

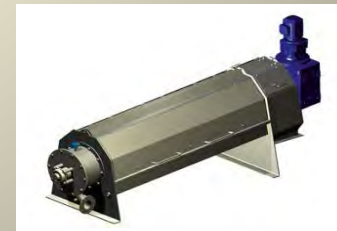
# **Dewatering Equipment Overview:** *Application, Operations, Maintenance*

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# Biosolids Processing Technology

 Thickening

 Dewatering



# *Points of Emphasis*

- Available Dewatering Technologies
- Process Generating the Biosolids
- Technology Selection
  - How The Machine Operates
  - Maintenance Requirements
  - Capital Cost
  - Energy Requirements

# *Types of Mechanical Technology*

- Batch Process-Filter Press
- Continuous Process
  - Low Speed Technology
    - Belt Press, Gravity Belt Thickener, Rotary Drum Thickener, Screw Press, Volute Press
  - High Speed Technology
    - Centrifuge

# *Biosolids Thickening*

Low Speed Technology

# Biosolids Thickening: *Low Speed*

## Gravity Belt Thickener



- Straight forward operation
- Enclosed process available
- Some GBTs require no civil prep
- Low energy (~2-5 hp)
- Low Maintenance
- Range: 120 gpm to 900 gpm

## Rotary Drum Thickener



- Straight forward operation
- Enclosed process, no mist
- Simple installation
- Low energy (~2 hp)
- Maintenance varies
- Range: 60 gpm to 750 gpm

# *Gravity Belt Thickener*



ABE.mp4

# *Gravity Belt Thickener*

## **Operations**

- Manual process optimization
- Tuning Parameters:
  - Belt Speed
  - Hydraulic Loading (gpm)
  - Solids loading (lbs./hr.)
  - Polymer dosage
  - Mixing/Polymer injection point/polymer concentration

## **Maintenance**

- Manual or automatic bearing lube available
- Bearings lubrication every 6 months
- Continuous, self cleaning belt
- Belt replacement 2000-4000 hours
- Wear items, seals, grid, doctor blades



# *Rotary Drum Thickener*



G3 RDT movie\_cfg1\_h264.mp4

# *Rotary Drum Thickener*

## **Operations**

- Manual process optimization
- Tuning Parameters:
  - Drum Speed
  - Hydraulic Loading (gpm)
  - Solids loading (lbs./hr.)
  - Polymer dosage
  - Mixing/Polymer injection point/polymer concentration

## **Maintenance**

- Trunion and chain drive
- Pillow block with direct drive
  - Gear box fluid every 6 months
- Spray shower
- Wedge wire repair
- Wear items, trunions, chain drive components

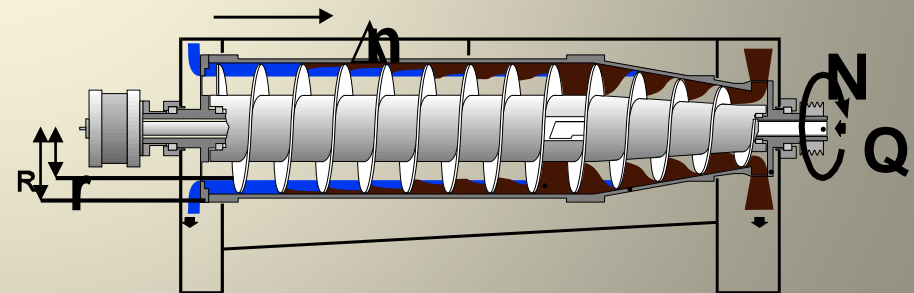
# *Biosolids Thickening*

High Speed Technology

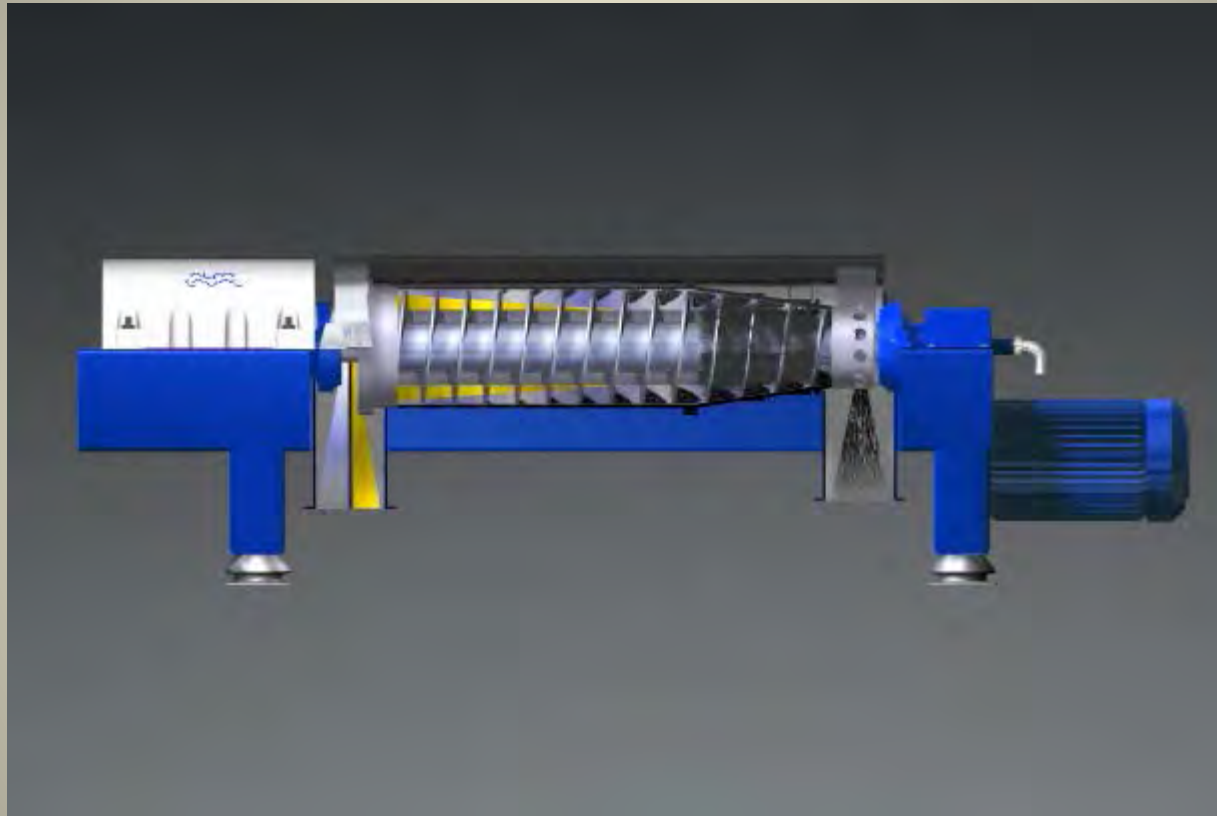
# Decanter Thickening: High Speed



- High throughput per footprint
- Advanced, autonomous controls
- Enclosed process = better atmosphere
- Relatively compact solution
- Polymer used to tune recovery rate
- Range from 25 gpm to 1000 gpm



# *Decanter Centrifuge Thickening*



Decanter inside~6116768.mpeg

# *Decanter Centrifuge Thickener*



















## **Operations**

- Manual or full automation for process optimization
- Tuning Parameters:
  - Bowl Speed
  - Pond depth
  - Torque/Load
  - Hydraulic Loading (gpm)
  - Solids loading (lbs./hr.)
  - Polymer dosage
  - Mixing/Polymer injection point/polymer concentration

## **Maintenance**

- Manual back drive bearing lube ~300 hours
- Manual or automatic main drive bearing lubrication
- Gear box fluid every 6 months
- Clean in Place-as needed
- Wear saddles as needed

# Technology Comparison: Thickening

Benefits	Gravity Belt Thickener	Rotary Drum Thickener	Thickening Centrifuge
Wash water			
Noise			
Polymer use			
Foot print			
Power			
Cake dryness			

# *Biosolids Dewatering*

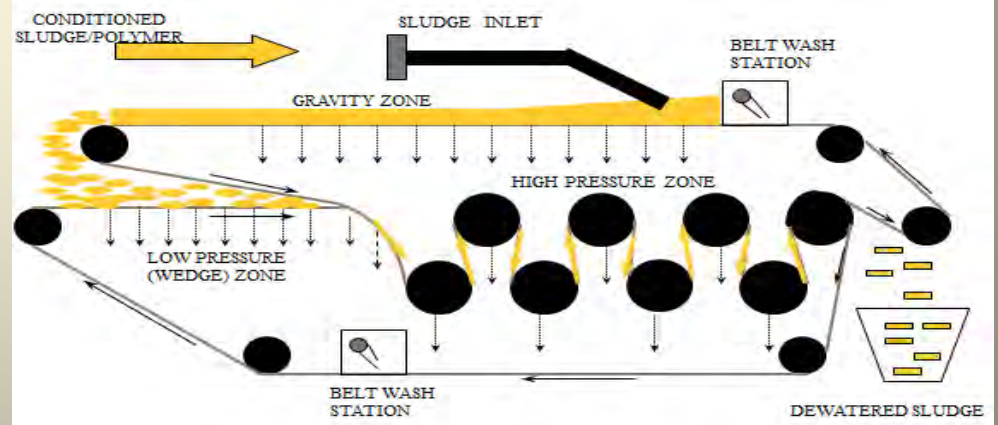
Pressure Filtration

Centrifugation



# Belt Filter Press

- Robust, long service life
- Low maintenance
- Variety of configurations
- Low energy use (~10 hp)
- Wide range of operation



# *Belt Filter Press*



BFP\_preview\_200814.mp4

# *Belt Filter Press*

## **Operations**

- Manual process optimization
- Tuning Parameters:
  - Belt Speed
  - Hydraulic Loading (gpm)
  - Solids loading (lbs./hr.)
  - Polymer dosage
  - Mixing/Polymer injection point/polymer concentration
  - Belt tension (50 pli max.)

## **Maintenance**

- Manual or automatic bearing lube available
- Bearings lubrication every 6 months
- Gear box fluid 1000 hours
- Hydraulic fluid 1000 hours
- Continuous, self cleaning belt
- Belt replacement 2000 to 4000 hours.
- Wear items, seals, grid, doctor blades

# *Biosolids Dewatering*

Screw Press

# *Screw Press*

*Low Power, Supervision and Maintenance Requirements*

- User-friendly design
- Quiet!
- Requires minimal operator attention
- Simple concept – high uptime
- Low rotational speed means
  - Low power demand, reducing operational costs (~2 hp)
  - Sealed process; low to no odor



# *Screw Press*

## **Operations**

- Manual process optimization
- Tuning Parameters
  - Hydraulic loading
  - Solids loading
  - Mixing
  - Polymer dosage
  - Discharge pressure

## **Maintenance**

- Manual or automatic bearing lube available
- Bearings lubrication per manufacturers schedule
- Gear box fluid 1000 hours
- Wear items, flight brushes or tips

# *Biosolids Dewatering*

Filter Press  
(Plate and Frame)

# *Filter Press*

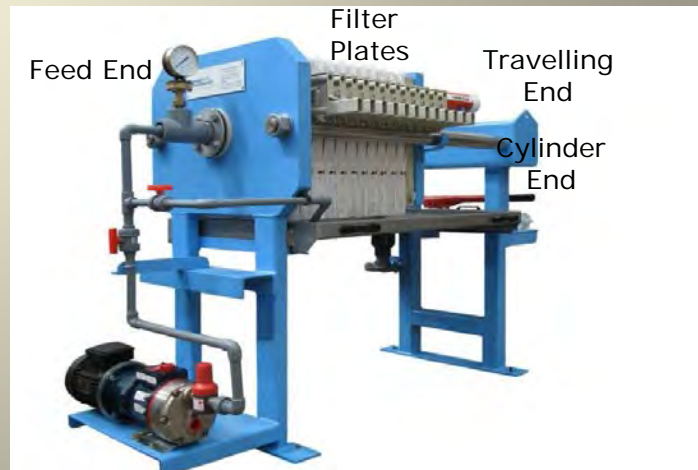


PP\_movie\_cfg1.mp4



# *Filter Press*

Batch Technology for Cake Solids to 40%+



- Ideal for dry cake solids, up to 40%
- Solids capture over 99%
- Easily customized for most dewatering needs
- Operating costs low due to low energy demand, low disposal cost
- Configured for manual, semi-auto and automatic operations.

# *Filter Press*

## **Operations**

- Manual Cake Discharge
- Tuning Parameters
  - Hydraulic loading
  - Solids loading
  - Mixing
  - Polymer dosage
  - Discharge pressure

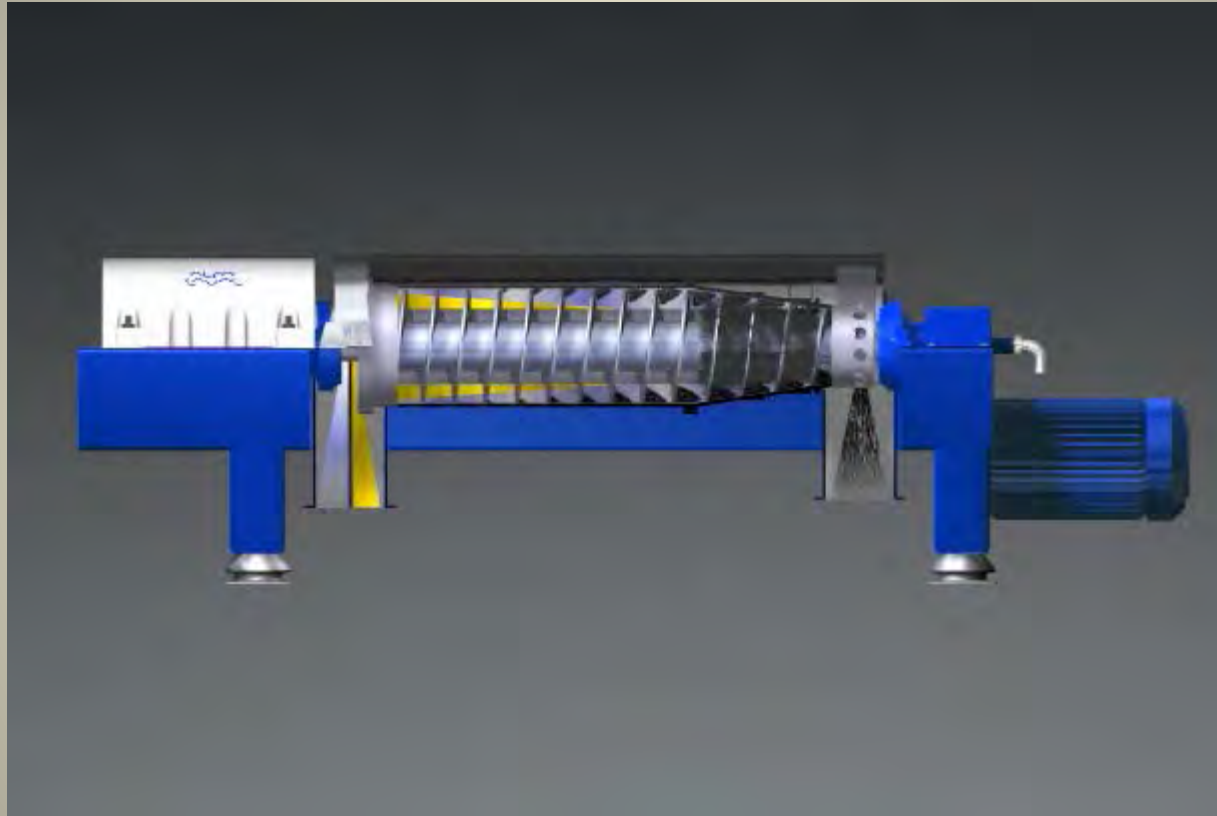
## **Maintenance**

- Feed Pumps
- Cloth Wash Down
- Bombay Doors
- Replace Cloths
- Replace Frames

# *Biosolids Dewatering*

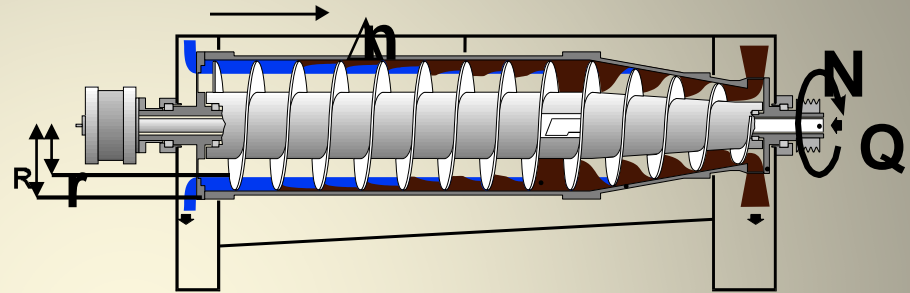
Decanter Centrifuge

# *Decanter Centrifuge Dewatering*



























Decanter inside~6116768.mpeg

# Decanter Centrifuge Dewatering



- Advanced, autonomous controls
- Enclosed process, no mist
- Relatively compact solution
- Higher performance, higher energy
- PM is relatively low

# Technology Comparison: Dewatering

Benefits	Centrifuge	Belt press	Chamber press	Screw press
Wash water				
Noise				
Polymer use				
Foot print				
Power				
Cake dryness				

# *Summary and Take-Aways*

- Several dewatering technologies to choose from
- Technology selection is based on the design demands, O&M needs, capital cost and operating budget
- Sludge makes all the difference!

*Questions or Comments?*

**Thank You!**