



Technology Readiness Level: **4**
 Component and/or Breadboard Validation
 in Laboratory Environment

High Temperature Vacuum Assisted Resin Transfer Molding (HTVARTM) for Production of Fiber Reinforced Composites

Benefits

- Solventless processing of high temperature polyimides out-of-the-autoclave
- Higher service temperature than state-of-the-art fiber reinforced composites
- Reduction in the costs associated with up front capital equipment
- Lower part and fastener counts

The Problem

Vacuum assisted resin transfer molding (VARTM) is a process used extensively in the production of large fiber reinforced composite products such as boat hulls and windmill blades. VARTM is typically used with polymers or resins that can be processed at low temperatures. The recent emergence of liquid processable polyimide resins has presented an opportunity for application of VARTM to the production of large, high-temperature performing composite structures such as nacelles, the structure that surrounds an aircraft engine.

Eltron has developed a unique high temperature VARTM process for producing carbon fiber reinforced polyimides with service temperatures greater than 300°C. Production of large composite structures by this method has several advantages over the state-of-the-art. Reduced capital equipment cost is possible because a large autoclave is not needed. Lower part and fastener counts are possible because near-net shape composite structures can be produced in a single operation.

Features and Benefits

Feature: Out-of-autoclave process
 Benefit: Reduces production costs 15-25%

Feature: Solventless process
 Benefit: Worker safety



Stage of Development

Eltron has a functional laboratory system and has produced prototype parts. The process is being developed for the United States Air Force, which seeks high temperature composites for use in military aircraft structures. Eltron has a patent pending with the USPTO for this technology, *Production Process for High Service Temperature Polymer Matrix Composites*, application # 61/179,188.

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