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Effect of prepreg format on defect control in out-of-autoclave processing

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Abstract

Prepreg format plays a key role in part quality for composites produced using vacuum bag only (VBO) techniques. To date, however, VBO prepregs have been produced by modifying existing autoclave formats. In this work, we introduce USCpreg, a prepreg format designed specifically for out-of-autoclave cure, featuring through-thickness permeability. We describe the fabrication and analysis of laminates processed with USCpreg, as well as laminates fabricated from traditional VBO prepreg formats. The through-thickness pathways for air transport in USCpreg result in near-zero internal porosity and defect-free surfaces in parts cured under VBO conditions, even under challenging processing conditions. Results highlight the fact that surface and internal porosity depend on prepreg format, and that through-thickness permeability is critical to achieving high quality parts in non-ideal manufacturing scenarios.

Keywords:

- A. Prepreg
- A. Polymer-matrix composites
- B. Porosity
- E. Out of autoclave processing

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