# PULPING, BLEACHING, REFINING, SCREENING, AND PAPERMAKING CAPABILITIES

## Pilot Scale Testing and Contract Manufacturing

- Complete web manufacturing environment
- Equipment suited to small production operations
- Toll manufacturing opportunities
- Experienced staff
- Close customer-Herty staff interactions on all phases of the work
- Pilot pulping, repulping, refining, screening, papermaking, sizing, calendering
- Knowledgeable in dealing with unique fiber types
- Range and flexibility of pilot equipment
- Experienced supervision
- Fast response to customer needs
- Confidentiality of all customer work
- ISO 9001:2008 certification , pilot plant and lab

## Laboratory Capabilities

- Independent laboratory services
- Support for pilot plant trials
- Highly trained, experienced technicians
- Extensive wet, analytical, surface and microscopic analysis and physical testing of materials
- Physical Testing - TAPPI conditioned test lab and pre-conditioning chamber with a wide range of instruments for characterization for physical, optical, and surface properties
- Analytical Testing: Wet chemical and instrumental methods
- Pulping, bleaching, other chemical modifications
- Wood, pulp and fiber evaluation
- Paper, non-wovens, and related materials; e.g., linerboard and medium evaluation
- Optical properties
- Chemical analysis
- Biofuels laboratory analysis capabilities
  - Size distribution based on chip thickness with Domtar classifier (wt %)
  - Size distribution based on chip length and width with Williams classifier (wt %)
  - Fines content (various size screens, wt %)
  - Specific gravity (bulk density), g/cc
  - Moisture content (wt %)
  - Bark content (wt %)
  - Lignin content (wt %)
  - Carbohydrate content (wt %)
  - Ash content (wt %)
  - Ash elemental analysis – *(ICP)*
  - Heating value (kJ/kg ((BTU/lb)) – (e2k bomb calorimeter)
  - Thermal analyses (TGA/DTA, DSC)

## Specific Equipment

- Chipping, Hammermilling, Wood Drying
  - Pilot hammermill, Meadows, 5tph, choice of screens
  - Pilot belt dryer, Belt-o-matic, 2 tph 2-pass
- Chip Classifier, Chip Thickness Tester (Lab)
- Digesters
  - Lab: Vert., 304SS, 0.022 $m^3$ (0.78 $ft^3$), 827 kPa (120 psi), 174° C (345° F), 2400 g OD chips
  - Lab: Horizon. Rotary: 316 SS, 0.026 $m^3$ (0.91 $ft^3$), 1207 kPa (175 psi), 3000 g OD chips
  - Pilot: Batch, 90 cu. ft., 150 psig, 304 SS, insulated, steam-jacketed, sight glass, externally-heated liquor recirculation; insulated blow line and blow tank
- Hydrapulpers
  - Lab: Adirondack 12 liter (450 g ad), 5-15% C, 316SS, temperature control
  - Lab: Rice Barton 13 liter SS
  - Pilot: Tornado, 7.6 $m^3$ (2000 gal.) batch capacity , 11.4 $m^3$/min (3000 gpm) re-circ. rate
  - Pilot: Hydrapulper, 2.4 m (8 ft), 0.23-0.54 bdmt (500-1200 bd lbs.)
- Bleaching (Oxygen, ozone, chlorine dioxide, hydrogen peroxide)
  - Lab: Quantum Mark V bleaching reactor, 4 liter; Lab bag bleaches (400 g)
- Refiners
  - Lab: calibrated Valley Beater and PFI mill
  - Pilot (several refiner plate options for each one)
    - Sprout 36-2 Hi Consistency, 0.9 m (36"), 224 kW (300 HP), 4-speed 600-1800 rpm, 20-80 tpd, 1.5-100% C
    - Beloit DD 4000 refiner, 0.4 m (16"), 187 kW (250 HP), variable speed, 0.28-0.75 $m^3$/min (75-200 gpm) flow rates, 2-4.5% C
    - Sunds JC-00 Conflo, 0.3 m (12"), 112 kW (150 HP), 1180 rpm, 40-185 gpm, 2-4.5% C
    - Sprout Twin-Flo, 0.3 m (12"), 112 kW (150 HP), 1770 RPM, 0.3-0.45 $m^3$/min (80-120 gpm), 2-4.5% C
- Screening
  - Lab: Large flat screen to screen lab cooks (2); Pulmac Shive analyzer
  - Lab: Somerville screen; Pulmac Master Screen with pulp classifiers
  - Lab: CSF, SRF; HiResolution FQA fiber analyzer
  - Pilot: Ahlstrom F-1 pressurized screen (0.5-4% C, 20-150 tpd)
    - Holes, Profile: 0.1cm, 0.14 cm, 0.20 cm (0.039", 0.055", 0.079"); Smooth: 0.08 cm, 0.12 cm (0.032", 0.047")
    - Slots, Profile: 0.15 mm, 0.20 mm, 0.25 mm, 0.36 mm (0.006", 0.008", 0.010", 0.014"); Rotors: Ahlstrom LR, Ahlstrom VF
  - Pilot: KBC UV-100 skid-mounted pressurized screen, 4-foil rotor, various screen cylinders
- Papermaking
  - Lab: TAPPI standard handsheets; Noble & Wood handsheets (20x20 $cm^2$) (8"X8")
  - Lab: Adirondack Formax sheet mold (30.5X30.5 $cm^2$) (12"X12")
  - Pilot: 0.84 m (33") flat fourdrinier, 1, 2, or 3-ply, zone dilution control headbox, top dewatering capability, dandy roll, 2-nip press, contact dryer section, size press, calender, 4.6–61 m/min (15-200 fpm), 0.2–2.7 mt/d (500-6000 lb/d, 30-980 gsm (20-600 lb/3000 sq. ft.)
  - Pilot: 0.71 m (28") Rotoformer, through-air dryer, 0.05-0.9 mt/d (100-2000 lb/d), 13-650 gsm (8-400 lb/3000 sq. ft.)
  - Pilot: 1.1 m (44") Deltaformer, 3 forming angles, 1, 2, or 3-ply, press, contact dryers, 0.05-2.3 mt/d (100-5000 lb/d), 20-400 gsm (12-245 lb/3000 sq. ft.)
- Calendering
  - Pilot Perkins hot roll 288° C (550° F) soft nip, 350 kN/m (2000 pli), 0.9 m (36") wide, 6.1-61 m/min (20-200 fpm)