Lime Mud Filter (LMF) Optimization

TAPPI 2023

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Presentation Agenda – What Affects LMF Solids?

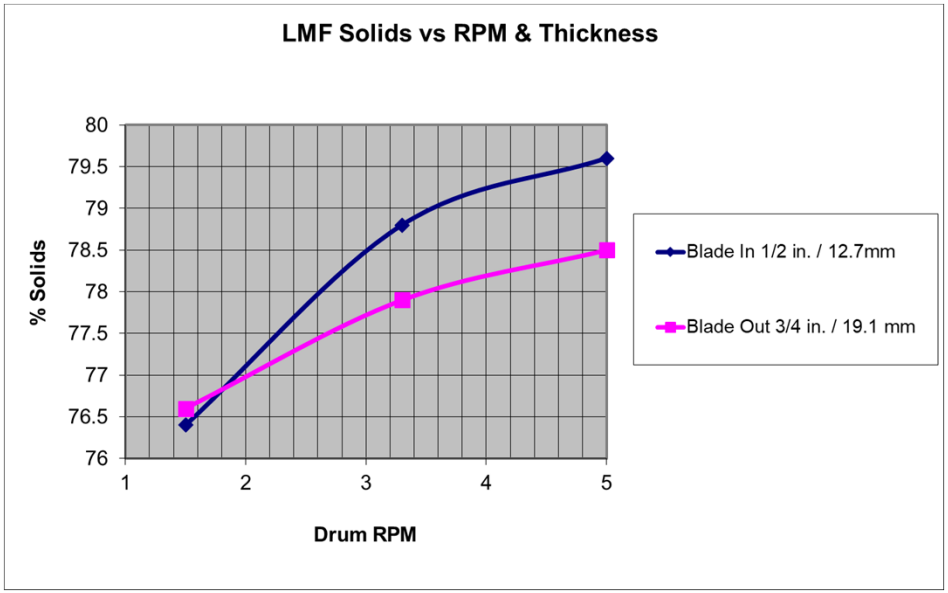
- 5 Things Dictate LMF Discharge Solids & Washing Efficiency
  - 4 – Process Parameters
  - 1 – Mechanical Configuration

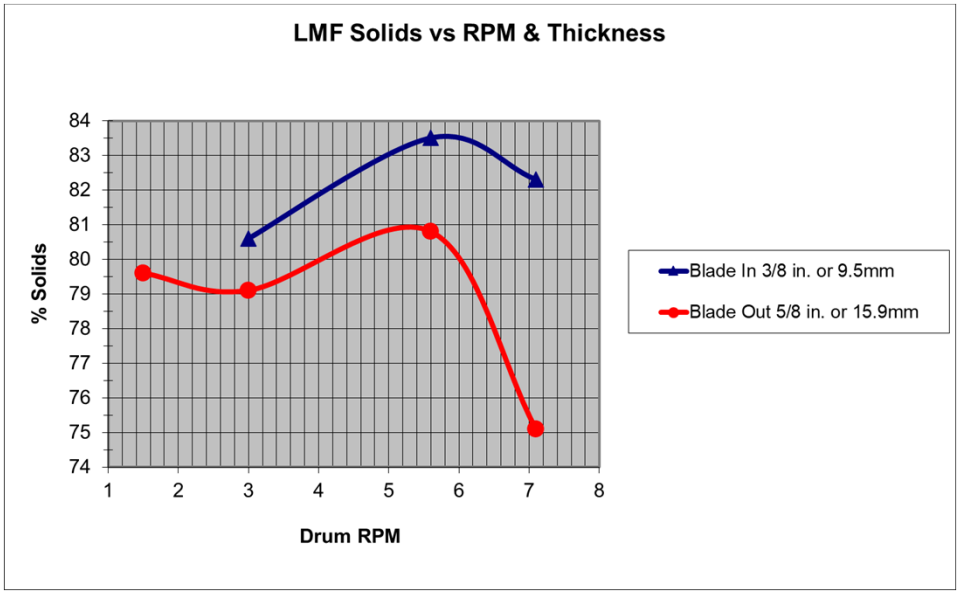
1. Overall Cake Thickness
2. Feed Slurry Density and Temperature
3. Shower Bar Configuration – Temperature & Location of Bars
4. Permeability of Lime Mud Precoat – Particle Size & Reprecoater Operation
5. Vacuum and Distribution Under Grids
    1. Internal Drum Piping Configuration & Grid Design

Ideal Appearance of Lime Mud Filter Discharge Solids & Cake Renewal

1 of 4 Four Drum Filter Process Parameters – Cake Thickness

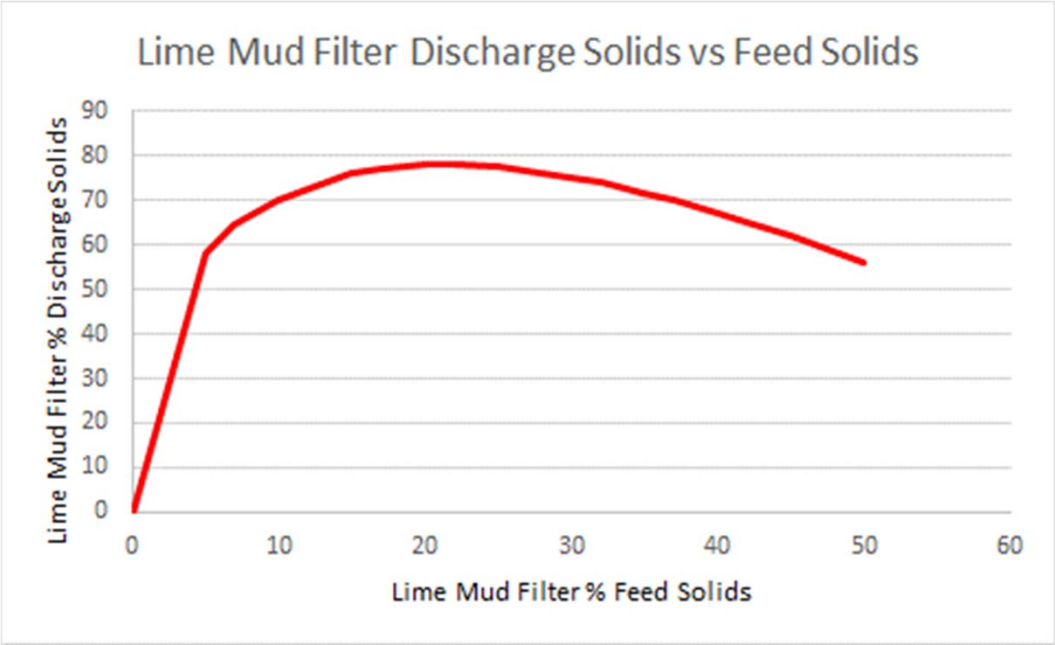
- Overall Cake Thickness
  - Scraper Setting – 3/8” from High Point is Best in Class
    - Drum RPM – 3-4 Revolutions per Minute
    - Drum Loading < 0.75 lb Lime Mud per Square Foot of Drum Area
    - Drum Roundness – Total Indicated Runout (TIR) as Manufacture < 3/16 inch

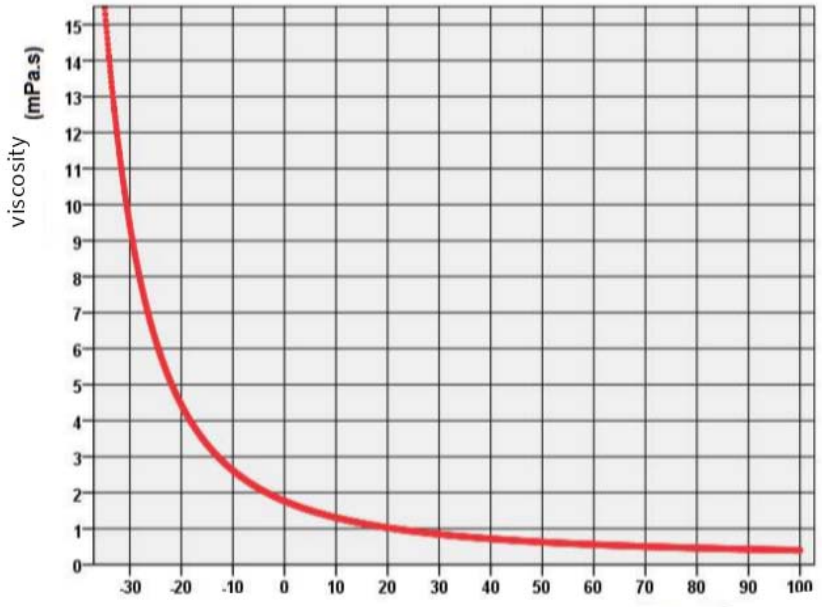




2 of 4 Drum Process Parameters – Density/Temperature

- Feed Slurry Density and Temperature
  - Density ~ 25% Solids
  - Temperature 140°F to 160°F (60°C to 71°C)



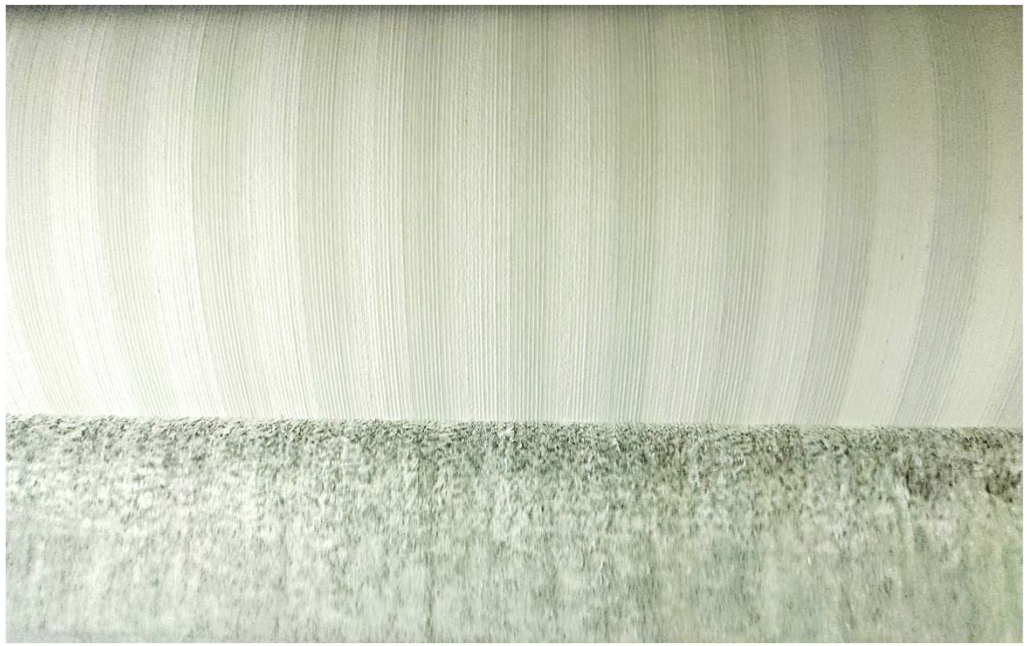


LMF Feed Slurry % Solids & Impact
40% Solids Feed & 25% Solids Feed

Blow-Off Lime Mud Filter – No Precoat
Issues: Low Solids 50-58%
Benefit: No Precoat to Blind

3 of 4 Drum Process Parameters – Cake Wash Spray Bars

Location (Internal Piping) & Temperature 160°F to 190°F (71°C to 88°C)



4 of 4 Drum Process Parameters – Particle Size Can Be Measured Via Settling Test

0m/1000ml

6.7m/910ml

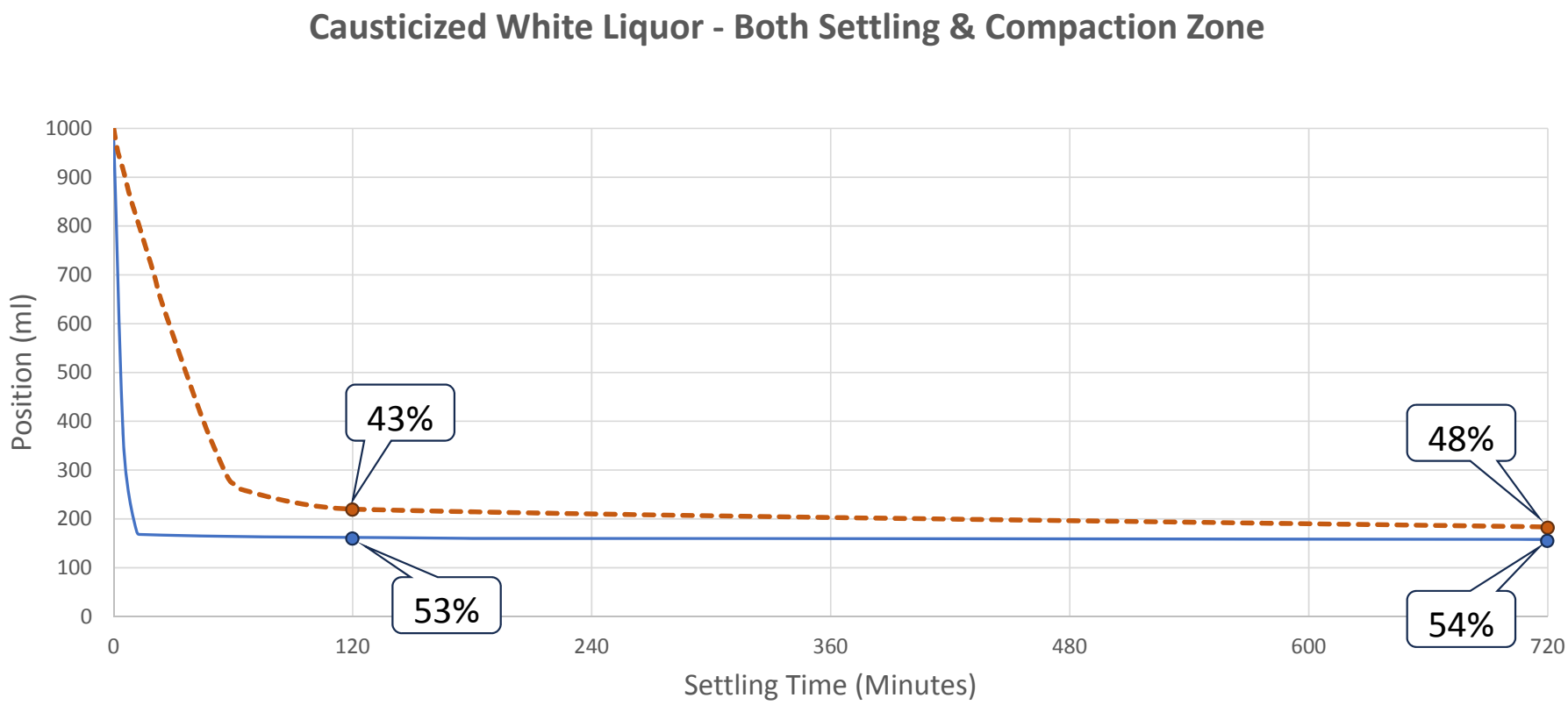
38.7m/490ml

60m/280ml

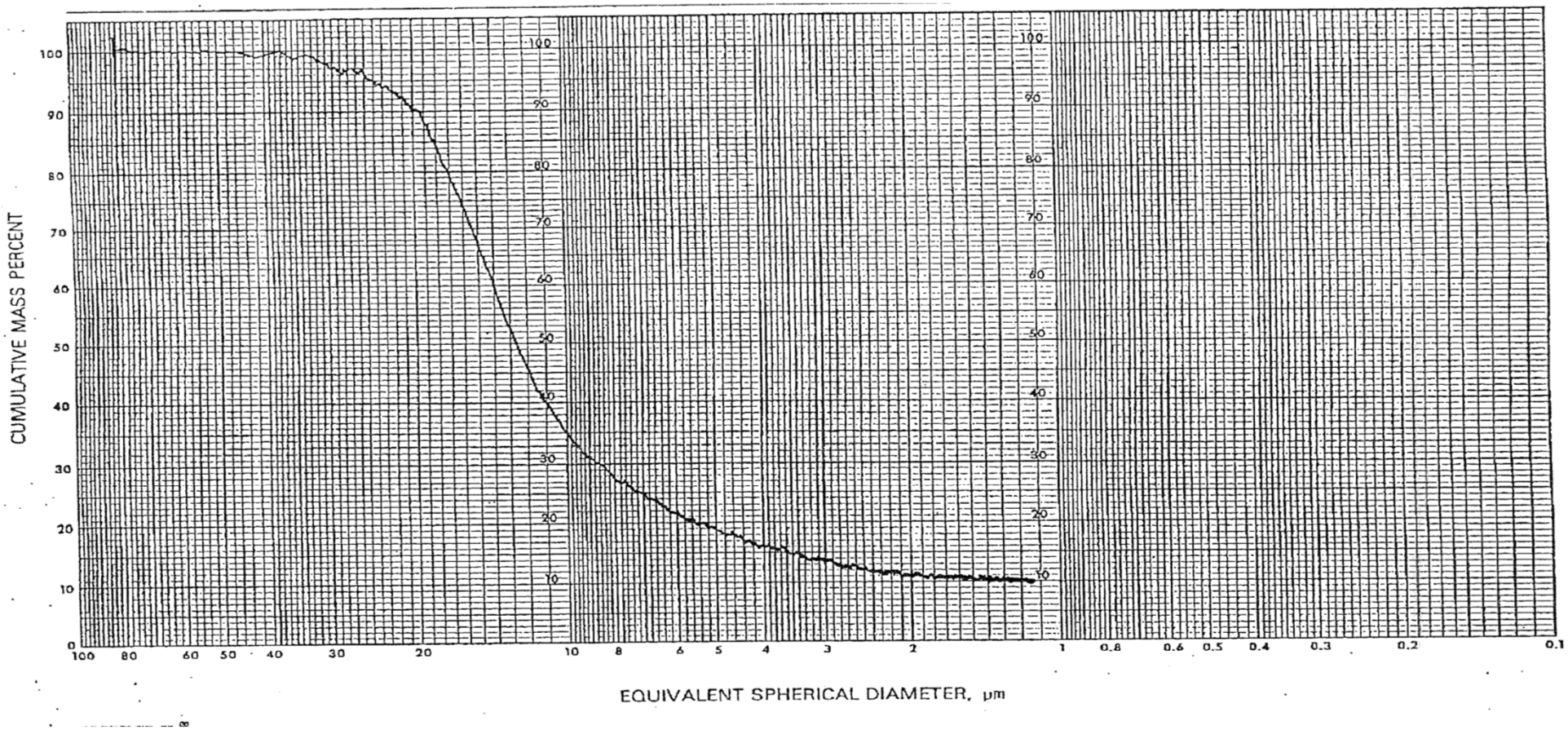
66m/260ml

180m/180ml

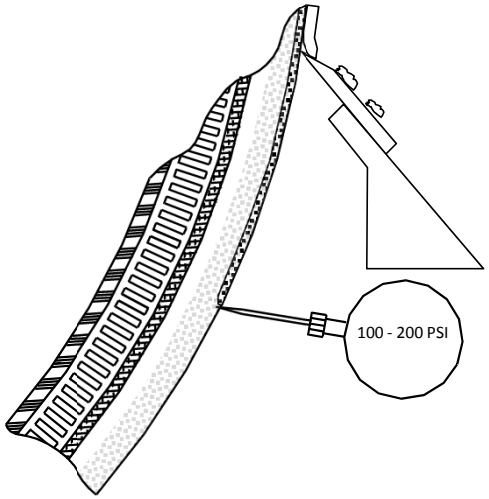
Particle Size Distribution – Measured by Settling Test

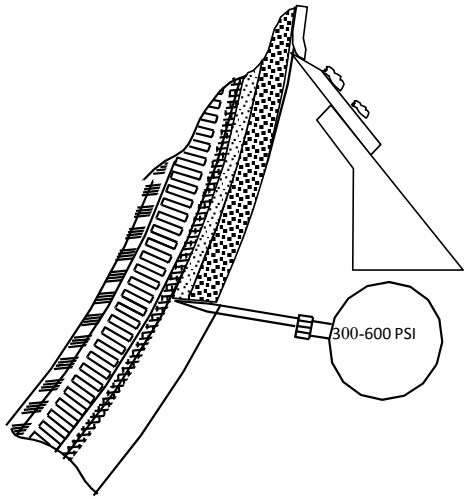


Particle Size Distribution – Process & Mechanical Small – Over-liming, Over-Agitation, Temperature, ETC



Three (3) – Levels of Precoat Blinding
1) Outer Precoat, 2) Inner Precoat, & 3) Face Wire

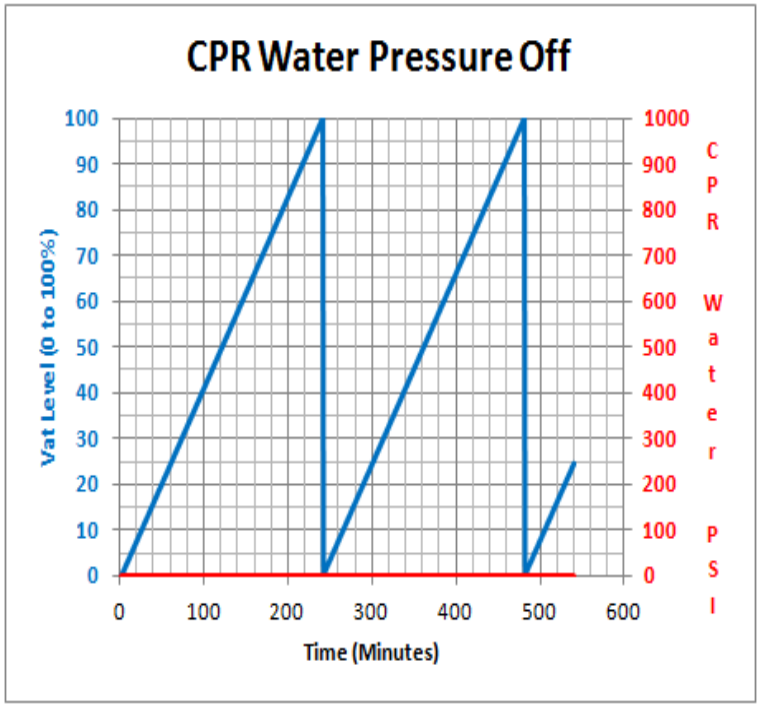


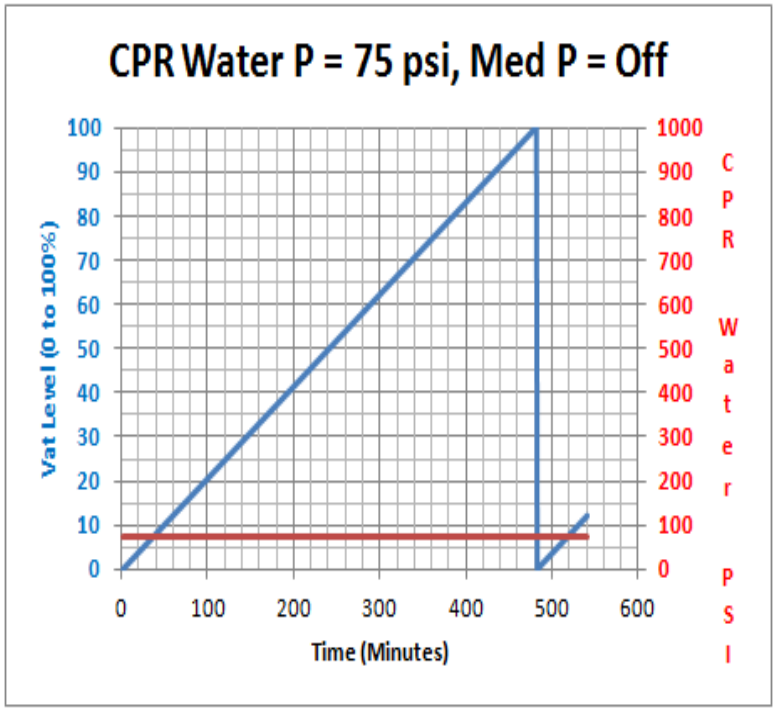


- Outer Precoat – Nozzle Penetrate 1/8 – ¼” = 50 to 300 psi
- Inner Precoat – Nozzle Penetrate to Face wire = ½ - ¾” = 300 to 1000 psi
- Face Wire – Nozzle Penetrate to Face Wire w/Force = 700 to 1000 psi

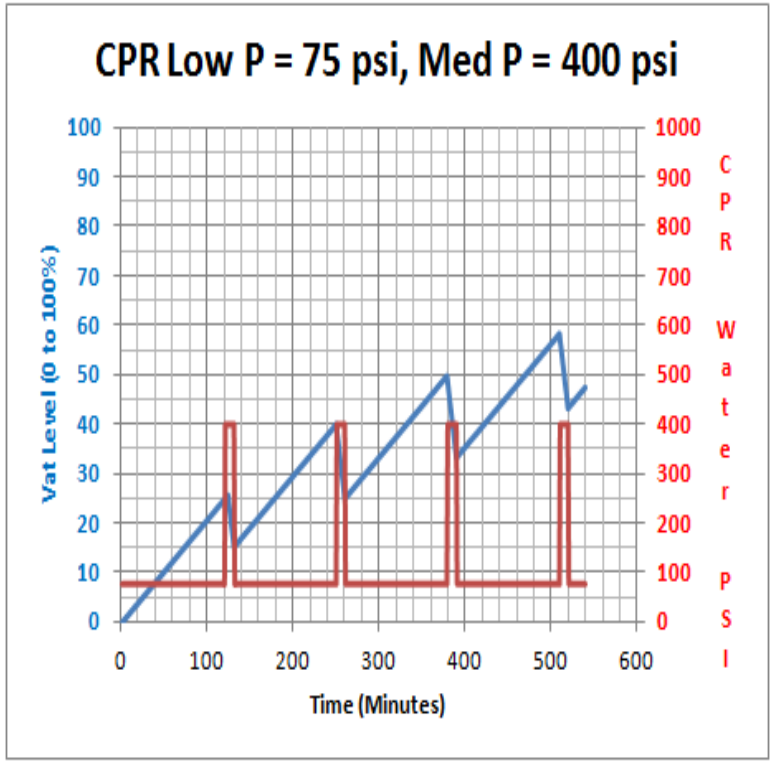
Reprecoater Optimization

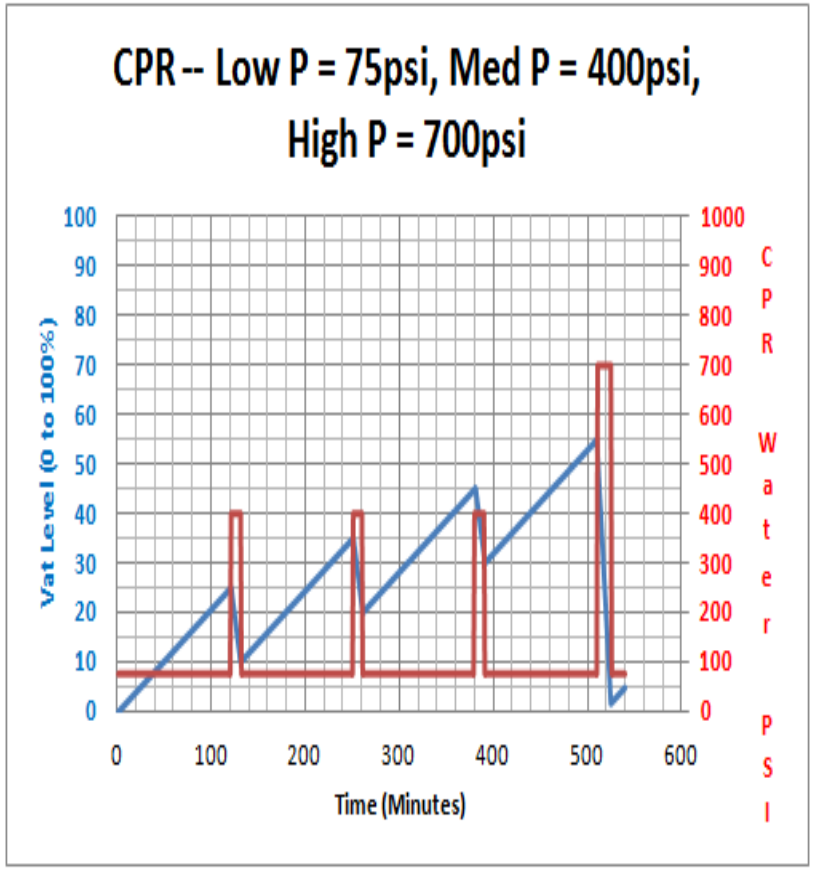
1. Use MINIMUM water pressure to maintain precoat permeability
   1. Vat level is the primary indicator
   2. Excessive water pressure: 1) Wears the face wire out, and 2) Lowers Solids



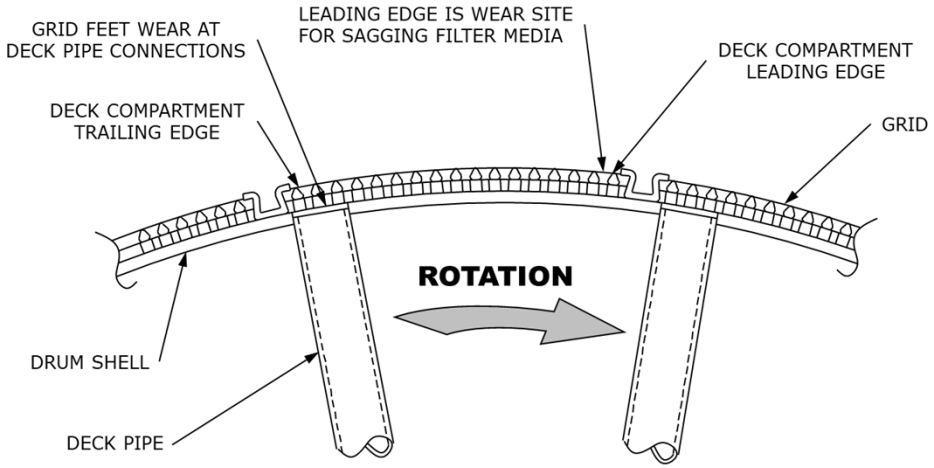


Base Pressure Increase = Slower Vat Level Increase
Medium Pressure Increase = Lowers Base Vat Level

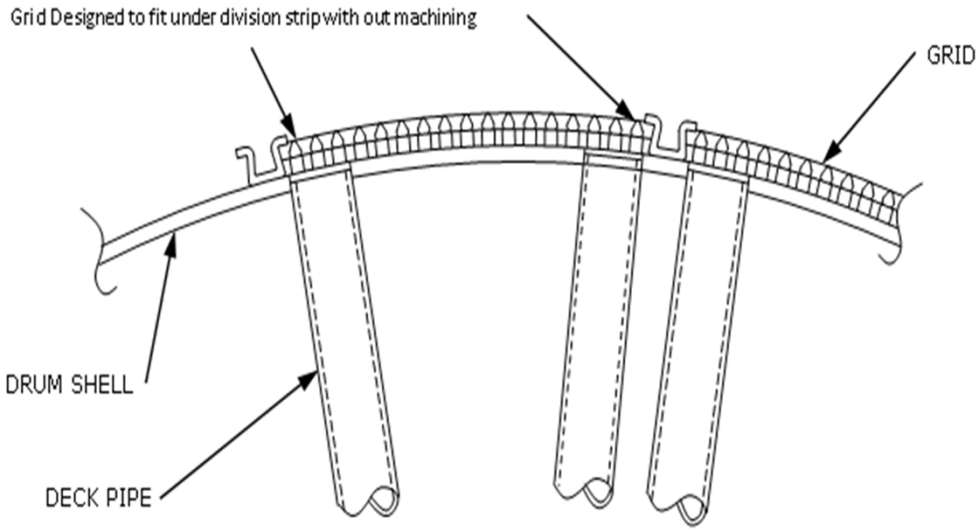




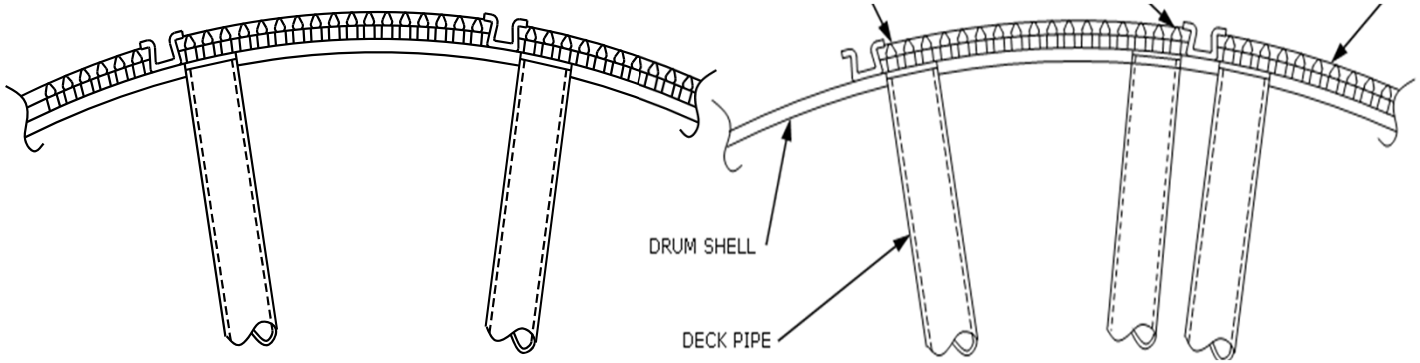
1 of 1 Mechanical Design Parameters
Vacuum Distribution Under Grids
Ideal = Pressure Same Everywhere in Section

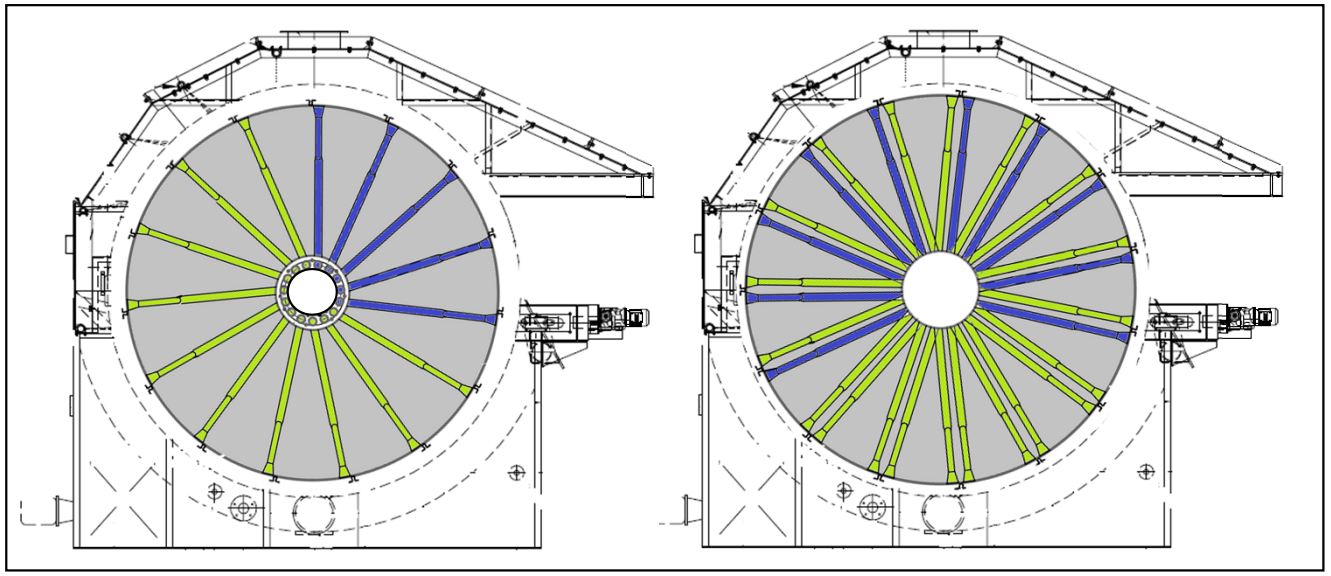


TYPICAL DRUM SECTION



Leading and Trailing Pipes – Dictates Solids & Washing Efficiency

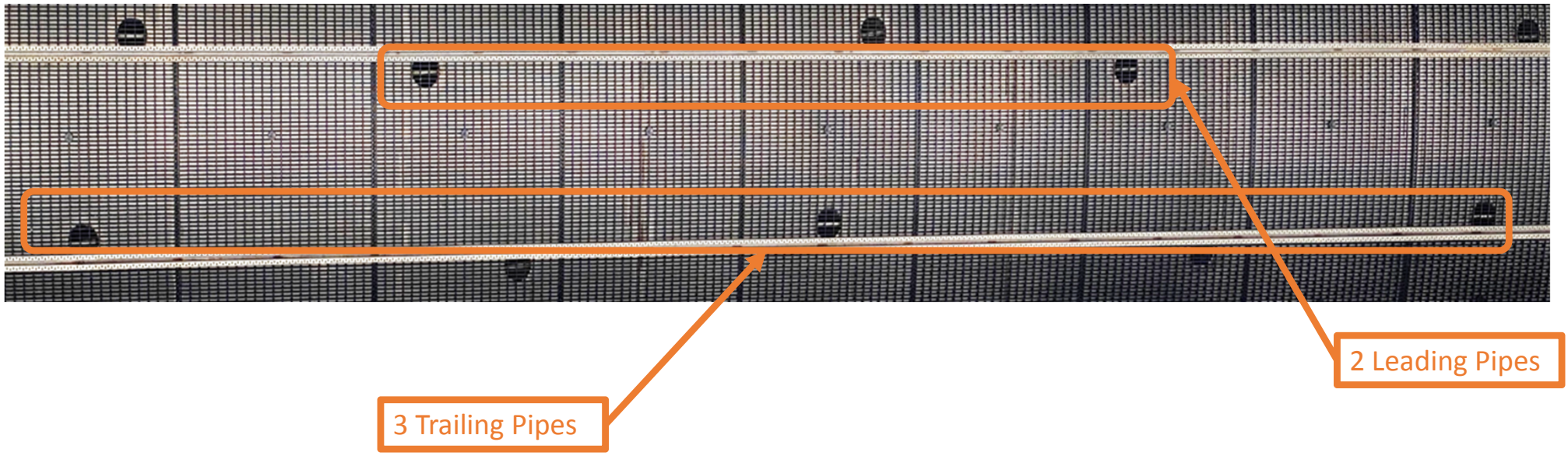




Drum – View is Rising Side

- 2 Leading Pipes
- 2 Trailing Pipes

Vacuum Distribution = Many Inlets & Tall Grids
3 Trailing and 2 Leading Pipes

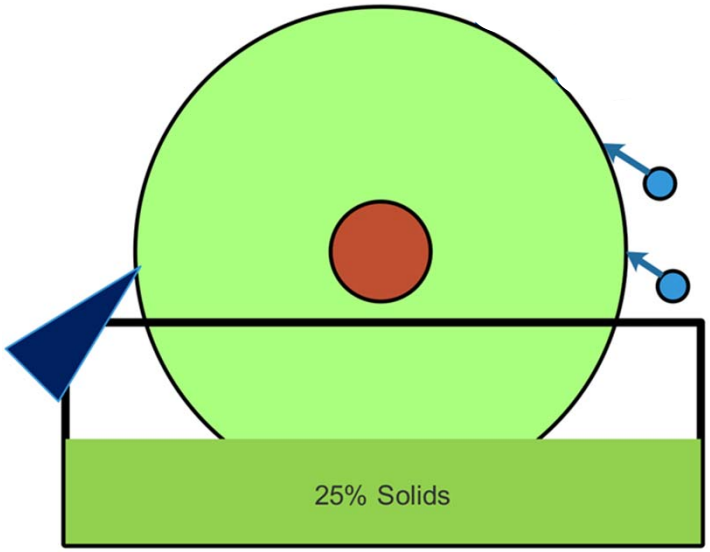


Poor Vacuum Distribution – Few Inlets & Short Grid Legs

Leading & Trailing Pipes – Shower Bars 9 to 12 O-Clock
No Leading Pipe Inlets = Shower Bars Can ONLY Be Low

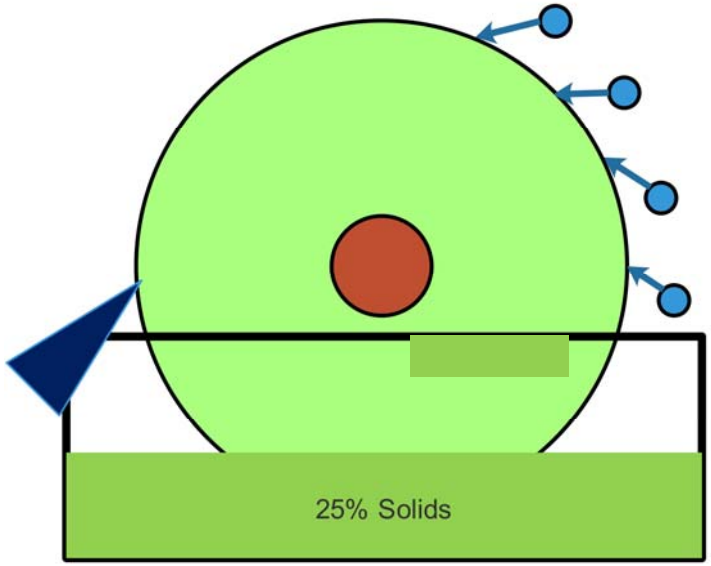
Internal Drum Piping Trailing Only

Shower Bars Must Be Low on Drum



Internal Drum Piping Leading+Trailing

Shower Bars Can Go to 12 O'Clock



Presentation End

Questions?