

composite solutions



Composites are no longer the new frontier in advanced structures. They are now well established in the air on land and at sea.

In the 21st century more applications are found: replacing metal parts in aircraft, building sturdy sea going vessels, making huge blades for turbines producing clean energy, saving fuel on vehicles and even reinforcing concrete buildings.

The advantages are numerous: lower weight, increased mechanical properties, excellent fatigue resistance, lower vibration propagation, corrosion proof and the ability to offer a perfect surface finish.

The trade off is perhaps concept complexity, with a huge choice of solutions available. RESOLTECH provides most of the answers for durable and cost effective structures.



RESOLTECH is a European company offering a large range of epoxy and polyurethane formulations as well as reinforcements, cores and associated products and services.

These materials cover all composites requirements with the exception of prepregs.

PROCESSES

CONTACT MOULDING

The traditional way that started around WW2. Evolutions led to the use of vinylester and then epoxy resins as well as better reinforcements, both in terms of fibres and weaving. This technique can produce good results with resin content around 40 to 50%. Cored laminate provide better properties.

VACUUM CONSOLIDATION

Applying a sealed membrane over the mould and pumping the air out does improve the resin ratio (35%) as well as compacting the laminate. Some aerospace parts were still produced this way in the nineties.

RESIN INFUSION

The obvious evolution from wet layup and a real alternative to prepregs. Infusion provides good resin ratios (up to 37%) and dramatically improves workshop conditions. The laminate is applied dry including the cores and even internal frames and girders. Once the vacuum is made, resin flows in naturally and impregnates the laminate. Infusion provides better quality and weight control, excellent mechanical properties and affordable costs as it does not require high temperature tooling and ovens.

PREPREG CONSTRUCTION

The ultimate in terms of performance, prepregs are also more expensive to apply especially with autoclave curing. Standard cure temperature is 120°C although some systems are available with lower temperature cures (around 80°C).

COMPOSITE APPLICATIONS

LAMINATING

Resoltech offers different systems for different types of applications.

1040	High performance system, TG up to 140°C.
1050	Standard laminating system, adjustable working time.
1070	Clear & UV stable system.
1080	High performance system, High stiffness.
1400	3 part epoxy laminating system.

These systems are suitable for a large spectrum of applications. Many of the laminating systems cure at ambient temperature and are suitable for mould releasing without postcuring. Post curing will improve overall performance of the laminate and increase its temperature resistance.

INFUSION

The RESOLTECH infusion systems combine low viscosity, fast wet-out properties and high mechanical performance.

The RESOLTECH infusion solution includes the matrix systems, gelcoats as well as reinforcements, cores and hardware. The infusion systems are also suitable for injection.



1800	Infusion formulation: 180mPAS viscosity, 130°C TG.
1050	This system also performs well for infusion.
3010	Tie coat for polyester gelcoats.
9040PX	Polyester gelcoat available in a wide range of colours.

PREPREGS

RESOLTECH supplies ancillary products for prepreg construction: Temperature resistant gelcoats and coatings, adhesives for secondary bonding and cores.

7080	Epoxy gelcoat for prepregs curing below 100C°.
7090	Epoxy gelcoat for prepregs curing below 150C°.



STRUCTURAL BONDING

Composite construction still involves bonding parts together. RESOLTECH has a range of epoxy and polyurethane adhesives formulated for highly demanding applications, bonding FRP, steel, aluminium and other materials.

3030L	Underwater cure adhesive putty for repairs
3040	Core adhesive
3050	Cold cure adhesive
3060	Fast epoxy adhesive for secondary bonding

TOOLING

The first step towards manufacturing composite parts: modeling and tooling. RESOLTECH offers a range of advanced materials for both high and low temperature tooling. Please view the TECHNOTES #7 for information on tooling solutions.



SURFACE FINISHING

There are two ways to have a first class finish on composite parts: straight from the mould with a gelcoat or by fairing and finishing the surface.

8020	Lightweight epoxy filler.
3000	High build surfacer.
3010	High build surfacer.
3020HP	Epoxy lightweight filler
7060	Standard epoxy gelcoat. Wide range of colours.
7080	Epoxy gelcoat 100°C. Wide range of colours.
7090	Epoxy gelcoat 150°C. Wide range of colours.
9040PX	Polyester gelcoat. Wide range of colours.

MANUFACTURING WITH COMPOSITES

DESIGN & ENGINEERING

Unlike other materials such as metals where the components have already been manufactured and simply need to be assembled composites involve making the whole structure. This requires a high level of design and engineering. Another aspect of the problem is that composites often offer more than one solution.

High performance computer softwares enable engineers to create optimised laminates, ensure their mechanical performance and even accurately simulate the infusion of a structure.

QUALITY CONTROL

A critical part of composite manufacturing, starting from storing the materials to processing and curing them. Composites require thorough control and processing rules.

CURING

Curing is an important part of the process since the resin systems require a minimum cure temperature for a certain amount of time in order to reach their full characteristics.

While some systems only require a cure at about 20°C, most systems will allow for mould release at ambient temperature followed by a post cure at temperatures around 60°C. Should a higher TG be requested, a higher temperature cure will be needed (approximately 30°C below the required TG).



It is important to follow the cure specifications from the products data sheets.

REINFORCEMENTS

Reinforcements are the main load bearers of a composite structure and are available in a very wide range of styles.

There are different types of fibres: E glass, R glass, aramid, carbon and any hybrid combination of these.

Furthermore, different ways to assemble the fiber yarns together do have their importance. There are two main categories: wovens and non-crimp.

Woven fabrics are mostly available in plain, twill and satin weaves.

Non-crimp products are available as unidirectionals and multiaxials. Multiaxials are available in different forms from double bias or biaxial (2 layers) to quadriaxials. They allow for the fibres to be oriented in selected ways and save labour during the manufacturing process.

The **TECHNOTES # 8** covers the range of reinforcements available from Resoltech.



Pacific 50, a Murray designed IMS cruiser/racer. Australia.



CORES

The main core materials used in composites are foams, balsa and honeycombs. Each of these has advantages for selected applications.

Resoltech supplies PVC and PU foams in different configurations: plain, contoured and infusion ready.

NOTICE

The above information is given in good faith and believed to be accurate. Please check with the our sales department should you be unable to find the product or service you need. Resoltech reserves the right to amend this list without prior notice.

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