

## POLYESTER RESINS

**Unsaturated Polyester Resin Solution:** Unsaturated refers to carbon-to-carbon double bonds, which have the ability to open up and crosslink with other unsaturated molecules such as styrene. The breakdown of the word polyester is **poly** meaning many and **ester** being a certain type of chemical connection that binds these molecules together. A **solution** indicates a mixture of different molecules; those that will crosslink together like the polyester and the styrene and those that will control the rate of the reaction such as the cobalt and various aniline accelerators.

There are basically 4 different types of **Unsaturated Polyester Resin Solutions**, which we sell and they are the low profile **DCPD**, **Orthophthalic**, **Isophthalic**, and **Vinyl-Ester**. The type of resin produced is dictated by the raw materials, which are used to make the polyester molecule and will result in these products having different end properties and different associated costs. While resins may be fit into these different classes, keep in mind many manufacturers will blend them together for their different products.

**DCPD Type Resins** are based on a chemical called **Dicyclopentadiene** and form a type of resin called **Low Profile**. Low Profile indicates resins, which are typically harder with less shrinkage, and most importantly, resist the tendency for resins to “print through”, that is to show the profile or outline of the underlying fibers of glass, carbon or aramid through the gel-coat surface.

**Ortho Type Resins** are based on **Orthophthalic acid**. These are the general purpose resins used in thicker laminates to build up thick sections of composites. They are easy to work with and usually cure with a slightly tacky outside layer, which is good in that it provides better inter-laminar adhesion to additional layers. The engineering parameters of these products such as tensile strength, flexural strength, impact resistance, and fatigue resistance are best described as good but not best.

**Iso Type Resins** are based on **Isophthalic acid**. These are generally considered a higher class of resin and a little more costly. They are not quite as user friendly but have improved engineering parameters such as tensile strength, flexural strength, impact resistance, and fatigue resistance. Additionally, they will also have much improved water and chemical resistance.

**Vinyl Ester Resins** are based on **liquid epoxy resins**. These Resins are considered the premium product in performance as well cost. Their downside is they have a tendency to foam with the wrong catalyst, which can result in porosity. The bigger advantages to these resins are their fatigue resistance and their high temperature resistance for chemicals and solvents. This makes them useful for a number of applications where no other product would suffice such as tanks for acid baths and containment for other chemicals. Additionally they have excellent water resistance and have become the resin of choice as a moisture barrier coat for submerged applications such as boats and pools.