Article published on June 12th 2012 | Business

Epoxy resins have been in use for almost a century. Epoxies are versatile polymers and exhibit distinctive blend of properties. In any high-tech structural use, where light weight, durability, low cure shrinkage, strength and stiffness, adhesion electrical insulation and corrosion resistance properties are entailed, resins are regarded as the minimum standard of performance for the matrix of the composite. This is the reason why in aerospace, airplanes, aircrafts, offshore racing boats applications, resins have been the â€˜normâ€™ for years.

Nonetheless, 95% of pleasure boats under sixty feet now are still constructed with polyester resin. The key consideration for materials choice for most composite builders is cost, with value and performance usually being a secondary consideration. As a rule, resins are twice as costly as vinyl ester resins and vinyl ester are twice as costly as polyesters. On the other hand, when considered against the cost of the entire structure (the boat), the cost is fairly insignificant and the value of superior quality and long term benefits of better durability (hence better resale value) can be magnanimous.

Contributing Factors to this Better Value:

Adhesive Properties:

Epoxies have far superior adhesive properties as compared to vinyl and polyester resins. The better adhesion of epoxies is due to 2-key reasons. The first is at the physical level- as epoxy cure with low shrinkage, several surface contacts set up between liquid resin and reinforcement is not disturbed during cure. The outcome is a more homogenous bond between resins and fibres and a better transmission of load between the various components of the matrix. The second one is at molecular level, wherein the presence of polar hydroxyl boosts adhesion.

Mechanical Properties:

Two vital mechanical characteristics of any resin systems are its tensile stiffness and strength. The tensile strength of epoxy resins is 20-30% higher than vinyl ester and polyester. It is to be noted that boats constructed with vinyl or polyester are seldom post cured in the workshop while boats made with epoxies quite often are.

Enhanced Resistance to Micro Cracking and Fatigue:

In majority instances, an appropriately designed hull laminate will never be subjected to its ultimate strength therefore, physical properties of resin matrix, though imperative are not the sole criteria on which the choice has to be made. Long before the final load is transferred and failure occurs, the laminate will reach a stress level, wherein the resin will start to split away from the fibre reinforcements not aligned along with the applied load.

Reduced Degradation from Water Penetration:

A vital property of resin, especially in a marine environment is its capability to resist degradation from water ingress. Both vinyl and polyester are prone to water ingress because of the existence of hydrolysable ester groups in their molecular structures. Consequently, a slender polyester laminate can be anticipated to retain only 65% of its inter-laminate strength after immersion over the tenure of one year. Whereas epoxy resins laminate immersed for an identical time will retain around 90%.

Royceintl - About Author:
As a Epoxy Resins are more durable, versatile, and resistant, they are commonly used in various applications and industries. For more information logon to website http://www.royceintl.com.

Article Keywords:
Epoxy resins, epoxy resin