixing stick begin to mix the resin and hardener together to combine them completely.

Spend at least one minute mixing the resin and hardener together, paying particular attention to the sides and base of the container. Remember: Any resin that has not been thoroughly combined with hardener will not cure.

Once you have finished mixing in one container, it is good practice to transfer the mixed resin into a second container and undertake further mixing of the resin using a new mixing stick. Doing so will eliminate the risk of accidentally using unmixed resin from the bottom or sides of the container.

Pot-Life / Working Time / Cure Time

IB2 is a highly reactive resin system and once the resin has been mixed with the hardener, the reaction will start to give off heat (exotherm) which will further accelerate the cure of the resin, especially when the resin is in the mixing pot.

Transfer the resin from the mixing pot onto the part as soon as possible to extend the working time and avoid the risk of uncontrollable rapid cure in the mixing pot.

As with all epoxies, the pot-life/working time will vary significantly depending on the ambient temperature, the starting temperature of the resin and hardener and the amount of resin mixed.

IB2 can be used in ambient temperatures between 15°C (59°F) and 30°C (86°F). For best results, an ambient temperature of at least 20°C (68°F) is recommended. Ensure that both resin and hardener containers are within this temperature range before use.

For larger infusions, you can reduce the chance of the resin 'gelling' in the pot by mixing small quantities at a time and topping up the resin feed bucket as the resin is drawn into the laminate. Once the resin is in the laminate, it is much less likely to exotherm and gel before you want it to.

The table below gives an indication of pot-life and cure times:

	Pot Life 20°C (500g)	Gel Time 20°C (1mm)	Demould time 20°C
Time	1hr 25mins	7hrs 10mins	21hr 30mins

Full Cure / Post-Cure

As with most epoxy systems, where parts cure in normal ambient temperatures, full cure is not reached for several days. Although parts will be handleable after the listed demould time (at 25°C), full mechanical properties will take at least 14 days to develop in (at 25°C). Where possible, avoid exposing the cured resin to full service rigours for at least this time.

Mechanical properties and temperature resistance can be improved with means of a post cure at elevated temperature once the initial cure is completed. For parts that will be used at or exposed to elevated operating temperatures (such as vehicle bonnets/hoods in direct sunlight, engine-bay parts, car interior parts etc.) a post cure is strongly recommended to prevent distortion of the parts when they are put into service and experience these higher temperatures.

Where possible, parts should be post-cured still inside the mould to reduce distortion and improve surface finish (i.e. reduce 'print-through'). When post-curing parts in the mould, it is important to post-cure them without demoulding at all (i.e. don't demould and then put them back into the mould) otherwise you can get some strange patterns on the surface where some areas are post cured in direct contact with the mould surface and others are not.

A simple and very effective set of post-cure cycles for the IB2 Epoxy Infusion Resin are as follows:

CYCLE #1 SUITABLE FOR MOST SITUATIONS

16hrs at room temperature

24hrs at 40°C

If you're encountering any surface finish issues (faint print-through) then you can experiment with a slower 'ramp rate' and gradually bring up the temperature.

CYCLE #2 SUGGESTED FOR HIGHEST POSSIBLE HDT/ OPERATING TEMPERATURE

16hrs at room temperature

- 4hrs at 40°C
- 4hrs at 60°C
- 4hrs at 80°C

Once the final soak at 80°C is complete the part should be left to naturally cool to room temperature, ideally left in the oven to avoid thermal shock from rapid change in temperature. This Post cure will produce the highest HDT for the cured resin and would be ideal for environments where the temperature is around 80°C.

CYCLE #3 SUGGESTED FOR SITUATIONS WITH LIMITED AVAILABLE CURE TIME

16hrs at room temperature

8hrs at 80°C

Mechanical Properties

Mechanical properties for a range of post cure cycles

Property	Units	Post Cure		
		16hrs Ambient + 24hrs 40 °C	16hrs Ambient + 16hrs 60 °C	16hrs Ambient + 8hrs 80 °C
Tensile Modulus	GPa	3.04	2.79	2.64
Tensile Strength	MPa	68.0	65.0	60.0
Elongation at Break	%	5.3	5.9	9.5
Flexural Modulus	GPa	3.07	2.78	2.61
Flexural Strength	MPa	109.0	107.0	101.0
Shear Strength	MPa	43.0	42.0	41.0
Comp. Strength	MPa	91.0	87.0	82.0
Impact Resistance	KJ/m²	99.0	86.0	89.0
Tg Onset	°C	71.0	85.0	82.0

Transport and Storage

Resin and hardener should be kept in tightly seal containers during transport and storage. Both the resin and hardener should be stored in ambient conditions of between 20°C (68°F) and 25°C (77°F).

When stored correctly, the resin and hardener will have a shelf-life of 24 months. Although it may be possible to use the resin after a longer period, a deterioration in the performance of the resin will occur, especially in relation to clarity and cure profile.

Pay particular attention to ensuring that containers are kept tightly sealed. Epoxy hardeners especially will deteriorate quickly when exposed to air.

Disclaimer

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