

**COMPOSITE ENVISIONS KNOWLEDGE HUB
PRACTICAL AND INSIGHTFUL COMPOSITES INFORMATION**



PREPREG SELECTION: DOUBLE SIDED VS SINGLE SIDED



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INTRODUCTION

Prepreg selection is usually based on characteristics such as service temperature, ultimate strengths in each direction, cured density, or tack. But one important feature of prepregs often goes overlooked is resin application. In fact, many technical data sheets fail to mention whether a prepreg's resin is applied to a single side or both sides (double sided). We will cover why this small detail is so important, and if you should consider this characteristic when choosing the next prepreg for your part fabrication. After all, prepreg certainly is not cheap, neither is the time or resources spent in order to achieve the utmost laminate quality in each part fabrication.

SMALL DETAIL, PART CHANGING DIFFERENCES

With fabric type prepregs such as twills and satin weaves, conformity, drapability, and tact characteristics are high. The resin, responsible for providing tack during layup, generally makes layup processes a breeze. These same characteristics can be responsible for resin flow during cure, helping achieve adequate wetting throughout fabric layers. Choosing between single and double sided resin application criteria makes more of a difference when it comes to tighter woven fabrics. High crimp angles within these fabrics may make layup processes tougher. Woven fabrics have more trouble conforming and staying in place for complex parts. High crimp angles are great for achieving stiffer parts but lack in workability. Resin application to the fibers needs to be even and adequate, providing complete wet-out and good flow characteristics to the fibers in cure processes. These traits can “make or break” overall laminate quality. Whether the resin is applied to one side or both sides of the prepreg may make difference in surface finishes and cross-sectional laminate quality in complex layups and in tight layup radii.

DOUBLE SIDED PREPREG

Use for high crimp angle woven fabrics when laminate design calls for tight corners such as 90-degree angles with under a 2” radii or other complex part surfaces such as roll wrapping parts. If fabricated laminates are plagued with issues such as repeated bridging or porosity in tight radii, a double sided prepreg may be the answer to laminate quality issues.

Advantage: Less voids / porosity in radial area(s) of cross section. May be easier to layup with tack on both sides on fabric, especially for complex contours. Achieves even wet out easier than that of single sided prepregs.

Disadvantage: Higher possibility of surface porosity if there are any mistakes in bagging or cure processes.



SINGLE SIDED PREPREG

Highly advised for use on the “tack layer” or the first ply laid down to mold surface. Single sided prepregs promote higher quality surface finishes and ease in layup for the first ply being laid down. First plys are critical for numerous reasons as they are what comes off the mold, controlling the dimensions of the part. The first ply is also the “Cosmetic” layer. What will be seen, what may be prepped down the road for a clear coat application or paint as desired. A good resin layer from the mold surface is critical is secondary processing of composite parts.

Advantage: Promotes better possibility for higher quality surface finish.

Disadvantage: In complex parts with tight woven fabrics, resin will have tougher time achieving thorough wet out in the cross section of the laminate. Conformity issues may lead to bridging of plys and porosity issues even if there is no evident bridging during layup.

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