



## **PILOT PROCESSING FOR DEVELOPMENT AND SCALE UP**



### **BIAXIAL STRETCHER**

- Laboratory stretching machine for monoaxial & biaxial film orientation
- Test films and sheets in a very simple manner
- Sequential and simultaneous stretching modes
- Fully automated for complex deformations
- Force data recorded



### **HYBRID SOLUTION CASTING LINE**

- Hybrid solution casting / electrospinning system is a continuous roll to roll process that can produce from 3" to 25" wide films for pilot scale up / commercialization initiatives
- Drying or curing through evaporation, thermal, and / or UV curing
- Can produce transparent conductive films by embedding conductive nanowires using up to 36 spin sets in the cast solution/monomers
- Custom built film processing line



### **CAST FILM COEXTRUSION LINE WITH MDO**

- Single layer extrusion cast film or up to three different co-extruded polymers
- Machine direction orientation with stretching and annealing zones
- Has a let off for laminating an additional layer of film or textile
- Two extruders and feed block for multilayer coextrusions plus a third sidearm extruder for skin layers
- 12" die extrusion ready for pilot scale operation and scale up/commercialization
- Online metrology for uniformity of extruded films
- Custom built film processing line



### **BIO-HYBRID CASTING / COATING LINE**

- Hybrid casting / electrospinning / dip coating roll to roll system that can produce nanofiber embedded substrates and gels including transparent conductive films by embedding conductive nanowires using up to 9 spin sets in the cast solution / monomers and solidifies through evaporation and / or thermal / UV curing
- Capable of making nanofiber nano-mats with up to 9 different compositions and subsequently "wet" processing using up to 6 dipping tanks that are particularly useful for biofunctionalization
- Custom built film processing line





### ELECTROMAGNETIC PROCESSING LINE (EMP)

- Field assisted alignment of nanoparticles and suspendable materials
- Novel film formation process where through thickness "Z-direction" properties of films / membranes are substantially enhanced through preferential orientation of functional nanoparticles and polymer phases using external electric, magnetic and thermal gradient fields
- Mercury and lead UV for on demand cure after alignment
- Thermal annealing capabilities post processing
- Custom built film processing line



### INJECTION MOLDING MACHINES

- 170 Ton Van Dorn
- 110 Ton Milacron Roboshot S2000i110B electric
  - Film insert capability
  - Valve gate hot runner pin controlling system
- 80 Ton Van Dorn
- 28 Ton Van Dorn 28-80



### UV / IR CURING LINE

- Processing of UV curable coatings
  - Water based UV, High Solids Liquid Based UV, UV Powders
- Dual cure UV + IR coatings
- Thermal processing of coatings – IR (IR Pre-Heat, Flow out powder)
- IR Temperature Range up to 750C
- UV Lamp options
  - Mercury – Clearer coatings: 200 – 320 nm
  - Gallium – Pigmented coatings: 400 – 450 nm
- Line speed up to 600 mm/min
- Max sample size 150mm x 150mm x 150 mm



### ADDITIONAL PROCESSING EQUIPMENT

- Nanoimprint Lithography
  - Nanopattern replication of surfaces down to 10 nm for surface functionalization
- Single Screw Extrusion (3/4" Screw, 24 L/D)
- Twin Screw Extrusion (30mm Screw, 28.5 L/D)
- Blown Film Line (3/4" Screw, 24 L/D, 6-8" Max width)
- Brabenders
- Compression Presses (4000 PSI, 20 Ton, 35 Ton)

### CONTACT US

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