CCM Equipment

- **Autoclave**: Thermal Equipment Corporation autoclave, with capability to 1200 F and 500 psi. Chamber working size is approximately 20 in diameter and 4 ft in length.
- **Compression Molding Press**: 2 ft x 2 ft 150 ton Wabash heated platens (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 8 ft x 10 ft x 8 ft chamber (500°F), Blue M-Convection Oven 3 ft x 3 ft x 4 ft chamber (500°F).
- **Fabric Prototyping & Tow Sizing System**: CCItech SL8900 Sampling Loom System (2-D Loom, Warper, Sizing Unit).
- **Ultrasonic Welding**: Amtech Ultrashear 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 44 ft x 14 ft x 12 ft 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.
- **Spray Systems, Inc. Commercial Spray Booth**: 34 ft x 14 ft x 12 ft.
- **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.

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