

## FIBER & POLYMER SCIENCE CAPABILITIES

The Nonwovens Institute at North Carolina State University offers deep expertise in fiber and polymer science to support your project goals.



"In-house compounding capability means NWI can run various compounds and spin fiber within a single week, while also providing full process transparency."

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Experts working in The Nonwovens Institute's Fiber & Polymer Science Lab specialize in the characterization of various polymers, biopolymers and additives for melt-spinning pilot research. This lab is ideal for engaging in proof-of-concept with a minimum of input material required. Available technologies include **Instron® rheology** equipment (MVR and capillary rheometer), a **Hills homo-component multifilament research line**, **Biax 15" meltblowing labline**, fiber forming **Brabender® extrusion line** (meltblowing), a **Hills LBS-300 bi-component line** (multifilament, monofilament, spunbond aspirator and meltblowing), and a **Leistritz ZSE-18HPe twin-screw compounding extruder**. The newly added compounder is capable of feeding, compounding, devolatilizing, and pelletizing polyolefins (PP, PE), polyesters (PET, PBT, PTT, r-PET), polyamides (PA6, PA6.6, etc.), elastomers and biodegradable PLA, PBS, PHA polymeric compounds/masterbatches. In-house compounding capability means NWI can run various compounds and spin fiber within a single week, while also providing full process transparency.

### Lab capabilities include:

- Melt rheology
- Filament spinning
- Meltblowing
- Dual-beam meltblowing with particle dispersing
- Mini-spunbond
- Measuring fiber size and checking filament cross section
- Quick denier measurements
- Testing moisture content in ppm

### Polymer expertise includes:

- A full lifecycle view of polymers from structure to properties to processing to application
- Polymer characterization
- Polymer thermal analysis
- Polymer chemical analysis
- Polymer compounding and blending

# Fiber & Polymer Science Lab - Equipment Specifications

## MELTBLOWING

### Biax 15" Labline

- Fiber extrusion up to 315 C
- Air temp up to 300 C
- Up to 4 kg/hr PET
- .009" x 4 row capillary die
- .020" x 2 row capillary die
- Horizontal design
- Mobile collector drum vacuum motor
- Dual-beam with particle dispersing

### Brabender® Meltblowing

- Fiber extrusion up to 350 C
- Air temp up to 300 C
- Up to 4 kg/hr PET
- 5" Biax meltblowing dies
- Mobile collector drum vacuum motor
- Dual-beam with particle dispersing

## COMPOUNDING

### Leistritz ZSE-18HPE Twin-Screw Extruder

- Screw diameter: 17.8 mm
- Flight depth without tolerance: 3 mm
- OD/ID: 1.5
- Length-to-diameter ratio (L/D): 40:1
- Max screw speed: 1,200 RPM
- Motor power: 10 kW
- Max torque: 71 Nm
- Max temperature: 350 C
- Feed system: 3-component K-Tron gravimetric
- Side stuffer: Self-wiping twin screw solids metering
- Strand pelletizing group: cooling belt and pelletizer



Scan this QR code to ask questions and receive feedback from NWI's fiber and polymer science experts.

## MELT RHEOLOGY

### Instron® Ceast MVR

- Measures g/10 min
- ASTM D-1238 A/B/C; ISO 1133
- 50 C-450 C range
- 2.16 Kg & 5 Kg weights
- 2.095 mm ID x 8 mm die
- 1.045 mm ID x 4 mm die

### Instron® Ceast SmartRheo Capillary Rheometer

- Measures shear vs viscosity
- 2 load cells capacity: 20 kN
- 50 C-450 C range
- 200-10,000/s
- 30:1, 20:1, 5:1 dies

## FILAMENT SPINNING

### Hills Multifilament Research Line

- Extruder diameter: 1"
- Extruder 30:1 L/D
- Fiber extrusion up to 320 C
- Up to 4 kg/hr PET
- Round, hollow and trilobal cross-sections
- Screw includes Maddox mixing
- Direct connection of extruder to spin head
- Variable quench air flow rate, chilled
- Heated godets with separator rolls

### Hills LBS 300

- Bi-component line
- Extruders diameter: 3/4"
- Extruders 30:1 L/D
- Fiber extrusion up to 310 C
- Up to 3 kg/hr PET per extruder
- 2" spunbond aspirator and collector drum
- 4" meltblowing die and collector drum
- Monofilament and multifilament
- Plates for homo, side-by-side, sheath/core, 16 segment pie and 36 islands-in-the-sea