Whether you need analysis, prototypes or help with a full production facility, we can provide everything you need to be successful in launching or improving your product.

Our filament winding expertise combined with Zoltek's reliable supply of economical carbon fiber make us an excellent partner to help you develop or improve your products. Our R&D Support Center can assist customers with preliminary analysis, prototyping and testing. We can help you select appropriate materials and machinery.

Equipment available for R&D support includes:

- 6-axis Gantry style filament winding machine
- FW Series laboratory filament winding machine
- Both large and small curing ovens
- Resin Testing equipment
- Digital microscope with photographic capability
- Mechanical load tester with data logging
- Heated press for test panel fabrication

Mandrel Surface Creation - Define cylindrical, closed end pressure vessels or axisymmetric geometry

Project Manager - Create, modify and organize layers

Fiber Path Engine - Control fiber placement, identify slip, bridging, distribution and slack tendencies

Parametric Definitions - Import previous winding projects and modify geometry and insert or delete layers

Machine Motion Editor (EDPAT ll) - Modify and smooth machine motions in all axes

Winding Simulator - Identify exact representation of winding machine and mandrel

Finite Element Analysis - Import Geometry and Lamination data to FEA solver

About Us

Entec Composite Machines, A Zoltek Company, has been in business for over 50 years designing and manufacturing filament winding machinery. Entec has supplied over 750 filament winding systems to customers worldwide. Entec was acquired by Zoltek Companies in 1999. This acquisition allowed Zoltek to use Entec's expertise in material handling and processing to support their carbon fiber goals. Today, Entec's role has expanded from solely manufacturing filament winding machines and auxiliary equipment to working very closely with Zoltek on carbon fiber composite research and development. Entec has developed machinery for pultrusion, fiber placement, spool winding, towpreg and prepreg production, fiberglass pipe and tank production and a variety of extremely large and small customized filament winding equipment.

Zoltek Companies, Inc. headquartered in St. Louis, MO, Zoltek Companies, Inc. engages in the development, manufacture, and marketing of carbon fibers for various applications. Zoltek fibers are used as the primary building material in commercial products for wind energy, automotive, offshore drilling and sporting goods. Zoltek commercial grade carbon fibers are sold under the PANEX trade name and the oxidized acrylic fiber under the PYRON trade name. Zoltek operations are primarily in the United States, Mexico and Europe but their products are sold worldwide.

Carbon fiber works to reinforce and lift many products to new levels of performance. Performance characteristics and properties that are improved with the use of carbon fiber include; high strength, low weight, high stiffness, corrosion and heat resistance and electrical conductivity.
Working with Entec Composite Machines

Filament winding is the process of delivering continuous fibers and resin on a Mandrel surface in a precise geometric pattern. In this manner, structures can be manufactured that are inherently stronger and lighter weight than their steel counterparts.

Entec Composite Machines is the source for solutions to your filament winding needs. We provide a combination of: 1) Well proven heavy duty Mechanical Design, 2) State of the art Servo Control Systems, 3) Industry leading Winding Software and 4) Exceptional Customer Service. We can also help you design, develop or even improve your product.

Our unique position as a subsidiary of the world’s largest commercial carbon fiber producer, Zoltek Companies, Inc. combined with our extensive filament winding experience allows us to provide customers with the complete solution for manufacturing composite parts.

Entec Customers and their Products

- **AEROSPACE** – Waste Tanks, Pressure Vessels, Rotor Drive Shafts, etc.
- **AUTOMOTIVE** – CNG Pressure Vessels, Sheet Molded Battery Containers, Drive Shafts, R&D projects
- **DEFENSE** - Rocket Motors, Pressure Vessels, Launch Tubes, Rocket Nozzles & Nose Cones, Drive Shafts, etc.
- **INDUSTRIAL** – Paper Core Chuck Shafts, High Stiffness Light Weight Tubing, Water Pipe, Bearings, etc.
- **MARINE** – Mast Components, Propeller Shafts, Light Weight Tanks, Boat Decks
- **OIL & GAS** – Fiberglass High Pressure Pipe, Well Casing, Pipe Liners, Large Diameter Low Pressure Pipe and Tanks, Flexible Drill Pipe, Frac Plugs, etc.
- **SPORTING GOODS** – Golf Shafts, Paddles and Oars, Hockey Sticks, Bats, etc.
- **WIND ENERGY** – Windmill Blade Spar Caps
Filament Winding Machines

All Machines are Customizable!

The FW Series fits perfectly as a laboratory winder or as a development platform for high production parts. This machine is a single spindle and can be equipped with 2 - 4 axes of servo driven motion.

Featuring a sturdy steel rear-beam construction, this keeps the mechanical components accessible for easy maintenance. Mandrel handling can be accomplished with or without the assistance of an overhead crane.

Our PS Series is perfect for composite parts requiring a high rate of production. This machine can manufacture various parts, including; CNG pressure vessels, SCBA tanks, small rocket motors and sporting good equipment.

The machines can be designed in many different configurations, equipped with up to 10 spindles and 2-4 axes of servo driven motion. The heavy-duty steel overhead beam construction keeps mechanical components out of the way of flying resin.

Our largest standard winder, the 5K was created specifically for high precision, large Aerospace structures. This machine can be equipped with 2 - 6 axes of servo driven motion.

The heavy duty floor mounted beam construction allows for very heavy loads and for precise carriage positioning. This machine's stable structure allows for extremely high winding speeds.

Entec will customize any standard filament winding equipment to customer specifications. We also produce pultrusion equipment, paperless prepreg production lines, sheet molding production equipment, towpreg production equipment and tape winders.

Entec pipe systems are designed for high-speed production of high and low pressure fiberglass pipe for the oil, gas and water industries. To complement the pipe systems, we also produce oven curing systems, mandrel extraction systems, pipe threading stations and pressure testing equipment.
Whether you need analysis, prototypes or help with a full production facility, we can provide everything you need to be successful in launching or improving your product.
**Machine Control Systems**

Entec offers two types of machine control systems, WiMaX III and Siemens® Sinumerik. Each system offers different features, depending on what your company requires. We also offer retrofit options for your pre-existing machinery, including those built by other manufacturers.

**WiMaX III**

WiMaX III enhances the ease of use and simplifies your movement toward fully automated composite part fabrication. WiMaX III is backward compatible with Entec’s earlier versions of WiMaX and Hyperchain.

- Program Reverse
- Full Emergency Stop recovery
- Machine Simulator
- Can be run with industrial control panel, keyboard not required
- Edit circuit count on the fly
- Supports various tension systems
- Runs on Windows® 7 and XP
- Written to run on .NET platform and can be easily customized to fit customer requirements
- Patterns of infinite length
- Supports remote operation
- Supports Modbus TCP/IP

**Siemens® Sinumerik Controller**

The latest Siemens® control system is a fully integrated PC with an open-ended architecture, designed to accommodate multi-axis motion control.

- World wide support through Siemens
- Siemens hardware reliability
- Supports G-Code plus all Siemens extensions
- Runs FGX patterns
- Supports parametric programs
- Distributed and simplified system structure via Ethernet, PROFINET and PROFIBUS
- Scalable in hardware and software
- Full Emergency Stop recovery
- Machine Simulator
- Can be run with industrial control panel, keyboard not required
- Runs on Windows® 7 and XP

**Creels & Resin Baths**

Fiber delivery and resin impregnation play a crucial role in producing quality filament wound composite parts. Whether you are planning on using pre-preg fibers or implementing a wet-wind process, Entec has a complete line of creels, tensioners and resin baths to complete the job efficiently.
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For more information, visit entec.com

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**Zoltek Companies, Inc**

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