

Description

EL2 is a high performance epoxy laminating resin suitable for hand-layup of reinforcements such as carbon fibre, aramid and glass fibre. Its combination of mechanical performance, fast wet-out, easy handling and great value make EL2 a hugely popular choice in motorsport, boat-building, model-making and general composites.

Typical Uses

Use as a general purpose laminating layup epoxy resin for wet-laying or vacuum bagging composites such as glass fibre, carbon fibre and aramid fibre (Kevlar).

When cured the epoxy exhibits outstanding mechanical characteristics making it well suited to the lamination of structural parts. The resin also exhibits excellent clarity making it also suitable for use when laminating unpainted (or pigmented) carbon fibre composites.

Specification

The table below shows the typical uncured properties:

Property	Units	Resin	Hardener	Combined
Material	-	Epoxy Resin	Formulated Amine	Epoxy
Colour	-	Clear	Amber	Clear
Viscosity @ 20 °C	mPa.s.	1200 - 1800	5 - 80	1000 - 1400
Density @ 20 °C	g/cm³	1.13 - 1.17	0.90 - 1.06	1.05 - 1.15

How to Use

EL2 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 100:30 by Weight

EL2 Epoxy Laminating Resin should be mixed with AT30 FAST or AT30 SLOW Hardener at a ratio of 100 parts of resin to 30 part soft hardener, by weight. FAST and SLOW hardeners can be blended to achieve pot-life and demould times anywhere between those stated. However, you must still maintain the correct overall ratio of resin to hardener to ensure a proper cure.

When working with any epoxy resin, it is essential to mix the resin and hardener exactly at the correct mix ratio.

Key Features

- Easy to use
- Medium Viscosity Resin
- Outstanding Wetting Abilities
- Good Mechanical Properties
- Choice of Hardener Speed

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

EL2 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

EL2 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.

EL2 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.

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

	Pot Life @ 25 °C	Gelation @ 25 °C	Demould @ 25 °C
AT30* SLOW	95 - 115 mins	8.5 - 10.5 hours	20 - 30 hours
AT30* FAST	12 - 17 mins	2 - 3 hours	4 - 6 hours

*Fast and slow hardeners can be blended to achieve pot-life and demould times anywhere between those stated above.

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 EL2 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 post-cure cycle with the EL2 Epoxy Laminating Resin is as follows:

Cycle #1 Suitable For Most Situations

- 24hrs at room temperature
- 6hrs at 60°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 Subtle Improvements To Surface Finish

- 24hrs at room temperature
- 2hrs at 40°C
- 2hrs at 50°C

- 5hrs at 60°C

If you need to push the HDT of the finished part higher then you could increase post-cure up to a maximum of 80°C as follows:

Cycle #3 Suggested For Highest Possible Hdt/Operating Temperature

- 24hrs at room temperature
- 2hrs at 40°C
- 2hrs at 50°C
- 2hrs at 60°C
- 2hrs at 70°C
- 4hrs at 80°C

These are all just suggestions. Most situations just call for option #1; 6hrs at 60°C. Many customers also find that they can dispense with the 24hrs cure at ambient and simply load newly infused parts into the oven to begin the cure however this is something that you would need to experiment with yourself. A cure at ambient temperature before post-cure is generally favoured with most resin systems.

Mechanical Properties

The table below gives an indication of Cured Resin Properties

Property	Unit	AT30 SLOW	AT30 FAST
Hardness	Shore D	84 - 88	85 - 89
Linear Shrinkage	%	0.5	0.5
Tensile Strength	MPa	70.0 - 80.0	67.0 - 75.0
Elongation at Break	%	6.0 - 10.0	6.0 - 8.0
Flexural Strength	MPa	103 - 117	120 - 130
Flexural Modulus	MPa	2600 - 3600	3600 - 4000
H.D.T	°C	82 - 88	70 - 76

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 12 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. Our technical advice, whether verbal or in writing, is given in good faith but Easy Composites Ltd gives no warranty, express or implied, and all products are sold upon condition that purchasers will make their own tests to determine the quality and suitability of the product for their particular application and circumstances.

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Leaders in materials, equipment and training for advanced composites

Easy Composites Ltd
Unit 39, Park Hall Business Village
Stoke-on-Trent, ST3 5XA
United Kingdom

Easy Composites Ltd
Beneluxbaan 16
Rijen, 5121 DC
Netherlands

W: www.easycomposites.com
E: sales@easycomposites.com
T: +44 (0) 1782 454499

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