Slow Rotational Sludge Dewatering

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Presented by:

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The Quality Company - Worldwide

Conventional Dewatering Technologies

- Belt Filter Press (BFP)
- Rotary Disc Press (RDP)
- Inclined Screw Press (ISP)
- Centrifuge

Market Trends

- Operator Maintenance Considerations
  - Slow Rotational Equipment
  - Low Energy Requirements
  - Lower Polymer Usage
- Modular Design
  - Redundancy
- Design Consideration
  - Extended Operating Hours

Technology Comparisons

1 = Best 4 = Worst

	RDP	ISP	BFP	Centrifuge
Capital Cost	4	2	1	3
Annual O&M Costs	2	1	3	4
Life-Cycle Costs	2	1	3	4

Primary and Mixed Sludge

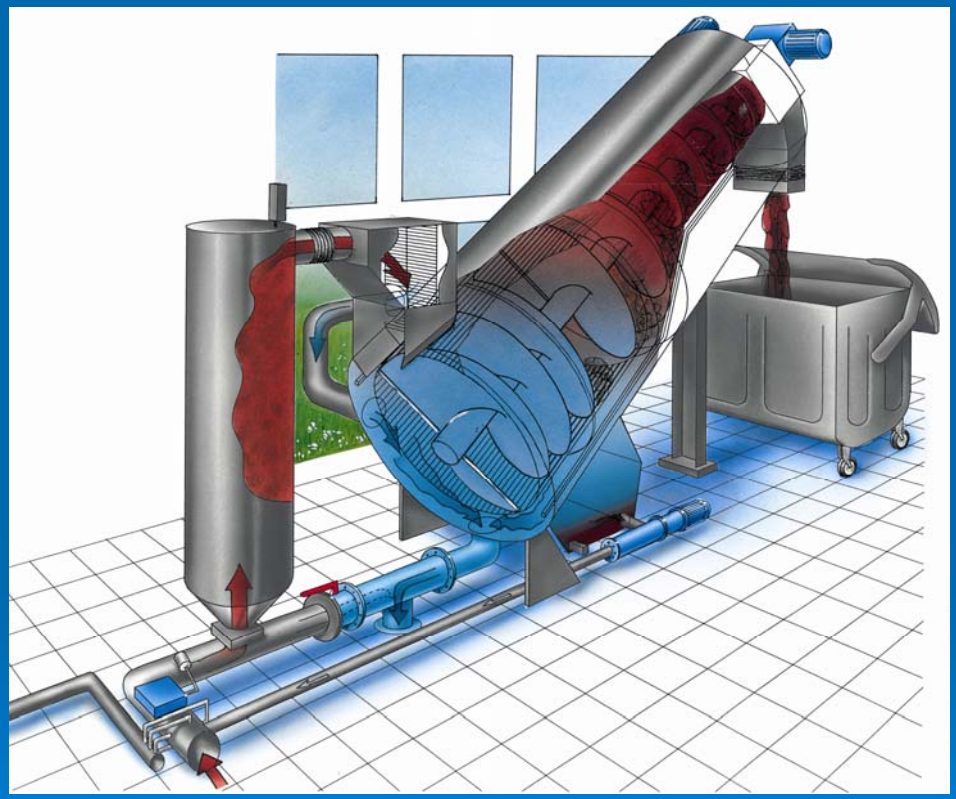
HUBER TECHNOLOGY

Inclined Screw Press

Inclined Screw Press Description

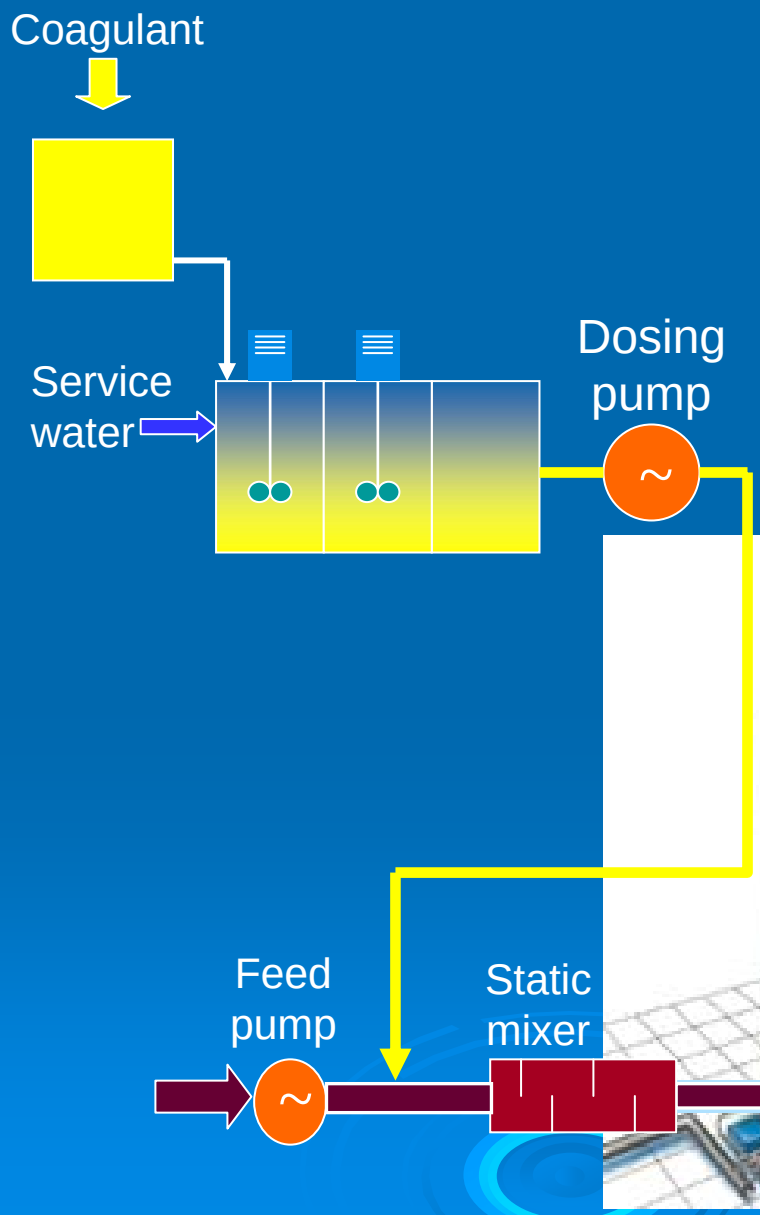
HUBER TECHNOLOGY

Archimedes Screw Concept rotating inside a wedge wire drum

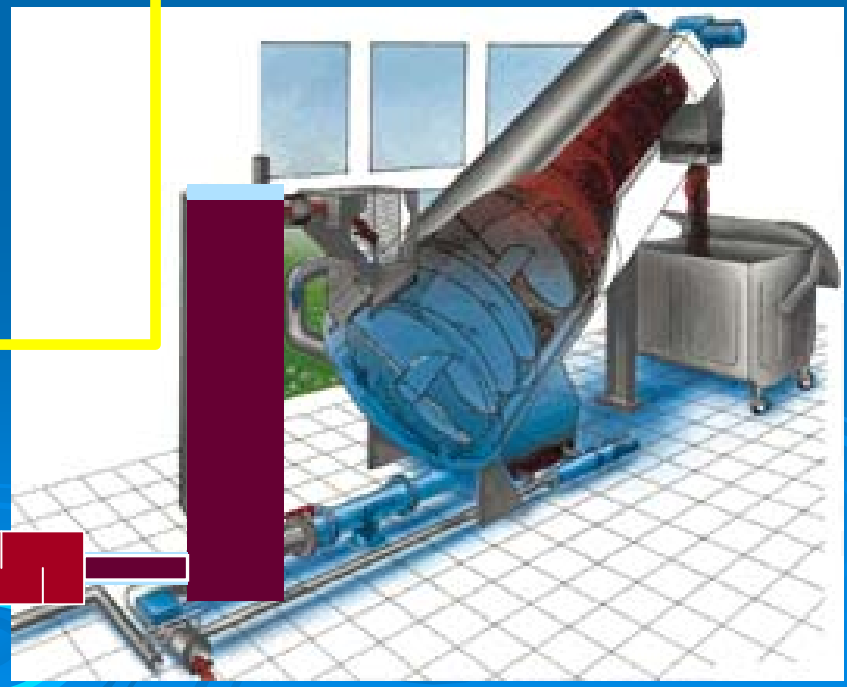


- Wedge Wire – 0.2 mm
- Screw Speed – 3-5 RPM
- Motor – 2 HP
- Totally enclosed for odor free operation
- Self cleaning
- Sludge Feed Pump – Progressive Cavity
- Variable Back Pressure Cone (Manual)

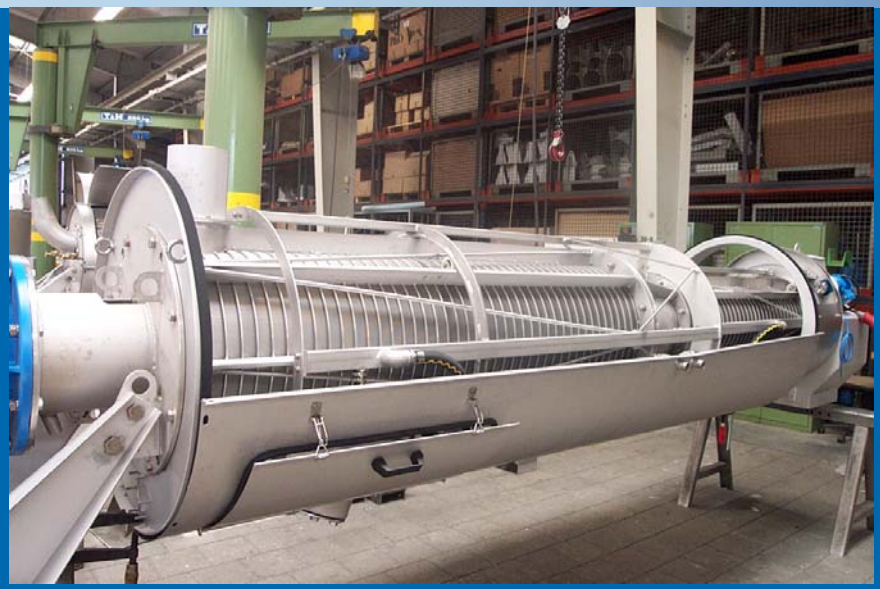
Inclined Screw Press Process Scematic



Inclined Screw Press

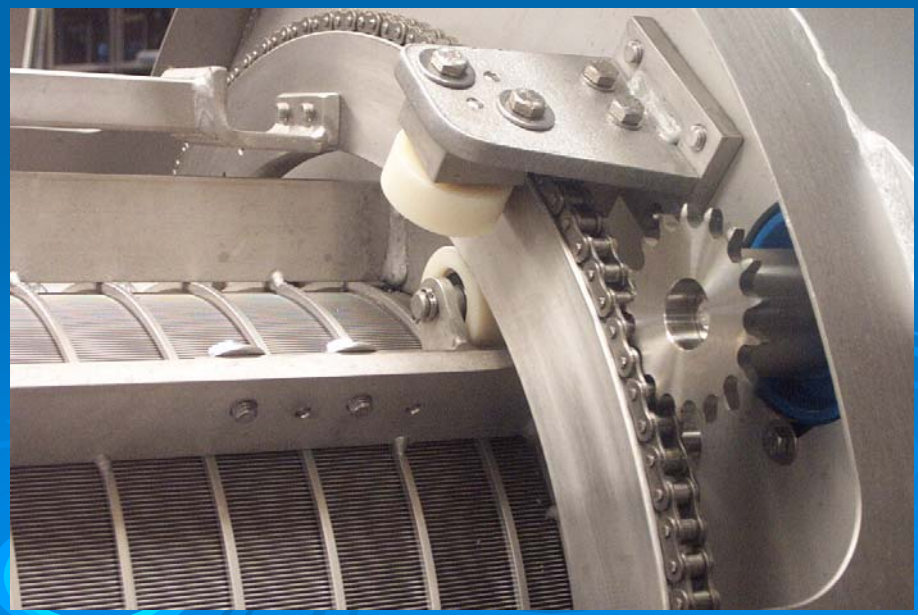


Inclined Screw Press



- Screw Press with skin removed showing the wedge wire baskets

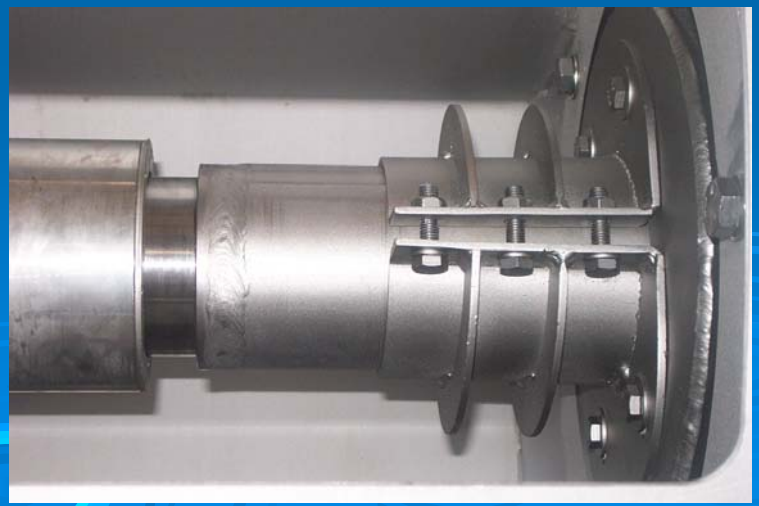
- Spray bar mechanism



Inclined Screw Press

- Upper and lower wedge wire baskets

- Pressure cone used for creating plug of sludge for increased dewatering performance



Inclined Screw Press

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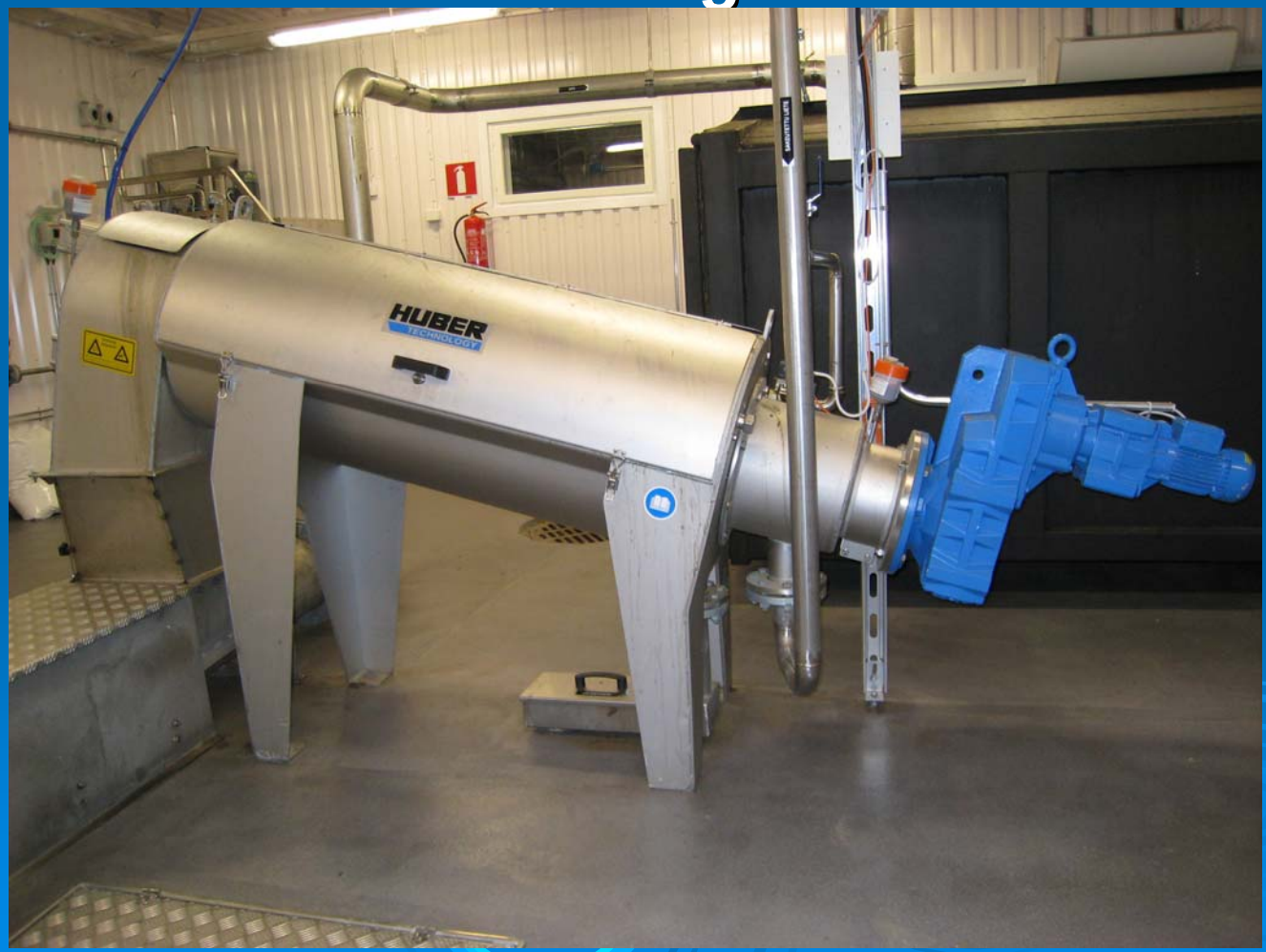
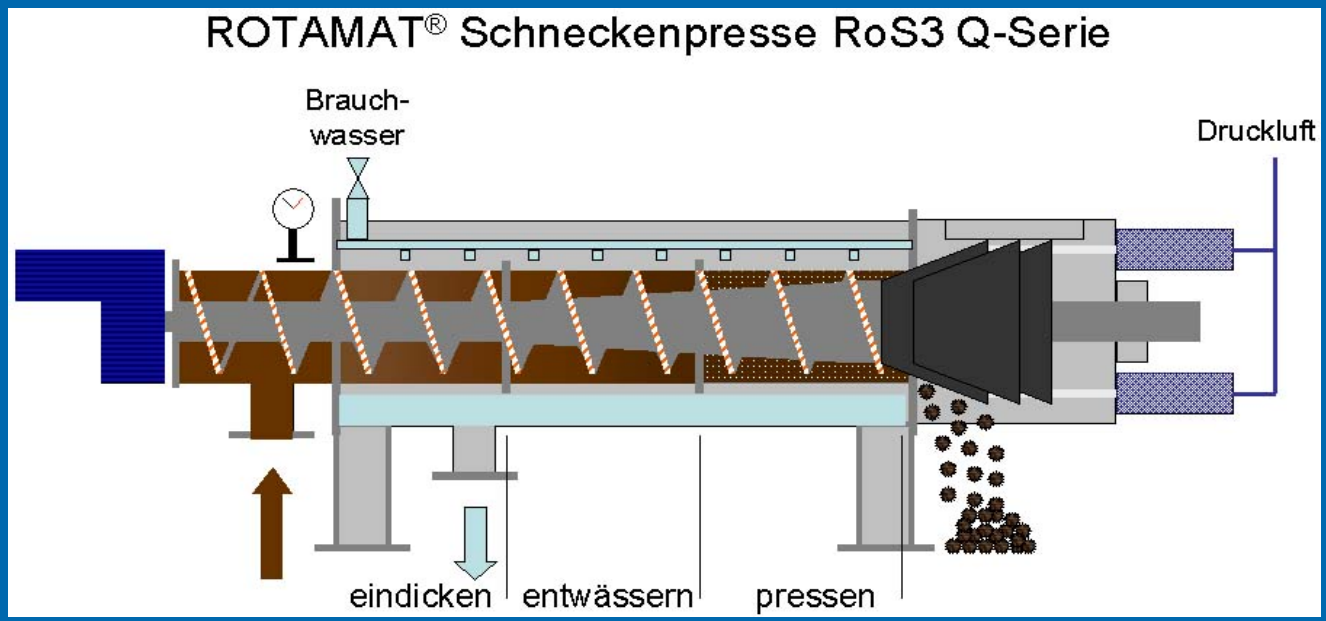
Developed Strictly for Waste Activated Sludge



Inclined Screw Press for Thin Sludge

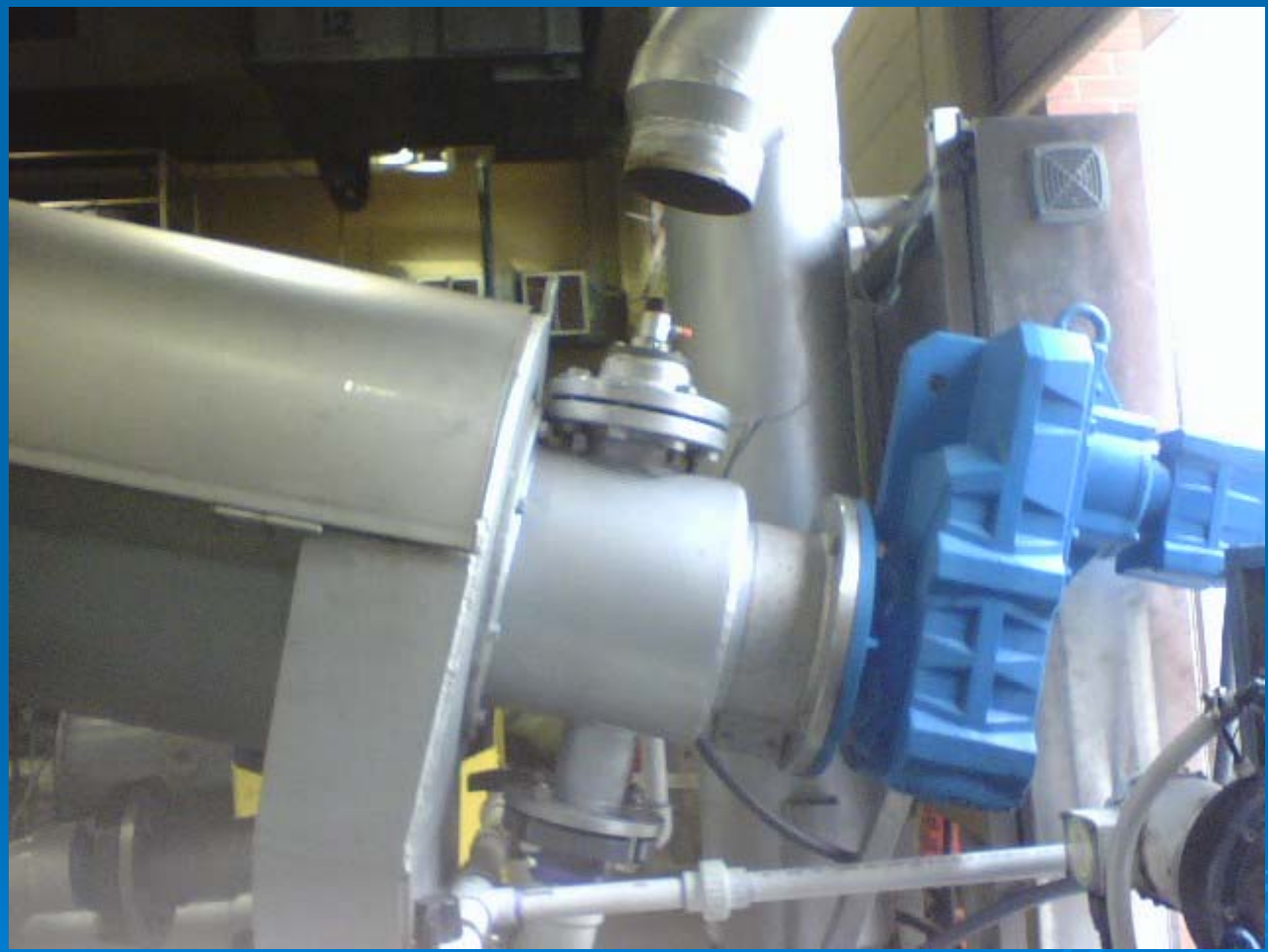


- Wedge Wire – 0.2 mm – 0.15 mm
- Screw Speed – 3-5 RPM
- Motor – 0.5 - 2 HP
- Totally enclosed for odor free operation
- Self cleaning
- Sludge Feed Pump – Progressive Cavity
- Variable Back Pressure Cone

Inclined Screw Press for Thin Sludge

- Inclined Screw Press with skin removed showing the wedge wire basket and spray bar

Inclined Screw Press for Thin Sludge



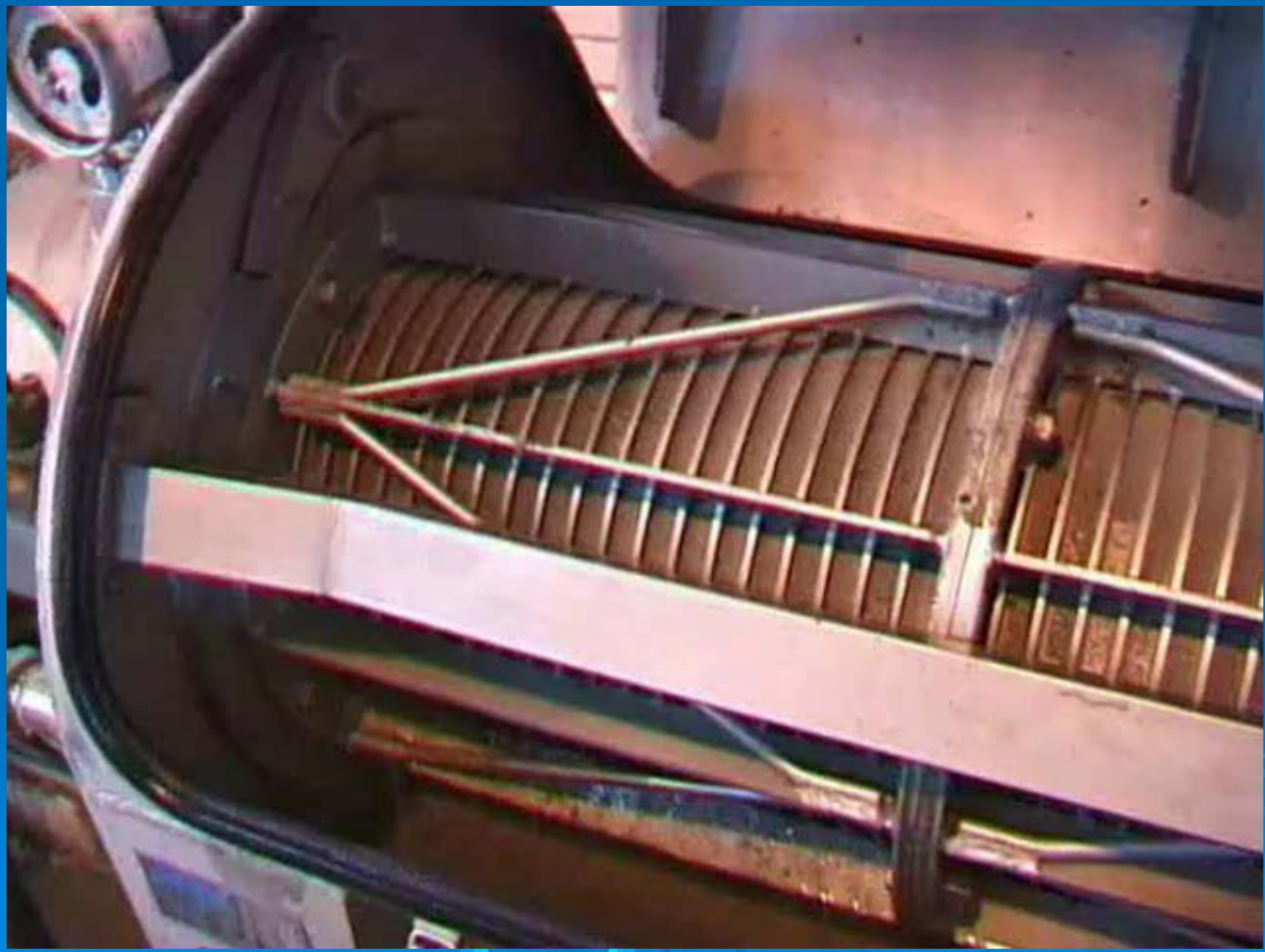
- Bottom Pressure Sludge Feed vs. Gravity Feed Conditioning Tank

Inclined Screw Press for Thin Sludge

- Consistently Above 95% Capture Rate

- Cake Solids Similar to or Better than a Centrifuge!

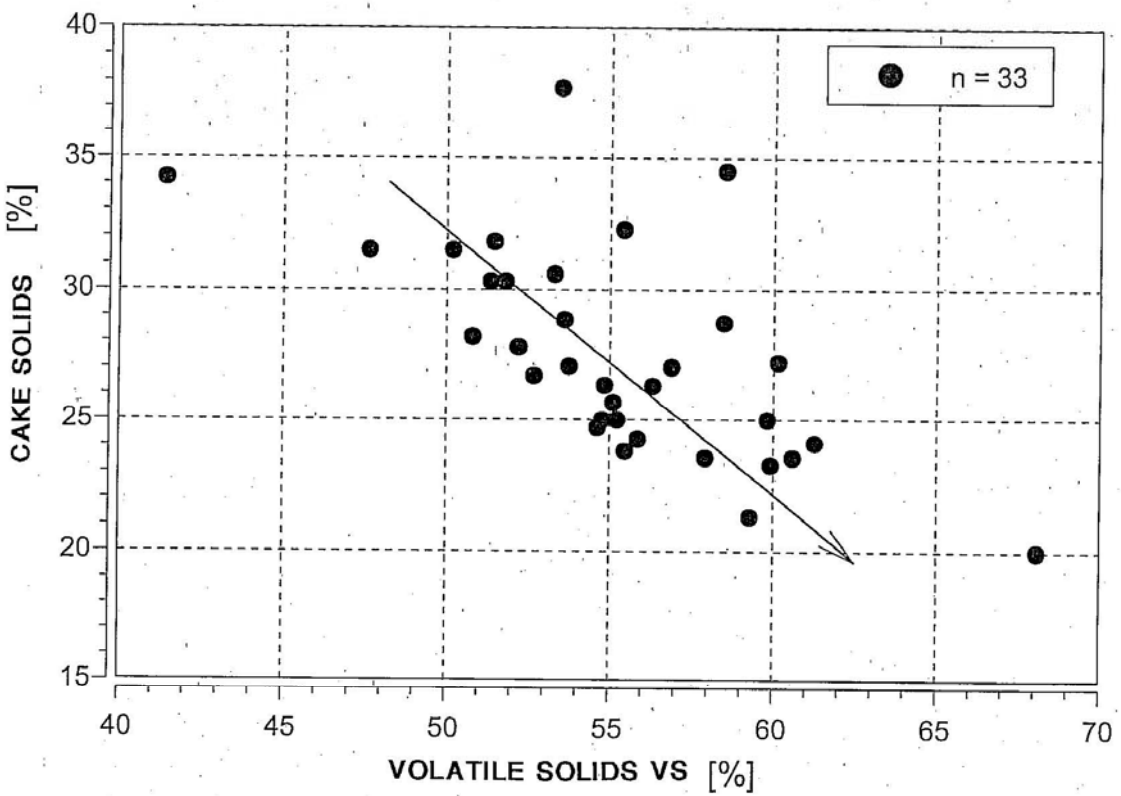
Inclined Screw Press Operation Video



Not Every Sludge Is The Same!

- Primary Sludge - high portion of organic matters, as feces, vegetables, fruits, textiles, paper ect.
- Secondary Sludge – waste activated sludge that discharges from reactors or clarifiers.
- Digested Sludge - Anaerobic vs. Aerobic
- Digestion Process – Break down of organic material (i.e proteins, sugars) into organic acids which are converted into methane or carbon dioxide gases.

Effect of Volatile Solids % on Dewatering Performance



Inclined Screw Press for Thin Sludge

New England Pilot Test Tour

- Kennebunk, ME
- Allenstown, NH
- Nashua, NH
- Paris, ME
- York, ME
- Cromwell, CT

Inclined Screw Press for Thin Sludge

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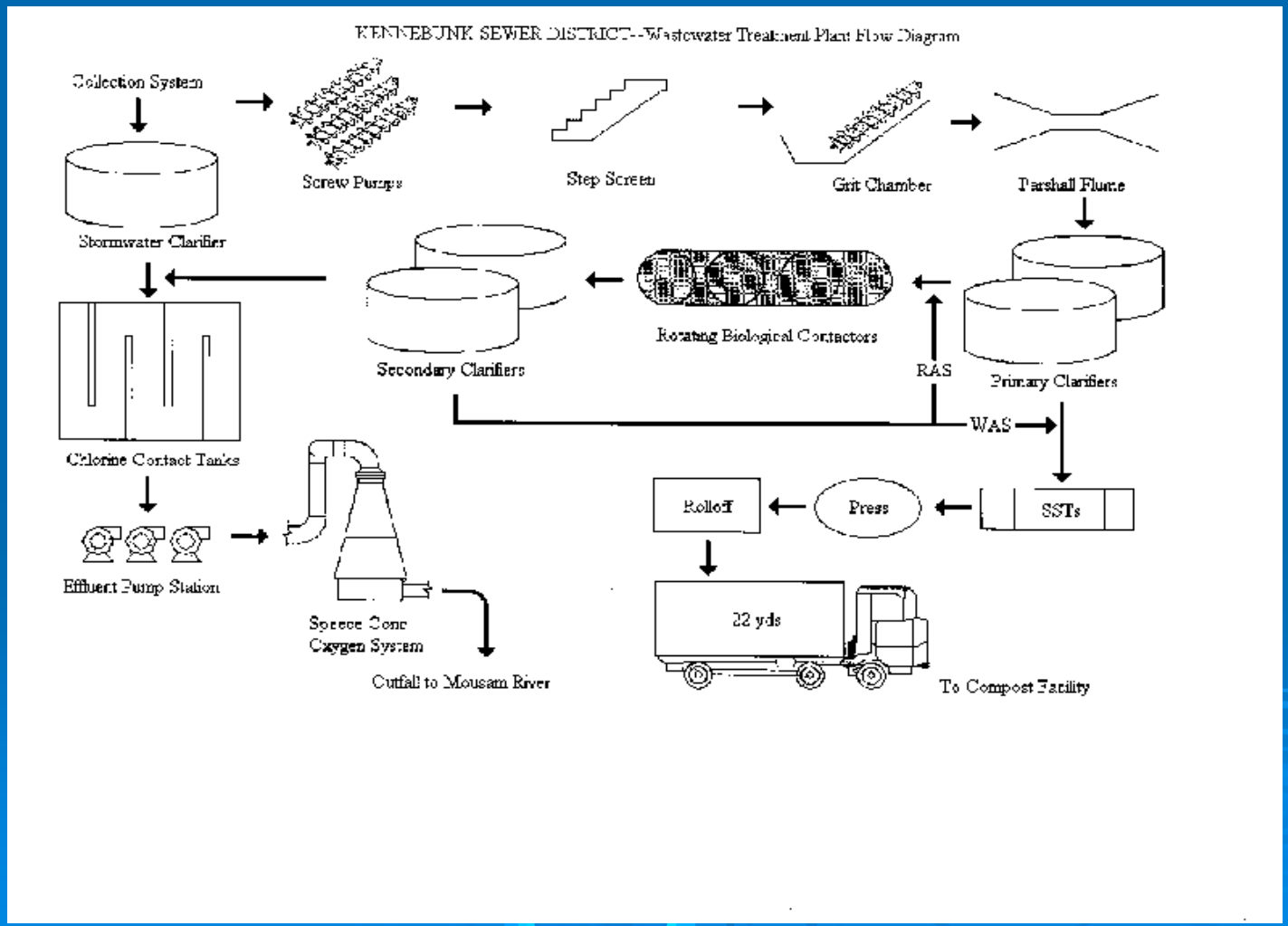
Kennebunk, ME

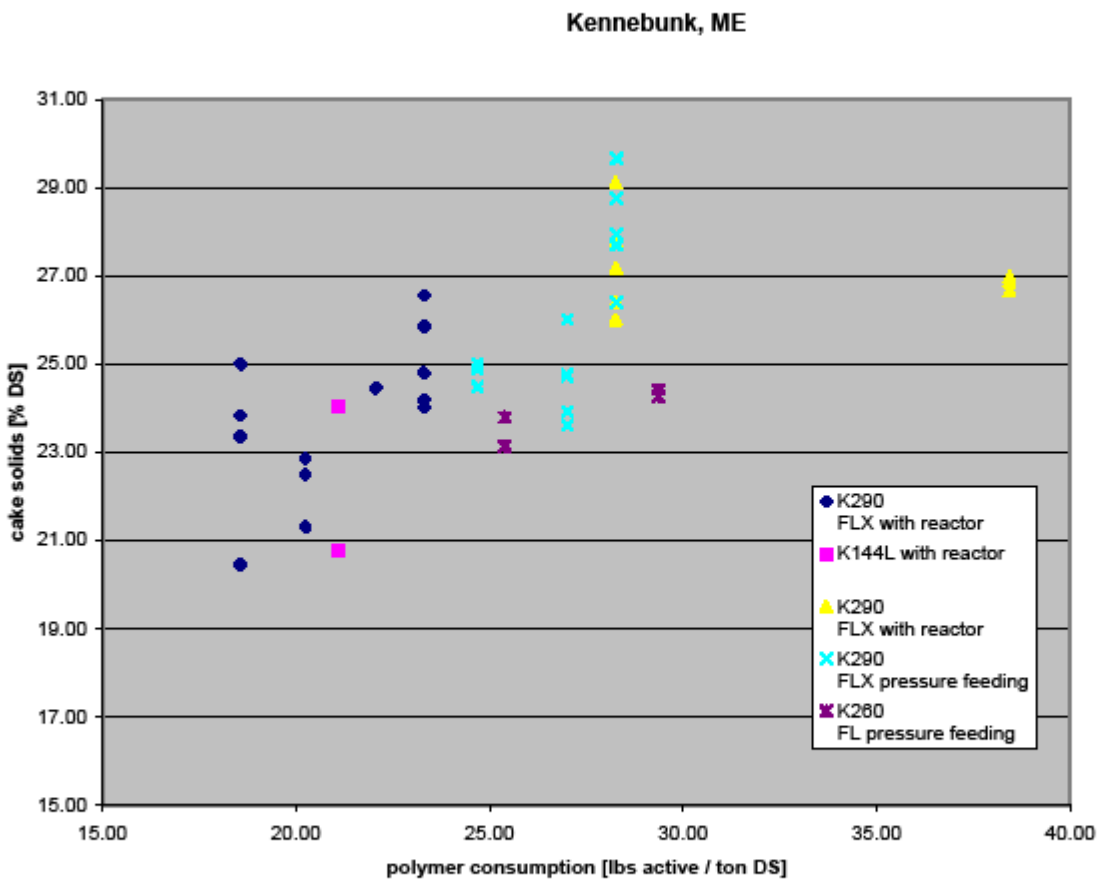


Inclined Screw Press for Thin Sludge

Kennebunk, ME

HLR (gpm)	11.5 -17.5
SLR (lb/hr)	68 - 125
Primary/Secondary Mix (by vol.)	20/80
Solids Feed (%)	1.2 – 1.4
Polymer (lb active/dton)	18.5 -38.4
Dry Solids (%)	20.5 – 29.7
Solids Capture (%)	96 - 98

Polymer Testing – Kennebunk, ME



Inclined Screw Press for Thin Sludge

York, ME

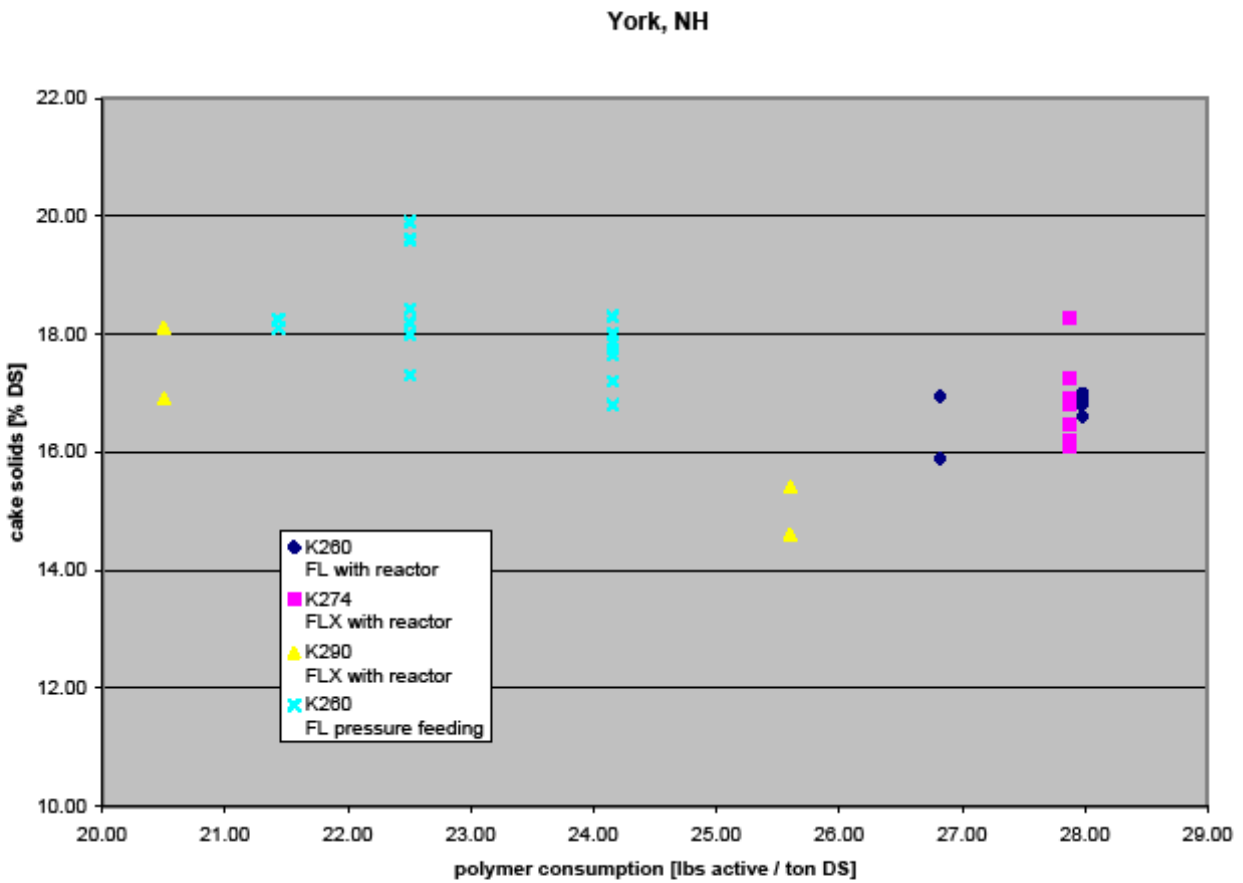
- Headworks – ¼” Bar Racks
- Grit - Vortex Grit Removal
- Aeration Tanks
- Secondary Clarifiers
- Sludge Holding Tanks
- Dewatering - Belt Filter Press

Inclined Screw Press for Thin Sludge

York, ME

HLR (gpm)	8.9 -17.5
SLR (lb/hr)	32 - 55
Secondary Sludge (%)	100
Solids Feed (%)	0.6 – 0.8
Polymer (lb active/dton)	20.5 - 28
Cake Solids (%)	15 - 20
Solids Capture (%)	97 - 99

Polymer Testing – York, ME



Inclined Screw Press for Thin Sludge

Maintenance

- Cleaning of wedge wire basket is done automatically ever 45 min – 1 hour
- Replace Gear Box Oil – 12-18 months
- Change Brush on Screw – 5 years
- Spray Nozzles – 5 - 7 years
- Bottom Bearing Assembly – 7– 10 years

Inclined Screw Press for Thin Sludge

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Conclusions

- Significant Reduction in Energy Usage
- Reduction in Polymer Usage
- Minimal Operator Attention
- No Pre-Thickening Required
- Extremely High Capture Rates
- Minimal Water Consumption (20 gpm @ 60 psi)
- Higher Cake Solids compared to BFP, RDP and other ISP's
- Similar Cake Solids to that of a Centrifuge!
- Dewatered Sludge with Minimal Odors
- Zero Fecal Coliform Reactivation or Regrowth

North Kent, MI PARCCSIDE WWTP Screw Press

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Eric Schiebold

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Questions?

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