UD-CCM Manufacturing & Prototyping Capabilities

**CCM Equipment**
- **Autoclave**: Thermal Equipment Corporation autoclave, with capability to 1200 F and 500 psi. Chamber working size is approximately 20in diameter and 4ft in length
- **Compression Molding Press**: 2ft x 2ft 150 ton Wabash heated platen (800°F) press
- **Liquid Molding**: Multiple VARTM workcells with all necessary accessories, RTM injection systems, a SMARTMolding fully automated VARTM workcell, Elevated temperature VARTM for BMI and toughened epoxy infusion, Co-Injection Workcell, process monitoring sensors, and all associated process control hardware, permeability characterization
- **Robotic Tape Placement**: ABB 6400 six-axis robot with custom designed heads – Computer-Controlled N2 Hot Gas Torches (2), 10 kW Huettinger Induction heater, IR heaters, all necessary hardware and process control systems
- **Thermoplastic Extrusion & Film Line**: DACA Micro-Compounder (5 cc max capacity), Twin screw Haake Extruder (480 C, 14 kg/hr) and Film line, Perkin Elmer Series 2000 GPC Lab Scale Film Extrusion System
- **Microwave Processing**: 3kW microwave processing system
- **Induction Heating**: 5kW heaters for polymer and metal matrix composite processing
- **Automated Lamination System**: Roller based heating and consolidation system for automated processing of thermoplastic and thermoset prepregs
- **Ovens**: Wisconsin Oven-Convection Oven 8ft x 10ft x 8ft chamber (500°F), Blue M-Convection Oven 3ft x 3ft x 4ft chamber (500°F)
- **Fabric Prototyping & Tow Sizing System**: CCITech SL8900 Sampling Loom System (2-D Loom, Warper, Sizing Unit)
- **Ultrasonic Welding**: Amtech Ultrasound 20 Robotic Consolidation System

**CCM-ATTL Equipment**
CCM’s Application Technology Transfer Laboratory (ATTL) was established in 2005 as an off-site facility to provide additional space for sub-component and full-scale part manufacturing and prototyping. Facilities at ATTL are used to demonstrate production processes at rate and quality.
- **Pultrusion**: HPI 20 kip Pultrusion Machine
- **Prepreg Line**: Aqueous Bath Thermoplastic Prepreg Line
- **CNC Automated Ply Cutting**: American GFM Model US15 Ultrasonic ply cutter with fabrication/assembly capabilities of bound dry preforms
- **Liquid Molding**: VARTM workcells including SMARTMolding with elevated temperature capability, and a 44ft x 14ft x 12ft dedicated climate controlled booth for process condition control and ventilation
- **Filament Winding**: Entec Filament Winder
- **Experimental Thermoplastic Lamination Workcell**
- **CNC Machining**: HAAS VF-9/40 Vertical Machining Center
- **Metrology**: 3D Laser Scanner/Coordinate Measuring Machine, Virtek Laser Projection System
- **Spray Systems, Inc. Commercial Spray Booth**: 34ft x 14ft x 12ft
- **Component Trimming & Finishing**: Specialized composite cutting equipment and dust collection controls
- **Assembly & Integration**: large scale composite structures and vehicle applications, including systems integration for electronics and electro-mechanical systems

**New at CCM: Hennecke GmbH High Pressure Resin Transfer Molding System (HP-RTM)**
The first open-access HP-RTM workcell in the United States allowing for:
- Manufacturing ultra-lightweight, high-performance composite structures
- Prototyping
- Small to medium production runs
- Industry sponsored programs
- Academic partnering
- Government programs

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