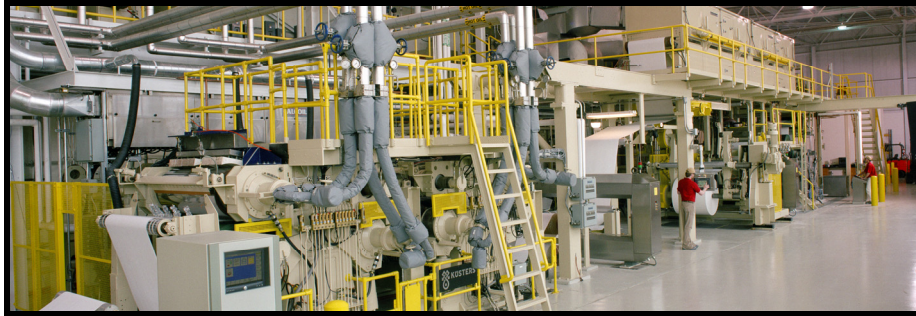




Coating at WMU



Pilot Coater

SDTA – LDTA – MSP – Pond – Airknife – Rod – Blade

The Western pilot coater is a 1-meter wide, 4000 fpm (1220 m/min) coater that includes rod or blade metering of a short dwell or roll applied coating. The coater configurations include metering size press, pond size press, both short dwell and roll applicator C1S, and airknife (roll applied coating at a maximum width at 26 inches (660 mm)). After the coater, two pairs of gas fired IR dryers are followed by two zones of air flotation drying. Also, in the coater line and can be used with or without the coater, is a tandem four nip calender. Its default set-up is two hot-soft nips, one steel-to-steel nip, or both. The calender can also be configured into four hot-soft nips. On-line coat weight and moisture measurement included. More information shown on coater schematic drawing that follows.

The Western pilot plant staff excels not only in running novel basestocks and new chemistries; they also are exceptionally good in adapting or retrofitting the coater to apply new surface treatment application and metering technologies.

Coating Preparation

Full service coating preparation services are available. Starch makedown offered via batch cooking, by continuous steam injection, AP, or enzyme conversion. High and low shear mixing in various batch sizes described in detail on the following pages. Complete wet and dry testing facilities on-site. The coating kitchen is equipped to handle dry and wet materials arriving in bags, drums, or totes.

Converting & Printing

Rewinding and slitting rolls is available on site. Rolls are rewound to make composite rolls of the various trial points or slit down to narrower rolls to fit a variety of converting operations. The 1 meter width of the coater produces rolls that will fit many commercial presses. Rotogravure and flexographic printing presses are available on site. WMU can also arrange local resources for sheeting or corrugating. The corrugator can take surface treated liner and/or medium off the WMU coater and produce a box. A finished corrugated box is ideal for further testing or providing sample products for your customers.

Documentation

A concise multipage report is provided for each trial. The report contains trends of real-time process data recorded off the machine automatically, coating formulations, machine set points, basestock rolls used, all test results, and operational notes for each trial point.

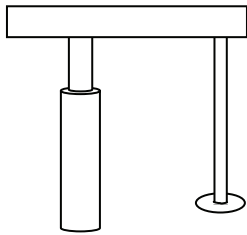


Coating Preparation at WMU

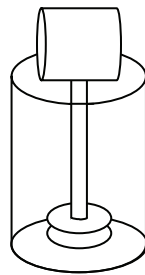
- Shipping & Receiving** Receive liquids in totes, drums or pails. Dry materials in bags. Both forklift and clamp trucks are available. Shipping by client-preferred vendor or through pilot plant.
- Tanks & Containers** Eight tanks, see descriptions that follow. All have convex bottoms that empty from the bottom center. Smaller portable containers are available.
- Pumps** Multiple drum pumps, diaphragm pumps (one portable), and progressive cavity pumps. Pumps and tanks connections via quick disconnect flexible hosing.
- Mixers** Table below summarizes selection, details follow on next page
- Measure** Dry Mass weighed and added into tanks
 Wet Water metered into tanks using flow meter. All other liquid materials are mass weighed.
- Leftovers** Client choice: return to sender, donate to pilot plant, or disposal (may incur a handling fee, consult plant).
- Storage** Long-term storage of rolls or materials, before or after a trial, is dependent upon space availability and requires prior approval.

Mixer / Tank	Volumetric Capacity gallon (liter)		Variable Speed	Vacuum Exhaust	Steam	Insulated	Temp. Controlled		Impeller
	Minimum	Maximum					Metered Water	Heated Jacket	
Blend - Supply	42 (190)	250 (950)	X	X	X	X	X	X	4-lobe axial flow
Blend - Supply	42 (190)	250 (950)	X	X	X	X	X	X	4-lobe axial flow
Starch Slurry		280 (1273)	X	X		X	X		Two 3-lobe axial flow
Starch Paste		200 (910)	X			X	X		3-lobe axial flow
Starch Enzyme		200 (910)	X			X	X		4-lobe axial flow
Blend / Cook	20 (75)	90 (340)	X	X	X	X	X	X	4-lobe axial flow
Blend / Disperse	75 (280)	450 (1700)	X	X		X	X		Two shafts with 2 stacked open rotor (radial flow) each, high shear or low shear
Blend / Disperse	20 (75)	90 (340)	X	X		X	X		2 stacked open rotor (radial flow), high shear or low shear
Blend / Disperse	25 (95)	50 (190)	X				X		1-open rotor (radial flow) high shear or low shear, floor mount unit for drum dispersion

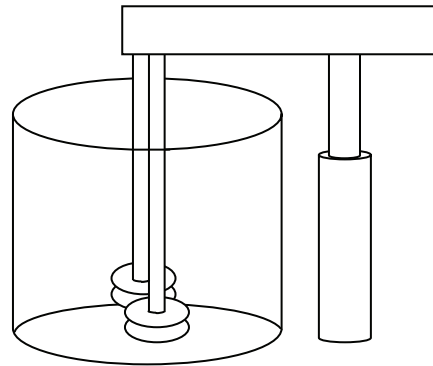
High Shear Dispersion – radial flow impellers



- 25-50 gal (95-190 liters)
- Floor mounted
- Height of blades adjustable
- One open rotor blades
- Portable drums, tanks and totes used to facilitate dispersion of small volumes

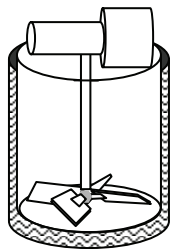


- 20-90 gal (75-340 liters)
- Vacuum dust exhaust
- Metered water
- Two open rotor blades

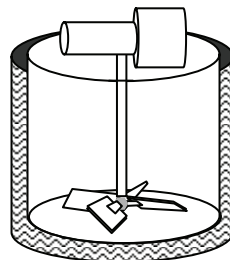


- 75-450 gal (280-1700 liters)
- Height of blades adjustable
- Vacuum dust exhaust
- Metered water
- Two sets of 2-open rotor blades

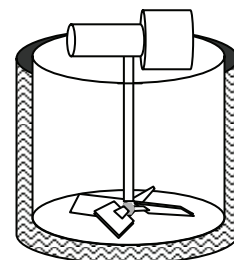
Blending – axial flow impellers



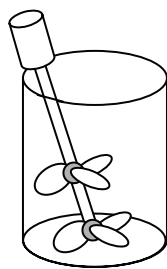
- 20-100 gal (90-375 liters)
- Vacuum dust exhaust
- Live steam - batch makedown
- Metered water
- Water jacket, temperature controlled
- 4-lobe impeller



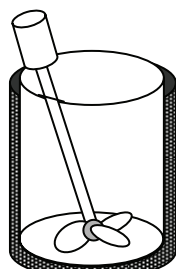
- (2) 42-250 gal (190-950 liters) tanks
- Coater supply tanks, each feeds either side or both
- Vacuum dust exhaust
- Metered water
- Water jacket or live steam temperature controlled
- 4-lobe impeller
- Progressive cavity pump outlet – feeds to filters, then coater, returns via progressive cavity pump, each with variable speed control



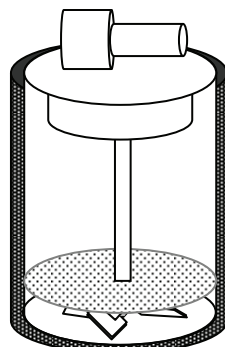
Cooking – Starch continuous batch makedown – steam or enzyme



Starch Slurry



Starch Paste (Converted)



Enzyme Tank

- Produces a continuous 4 gpm (15 lpm) flow of converted starch in 200 gallon (910 liter) batches at 30% solids
- Axial flow impellers
- Metered water into all three tanks – ambient to 150°F (65°C)
- Enzyme and paste tanks have insulated jackets
- Slurry tank includes a dust vacuum exhaust
- First blend tank, mentioned above, can also be used for batch cooking of starch, protein, PVOH ...