EPOXY INFUSION BIO RESIN
IB2

Key Features

- Ideal For Resin Infusion
- Ultra Low Viscosity Resin
- Outstanding Wetting Abilities
- Good Mechanical Properties
- Lower Environmental Impact

Product 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 flax reinforcements to provide composite parts with a significantly reduced environmental impact.

Our bio resins are 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. Additionally, 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. Once mixed with its hardener the overall plant-based content is ~31% which is amongst the highest in the industry.

IB2 is a high-performance bio epoxy resin suitable for use with a wide range of reinforcements including glass, carbon and aramid fibres as well as natural reinforcements such as flax and jute fibre. Its special low-viscosity formula is particularly suitable for resin infusion and RTM moulding processes. For hand laminating we have another Bio Resin, LB2, which has viscosity and cure profile better suited to hand layup processes.

Recommended Uses

IB2 is the perfect choice for use in combination with our range of sustainable natural flax reinforcements from Eco-Technilin. Used together, these materials allow the development and production of greener products with significantly reduced environment impact.

Having excellent mechanical and processing properties the IB2 Epoxy Infusion Bio Resin can be used for a wide range of uses including but not limited to:

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

Properties

The table below shows the typical uncured properties:

Property	Units	Resin	Hardener	Combined
Material	-	Epoxy Resin	Formulated Amine	Epoxy
Appearance	-	Clear Liquid	Amber Liquid	Clear Liquid
Viscosity @20 °C	mPa.s.	1350	7	185
Density @20 °C	g/cm^3	1.16	0.944	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 ofappropriate 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.

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During an infusion, you can reduce the chance of the resin 'gelling' in the pot by mixing small quantities at a time and topping up the resin jug 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	Gelation @ 20 °C	Demould Time @ 20 °C
Time	1 hr 25 mins	7 hrs 10 mins	35 hrs 30 mins

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.

As with many post-cure cycles for resins, the post-cure cycle for our IB2 Epoxy Resin is not too sensitive and a range of different post-cure cycles will produce good results, specifically improved mechanical performance and elevated HDT/operating temperature. Post-curing 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.) 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' which sometimes improves things:

CYCLE #2 SUGGESTED FOR HIGHEST POSSIBLE HDT/OPERATING TEMPERATURE

- 16hrs at room temperature
- 16hrs at 60°C

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

These are all just suggestions. Most situations just call for option #1; . A cure at ambient temperature before post-cure is generally favoured with most resin systems.

Mechanical Properties

Cured Resin Properties

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 Stength	MPa	68.0	65.0	60.0
Elong. at Break	%	5.3	5.9	9.5
Flexural Moulus	GPa	3.07	2.78	2.61
Flexural Strength	MPa	109.0	107.0	101.0
ILSS	MPa	43.0	42.0	41.0
Comp. Strength	MPa	91.0	87.0	82.0
Impact Resistance	KJ/m^2	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 10°C (50°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

This data is not to be used for specifications. Values listed are for typical properties and should not be considered minimum or maximum.

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