

TECHNICAL SERVICES

Avient Long Fiber Technologies
Application Development

SUCCESS. FROM START TO FINISH.

What if you had access to additional resources that expand your design, development, testing, and technical capabilities? When you work with Avient, you do. Material selection is a crucial step in any new product development project, but that is just the beginning. Long fiber thermoplastics (LFTs) offer benefits to design engineers seeking a material that provides exceptional strength, yet requires lightweight properties. However, to ensure your material performs as intended, there are several technical considerations to examine.

When working with Avient, our materials and technical experts act as an extension to your design and engineering teams, supporting your projects from start to finish. With global production capability and localized support to enhance your development process nearby, our team is uniquely positioned to fast-track your project from concept to commercialization—all while assuring confidence throughout the process by leveraging our large toolbox of support services.

DESIGN SUPPORT

Designing your application for long fiber thermoplastics, regardless of material familiarity, requires an assessment of a wide array of inputs to achieve the optimal geometry. This involves considerations with industrial design, material selection, simulation results, and optimization of the overall design as you learn to leverage the unique capabilities of the LFT material.

To best support your design success, we dive deep into understanding your application to identify your performance expectations, typical environmental exposure, common failure modes to watch out for, end-of-life options desired, sustainability requirements, and any pertinent regulatory requirements. More importantly, we learn your vision for the product and what is most important for your success. After this critical review, we can support your design in the following ways.

INDUSTRIAL & STRUCTURAL DESIGN

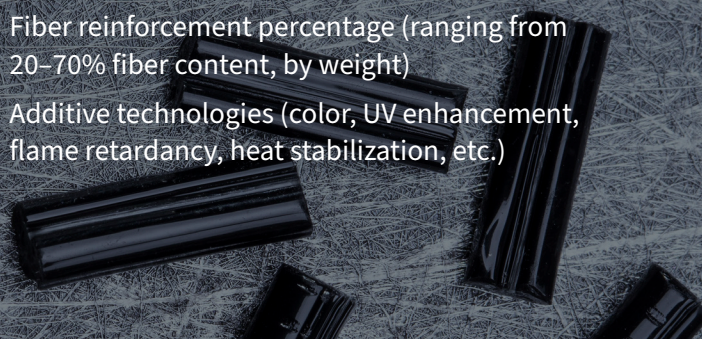
- Concept sketching
- Ergonomic enhancements
- Photo rendering
- Part consolidation, manufacturability, and structural optimization



MATERIAL VALIDATION

We have in-house capabilities to allow us to recommend and confirm proper material selection for your program. This includes physical testing, rheological behavior, thermal and moisture examination, microscopy, flammability testing, and weathering/UV exposure (QUV and Xenon Arc). With these capabilities at our disposal, we assist you with recommending the following characteristics that make up your customized solution:

- Resin system selection (i.e., nylon, polypropylene, rigid thermoplastic polyurethane, etc.)
- Fiber selection (i.e., glass, carbon, etc.)
- Fiber reinforcement percentage (ranging from 20–70% fiber content, by weight)
- Additive technologies (color, UV enhancement, flame retardancy, heat stabilization, etc.)



SIMULATION SUPPORT

Computer-aided engineering (CAE) allows us to accurately and efficiently understand a variety of assessments that help us guide your team through the design phase of a project to confidently dial in on a final design. These tools include mold-filling simulations to study fill patterns (including predicted pack and cooling) of the geometry and predict knit line locations at resin flow fronts to help ensure you are directing the best fiber alignment (strength) in the highest stress areas that your product endures when in use. We also use isotropic and anisotropic Finite Element Analysis (FEA) to simulate real-world application conditions to give you confidence in your material selection and to identify optimized structural geometry options. CAE also helps us design for possible warp and deflection of the finished part.

Software

- SolidWorks
- Digmat
- MoldFlow
- Abaqus
- Siemens NX

Onsite Processing Optimization Support

Proper application development continues through commercialization of the new solution. Our onsite technical support team is here to help with process development, mold design suggestions, material training, troubleshooting, and continuous improvement. Let us walk you through:

Optimizing the LFT Molding Processes

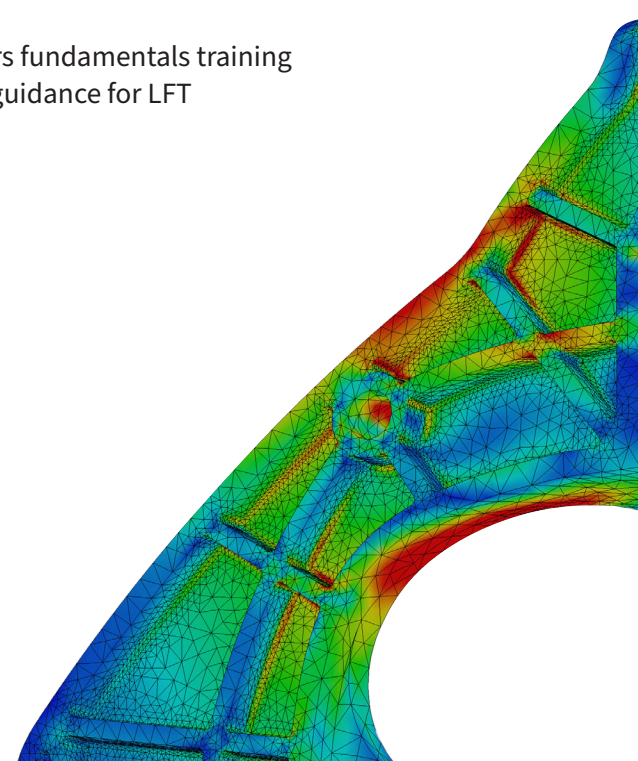
- Ensuring proper drying and preparation of the material (review of drying equipment)
- Processing guidance for the specific grade (temperature and pressure suggestions)
- Primary process development (including runner & gate geometry)
- Secondary operation process development
- Tooling debugging/optimization, especially if the injection mold is new

Troubleshooting

- Failure analysis/issue resolution (including pyrolysis/burn-off reviews to study internal fiber structure and length)
- Process/mold support to perfect finished goods
- Equipment review

Training

- Polymers fundamentals training
- Design guidance for LFT



IN-HOUSE PROTOTYPING SUPPORT

Our 55,000 square foot Application Development Center is most often leveraged for new program prototyping and R&D trials. We complete initial runs, tooling review, and optimize suggested processing settings that can be communicated to your long term processor of choice. We also study the fiber retention of these first shots and ensure that the material formulation selection is optimal.

Prototype Capabilities

- First articles
- Burn off (pyrolysis) studies to analyze fiber retention and performance
- Customer trials to display new program tooling
- Agile formulation modification, if determined it's needed after first article runs
- Injection molding machines ranging from 50–550 ton

Avient's unique combination of materials, design expertise, and technical services enables us to conquer challenges and unlock the potential of innovation in meaningful and dynamic ways for customers around the world. Our people, ideas, material science, resources, and unwavering commitment to service enables customers to transform their visions into groundbreaking products.

**READY TO GET
STARTED?**
So are we.

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