

# Q&A ORIBI Manufacturing

Matt Christensen, Chief Commercial Officer

Matt Christensen, Chief Commercial Officer from ORIBI Manufacturing, provides insights on the trends and opportunities for this material form. ORIBI Manufacturing is a Denver-based company specializing in thermoplastic composites fabrication for industrial applications. They are dedicated to cost-effective production of high performance

composite parts, leveraging unidirectional Continuous Fiber Reinforced Thermo-Plastic (CFR-TP) materials. Through the utilization of highly automated assembly processes, ORIBI delivers highly scalable, predictable, and tight-tolerance advanced composite parts.



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Chief Commercial Officer at ORIBI Manufacturing

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Matt, one of the things we find is that companies such as ORIBI fill an important gap between a design engineer wanting to use thermoplastics and a materials supplier like Toray Advanced Composites

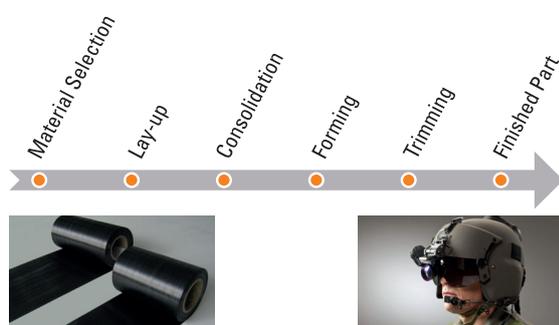
**Q1:** How long has ORIBI been manufacturing thermoplastic parts?

**A1:** ORIBI started back in 2009 with the primary goal of bringing composite manufacturing to a higher level of throughput and consistency than had been achieved to that point. Jack Wilfley, founder of ORIBI, worked with FiberForge in the past and helped them bring their automated composite manufacturing technology to market. He has deep roots within the manufacturing sector (fifth-generation Wilfley Pumps), and a strong passion for advanced composites, so he started making composite parts using the FiberForge system. Almost 10 years later, we still use those foundational elements within several of our processes and have developed proprietary systems to make parts even better, faster, and at a much lower cost.

**Q2:** What are the key processes used by ORIBI to produce advanced thermoplastic composite parts?

**A2:** Throughout our entire manufacturing process, we keep a close eye on potential continuous-flow bottlenecks that may occur while making each part. The key for us is to drive efficiency within each step, so we can capture product programs that require extremely fast cycle times and consistency, yet keep overhead costs low. Robotics really help us here. Programming, design, and maintenance are all in-house, so we can keep the product flowing at a high rate.

## Manufacturing Process



**Q3:** On processing, describe the general process and maybe the fast cycle times thermoplastics offer. How different or alike are the processes from metal stamp forming?

**A3:** The process is most like stamp metal forming, but instead of using sheet metal, we essentially use blanks of uni-directional CFR-TPs. Our process does require a matched-metal two-piece tooling system which we develop and build in-house. Tooling costs vary by size and complexity of the part, but we have a lifetime guarantee on the tool so if a customer wears one out through manufacturing, we will make a replacement at no extra cost. We have some tools that have over 200,000 parts made and are still functioning very well.

**Q4:** What markets does ORIBI focus on with fabricated thermoplastic composites? Recreational, military, vehicle, automotive?

**A4:** We have just begun to scratch the surface of thermoplastic opportunities within the US. That said, we are very active in the military/law enforcement, sporting goods, automotive, consumer product, and industrial segments. We find each industry is challenged to make products lighter, stronger, tougher, and less expensive, and we are fortunate to see a tremendous amount of return business by helping our customers solve those tough challenges.

**Q5:** What opportunities does ORIBI see for the future of thermoplastics?

**A5:** In the past, many of our customers came to us trying to solve a specific issue with a previously designed product and found the benefits of thermoplastic composites solved those issues almost like a band-aid. We now see these customers returning to design components with CFR-TP composites from the beginning, and the results often exceed their expectations.

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**Q6:** Does ORIBI have design capabilities, and is a lot of ORIBI's work modifying metal parts to thermoplastic composites?

**A6:** We often work with our customers' current design models to ensure the materials and process are aligned to exceed expectations. Although we do not design products from scratch, we help our customers understand the design opportunity the materials and process provide, which often results in better part designs in the long run. Yes, many projects focus on replacing metal components, but we see more and more projects leveraging CFR-TPs from the initial product design phase.

**Q7:** Are there limitations ORIBI has on size, thickness, or complexity of the part?

**A7:** Because we form parts under tremendous heat and pressure, size and geometric complexity of parts can be a challenge for us. We are continually expanding the part-size capacity, which today is about 40" x 40" (1016 x 1016 mm). If a part is "oversized," but has a compelling business case for ORIBI, we will design and develop machinery to enable production. In terms of complex geometry, the fiber within the CFR-TP tape does not stretch, so a tight radius (less than 1/8" or 3.18 mm) can be tricky. One interesting application which compensates for this is to leverage an overmolding process. The CFR-TPs work as the structure within the part, and overmolding through injection-molding will give detail that the customer needs. We are doing more and more overmolding since it can solve the issue of small details within a part.

**Q8:** For any one customer, what is the typical annual or weekly run rate of parts, i.e. hundreds, thousands, millions, etc.?

**A8:** Our process is very flexible, and we will make a small run for customers if needed. Generally, our sweet spot is at least 500 units per run to minimize the setup time and costs. Our focus on automation allows us to easily flex overall manufacturing capacity, so we're also geared up for high-volume, quick turnaround opportunities.

**Q9:** Do you have any interesting application stories?

**A9:** For an industrial application, we designed a series of axial fan blades from CFR-TPs and had them tested against the most popular aluminum fans in the market. We were able to make the blades thinner, which increased efficiency, and used materials that did not corrode within highly caustic environments. The blades had customized fiber orientations to maximize strength and stiffness while reducing weight and eliminating unwanted flex. Not only were we able to reduce the overall dB level of each fan, the calculated energy savings paid for the fans within 9 months of installation. The customer found the fans would stay balanced even though they were handled roughly during installation.

More information can be found at [www.ribimanufacturing.com](http://www.ribimanufacturing.com).



Thermoplastic composite parts made by ORIBI Manufacturing.

**TORAY**

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