

# GENERAL PURPOSE

## Key Features

- High Quality Polyester Resin
- UV Stable
- Very Clear Curing
- Good Wet Out of Fibres
- Lloyd's Approved for Marine Use

## Product Description

Polyester laminating resin has been the staple product of the composites industry for years and is still widely used in traditional composites and basic mould making.

Our High Quality GP Polyester is a high performance orthophthalic based polyester resin that has been specifically formulated for use in wet lay and vacuum bagged composites production.

GP Polyester is a low styrene emission unsaturated polyester resin based on orthophthalic acid. Styrene emission under working conditions is reduced by up to 50% compared to standard resins. When working with GP Polyester emission is only 2-5% of polyester resin usage whilst it is 5-10% from a standard polyester resin.

We only stock and sell a higher than standard grade of polyester laminating resin which is Lloyds approved (therefore suitable for boat making and boat repairs), UV stable, and very clear curing making it ideal as both a general purpose polyester resin and also suitable for clear laminating such as cosmetic carbon fibre parts. Excellent fibre wet out properties and easiness of application is characteristic of this resin.

The resin also exhibits good cured mechanical properties far in excess of many more traditional polyester resins, meaning stronger, lighter, higher performance parts.

## Recommended Uses

It is widely known that for high performance structural applications using carbon fibre or other advanced reinforcements (aramid, UHMWPE etc.) more advanced resin systems, such as epoxy, should be used.

There are however circumstances where the structural performance of a laminate is less important, and properties such as appearance, UV stability and cost are higher priorities. In these situations, a high quality polyester laminating resin can be used with carbon fibre reinforcement (often just a single layer, combined with additional glass reinforcement) to produce attractive, UV stable, carbon fibre finish laminates.

Our High Quality GP Polyester Laminating Resin offers particularly good wetting of fibres, meaning the 'wet-lay' or open lamination of parts can be undertaken whilst considerably reducing the problem of trapped air bubbles which often blight the cosmetic appearance of wet-lay laminates.

For the best results, we recommend a high quality clear polyester gelcoat and extensive use of a Bristle Roller to significantly reduce air entrapment and improve the cosmetic appearance of the laminate when working with a clear gelcoat.

## Properties

The table below shows the typical uncured resin properties:

Property	Units	Method	Value
Acid value	mg KOH/g	ISO 2114	19
Brookfield Viscosity 23°C	mPas	ISO 2555	1200
Cone & Plate Viscosity 23°C	mPas	ISO 2884	180
Styrene Content	%	SFS 4864	41
Density	g/cm <sup>3</sup>	ISO 2811	1.1
Gel time @ 23°C 1% MEKP	minutes	Internal	20
Peak Exotherm @ 23°C	°C	Internal	120

## How to Use

GP Polyester 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.

## Catalyst Ratio

### Catalyst Ratio 1 - 2% MEKP by Weight

GP Polyester Laminating Resin should be mixed with MEKP Catalyst at a ratio of 1-2%, by weight. Resin to catalyst ratios above are listed as parts by weight although parts by volume will effectively yield the same results.

Our GP Polyester Laminating Resin can be mixed with different amounts of MEKP catalyst to achieve different pot life and cure times at different temperatures.

Be aware that the higher the ambient temperature, the quicker the resin will cure and thus adding high levels of MEKP should be avoided to ensure you get a reasonable pot life and reduce the chance of an exothermic reaction.

## Mixing Instructions

GP Polyester 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 catalyst into a straight sided container. Using a suitable mixing stick begin to mix the resin and catalyst together to combine them completely.

Spend at least one minute mixing the resin and catalyst together, paying

particular attention to the sides and base of the container. Remember: Any resin that has not been thoroughly combined with catalyst 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

GP Polyester is a highly reactive resin system and once the resin has been mixed with the catalyst, 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 Polyester resins, the pot-life/working time will vary significantly depending on the ambient temperature, the starting temperature of the resin, catalyst ratio and the amount of resin mixed.

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

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 gel-time and cure times for different temperatures and MEKP catalyst ratios:

MEKP Ratio	1.0%	1.25%	1.5%	1.75%	2.0%
Gel Time minutes @ 23 °C	20	13	12	11	10

The resin, mould and workshop should all be at, or above, 15°C before curing is carried out.

Typical demould time is 24hrs at 23°C however full cure will not be reached for a further 7 days.

## Full Cure / Post-Cure

As with most resin 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 23°C), full mechanical properties will take at least 7 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 IP2 Polyester Infusion Resin is not too sensitive and a range of different post-cure cycles will produce good results,

The recommended cycle is as follows. The laminate should be allowed to cure for 24 hours at 20°C, and then be oven cured for 16 hours at 40°C or 3 hours at 80°C.

## Mechanical Properties

### Cured Resin Properties

	Units	Method	Value
Hardness	Barcol	ASTM D2583	45
Heat Deflection Temperature	°C	ISO 7572 (A)	66
Flexural Strength	MPa	ISO 178	90
Flexural Modulus	MPa	ISO 178	4100
Tensile Strength	MPa	ISO 527	55
Tensile Modulus	MPa	ISO 527	3600
Elongation at Break	%	ISO 527	2.0
24h Water Absorption (50x50x4mm)	mg/sample	ISO 62-80	19
28D Water Absorption (50x50x4mm)	mg/sample	ISO 62-80	92

## Transport and Storage

Resin and Catalyst should be kept in tightly seal containers during transport and storage. Both the resin and catalyst should be stored in ambient conditions of between 10°C (50°F) and 25°C (77°F).

When stored correctly, the resin will have a shelf-life of 6 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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