

ADVANCED SPUNBOND & HYDROENTANGLING PILOT CAPABILITIES

The Nonwovens Institute at North Carolina State University offers state-of-the-art technology and deep expertise in spunmelt nonwovens.

The Nonwovens Institute has decades of experience in spunmelt nonwovens, which in tandem with its in-house Reicofil spunbond line – soon-to-be upgraded to RF5 with full digitalization capability – provides you the opportunity to customize the web path to your specific application requirements. Thus, NWI's Advanced Spunmelt and Hydroentangling Pilot Facility also utilizes equipment from supporting partners – including Hills bico or mono filament die packs, two unwinds, an **Andritz thermobonding calender**, two **Andritz Perfojet** hydroentanglement units, a kiss roll, a through-air dryer, a high-speed **A.Celli winder and slitter**, and an **Orion slitter/rewinder**. Importantly, this system includes in-line electrostatic charging capability (corona).



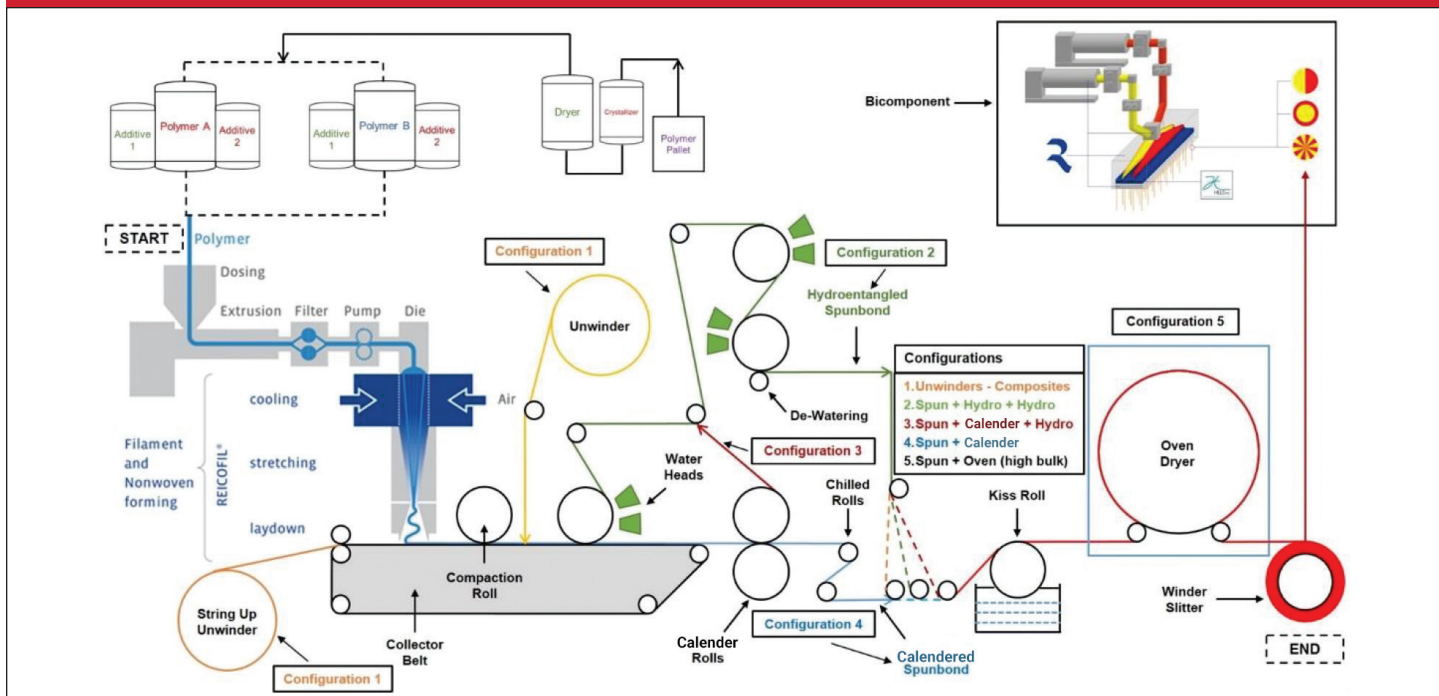
“Fiber options include sheath-core bico, side-by-side bico, or homofilament, as well as more complex cross-sections, such as segmented pie and islands-in-the-sea. Resin options include PP, PE and PET, along with many others, including nylon, elastomers and biopolymers, such as PLA.”

**NC STATE
UNIVERSITY**

Following spunbond web laydown, the line offers several bonding methods via a hydroentanglement unit (one pre-entanglement injector, plus two additional injectors), a thermal calender (includes roll options for 3 bond patterns), two additional hydroentanglement units (each with two injectors), a kiss roll unit, and a through-air dryer. The hydroentangling unit and thermal calender can also be used in combination. Layers can be added either via a front-end unwind or after the web laydown via an unwind

prior to bonding. Finally, the web path concludes with winding and slitting. NWI can run trials in many configurations, such as single-beam spunbond, and with a variety of fiber arrangements. Fiber options include sheath-core bico, side-by-side bico, or homofilament, as well as more complex cross-sections, such as segmented pie and islands-in-the-sea. Resin options include PP, PE and PET, along with many others, including nylon, elastomers and biopolymers, such as PLA.

Spunbond & Hydroentangling Lab - Equipment Specifications



Reicofil 4/Hills Inc. Bicomponent Spunbond Line

Extruders	"A" – 120.0 mm (4.72"), Single Flight – 30 D; "B" – 80.0 mm (3.15"), Single Flight – 30 D
Resins	PP, PE, PLA, PA & PET; Other resins also possible with qualification
Resin Crystallizer & Dryer Units	Max drying capacity of 450 kg/hr
Resin Feeding (2 dosing units)	Unit 1: 3-component dosing, 500 kg/hr output; Unit 2: 3-component dosing, 300 kg/hr output
Filament Spinning Speed	Up to 4500 m/min
Throughput	PP: 270 kg/hr/m (595.25 lbs/hr/m); PET: 400 kg/hr/m (881.85 lbs/hr/m)
Bicomponent Ratios	40/60 to 85/15
Fiber Designs (with Optional Additive add-on)	Homocomponent; Bicomponent - Sheath-Core, Side-by-Side, Islands-in-the-Sea, Segmented-Pie
Spinning & Web Width	1060 mm (41.73 inches)
Number of Bicomponent Holes (holes per meter)	Sheath-Core via 6861, 5510, 3507 or 2687; Side-by-Side via 6861, 5510, or 2687; Islands-in-the-Sea, Segmented-Pie via 3507
Spinnerets Hole Characteristics	Round 0.6mm diameter, L/D-4:1; Round 0.4mm diameter, L/D-4:1; Trilobal
Denier Range	PP - 2.0-6.0 dpf; PET - 1.0-3.0 dpf
Filters	After extruder and in spin pack, wire mesh as required.
Throughput/Hole	0.4 - 1.2 g/hole/min
Made Web Basis Weight Ranges	10 – 200 gsm (Possibly higher depending on bonding); Typical for Calendering – 10-100 gsm; Typical for Hydro entanglement – 50-200 gsm
Belt Speed Ranges	20-400 m/min
Calender Patterns	19.87% bond area diamond/square; 18.1% bond area elliptical; 12.1% bond area, round
Electrostatic Charging (corona)	4 charging bars, up to -50 kV per bar.
Possible Line Configurations	1-Multiple unwinds included to make composites; 2-Spun+Hydro+Hydro (for flexible structure); 3-Spun+Calender+Hydro (soft thermal bonded); 4-Spun+Calender (for thermally bonded web); 5-Spun+Oven (high bulk thermal bonded); 6-Water filtration for pulp/cellulose processing

Andritz Hydroentangling & Through Air Dryer / Bonding System

Width	1100 mm
Manifolds	7 Total on 3 drums (includes pre-wet injector)
Orifice Strips	Please reference Lab Guidelines for details
Filtration	Sand, bag filter, flotation cell
Dryer	Gas-fired Omega up to 260 C
Weight Ranges (Typical)	50-200 gsm
Speed Ranges	20-400 m/min

Scan this QR code to ask questions and receive feedback from NWI's spunmelt and hydroentangling experts.



To learn more about NWI, please email us at nonwovens@ncsu.edu or visit www.TheNonwovensInstitute.com