VISTEX

SMARTER • FASTER • COMPOSITES

Executive Summary

Vistex Composites provides manufacturers of carbon fiber composites a smart manufacturing process that increases margins, reduces costs, increases throughput, fosters critical new materials, and reduces waste while maintaining or exceeding quality of existing processes. Through this value, Vistex enables a three-fold broader adoption of composites while drastically cutting the environmental impact of production. Vistex enables thermoplastic composite materials, a new tougher material, that the composites industry currently struggles to manufacture with acceptable quality.

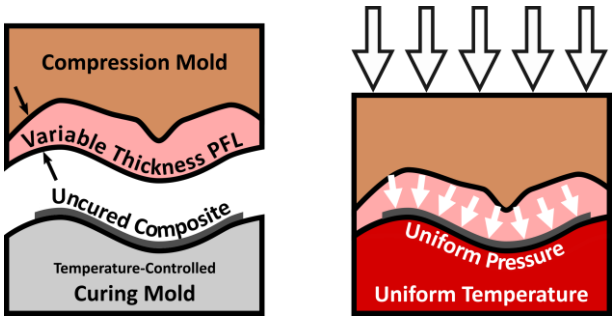
Founded: Oct 2012 Funding Stage: Product Deployment Tech Readiness Level: 6-7

The Problem

The industry standard autoclave process for making carbon fiber composites, as used in the aerospace, military, and automotive industries, is over 50 years old and cannot keep pace with current industry needs. Autoclaves are prone to high defect rates, suffer from extremely low throughput, cannot be automated, and in many cases simply do not work and therefore cause significant development delays and overruns. An autoclave is just a huge pressurized oven that provides uniform pressure and temperature. Each manufacturing cycle takes at least 2-8 hours, requires a tedious manual vacuum bagging preprocess and requires extensive consumables (e.g. energy, argon gas, plastic vacuum bagging materials). The slow cycles and high operating and capital costs have limited broader adoption of carbon fiber especially in the automotive sector where light weighting is a critical approach to global emissions standards. Other manufacturing processes currently used to address autoclave shortcomings suffer from reduced product quality, and/or marginal impacts on cost (e.g. Resin Transfer Molding, Quickstep®, RapidClave®).

The Solution & Competitive Advantage

Vistex's patented Pressure Focusing Layer (PFL™) technology utilizes a proprietary optimization algorithm to design hardware (a pair of molds) that provides the same uniform pressure and temperature as an autoclave. See Figure. In short, the software designs the geometry of the *compression mold* and *PFL*™ to induce uniform compression on the composite while the *curing mold* design provides thermal management. The process can fabricate nearly any shape and has been demonstrated for a wide range of commercial products including motorcycle helmets, CT scanner components, residential wind turbine blades, EV components and more. The PFL™ process has been validated using third party testing, and performance equaled or exceeded that of autoclaves.



The PFL™ process reduces: cycle times by 66-96%, capital equipment costs by 54-99%, operating costs by >80%, labor by >40%, scrap rate by up to 90%, energy consumption by 90-99%; and is being demonstrated as automation ready. This value proposition allows composite manufacturers to reduce per part costs by more than 30% while significantly increasing margins, and tripling their market opportunity[1]. The PFL™ process also has a powerful environmental impact. The energy savings of the PFL™ process are so substantial that if Vistex makes roughly 100 kayak paddles using the PFL™ process instead of autoclaving, the energy savings would be equivalent to what an average US household uses in a year.

The Opportunity

The global composites industry is growing to $115B by 2022 with a CAGR of 8.13%[2]. The tooling market is tied to this growth and is estimated to be at least $2B. The rapid growth is led by the transportation, consumer, wind, and aerospace sectors. Vistex's focus is on medium to high volume production (>100 units/year) production quantities in the transportation, consumer, residential wind, and non-structural aerospace segments. What these all have in common is reduced barriers to entry (e.g. less stringent

regulations), similar component requirements (e.g. strength, materials) and small to medium part sizes (i.e. <12 sqft). This more focused approach represents just under half the total market opportunity.

The Model

To date, revenues have focused on manufacturing composite products in-house which served to further validate the technology. However, Vistex is currently deploying a tooling revenue model. Specifically, Vistex will design and fabricate the tooling hardware for our customers and will periodically provide replacement PFL™s (which are a consumable). The tooling model is highly scalable and capital efficient. Within 4 years we expect to be selling 150 tools per year and providing replacement PFL™s for 400 tools per year netting revenues of more than $6M. It should be noted that Vistex's core technology, while developed for composites, is universally applicable to a wide range of manufacturing processes.

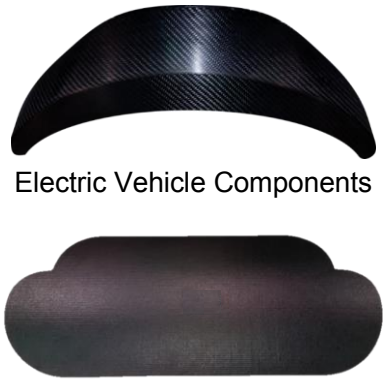
The Team

Casey Hoffman and Jaron Kuppers have built Vistex from a lab-bench idea to an established start-up that has successfully raised over $3.04M in grant revenue and subcontracts including investment from NYSERDA and a NSF SBIR Phase II. Both PhD mechanical engineers, Casey and Jaron have backgrounds focused in manufacturing and composites. They have recruited a team of business and technical mentors made up of VC's, successful entrepreneurs, and those with expertise in the composites industry. Additionally, Vistex partners with Composites One, the largest composites distributor in the US who has acknowledged the potential of Vistex's technology. Vistex is cultivating a relationship with one of the world's largest plastics manufacturers as a potential channel manufacturing partner and/or investor.

The Ask

Vistex plans to hold a seed round to raise ~$1M. The capital will be used for business development and marketing, industry certifications and qualifications, increasing staffing, and to support our existing operation at our 5,000 sqft facility in Schenectady, NY.

Helmets



Electric Vehicle Components

Medical Components

Consumer Products

Sports Equip

[1] Mazumdar, S., "Growth opportunities: materials innovation will drive composites usage to new heights" High Performance Composites Magazine. Available: http://www.compositesworld.com/ columns/growth-opportunities-materials- innovation-will-drive-composites-usage-to-new-heights

[2] Advanced Composites Market by Fiber Type (Carbon, S-Glass, Aramid), Resin Type (Thermosetting, Thermoplastic), Manufacturing Process (Filament Winding, Injection Molding, Pultrusion), End-use Industry, Region - Global Forecast to 2022