

Class Title:

Screw Centrifugal Pump:

Effectively moving Rags and Woven Wipes without clogging the pump

Presented by: David Miller
Regional Sales Manager
Hayward Gordon ULC
Central States

The Presenter: David Miller

Engineering Degree, BSME, Univ. of Cincinnati, 1989.

- Regional Manager at **Hayward Gordon** (Now)
- Regional Manager at **Netzsch** (4 years)
- Manager of Aftermarket Parts & Service at **Seepex** (2.5 years)
- Area Sales Manager, **Dupps** Company (5 years)
 - direct fired rotary drum dryers
- Product Manager, **Sweco** (10 years)
 - shaker screeners & filter-dryers
- Project Engineer, **Krauss Maffei** (3 years)
 - Filtering basket centrifuges

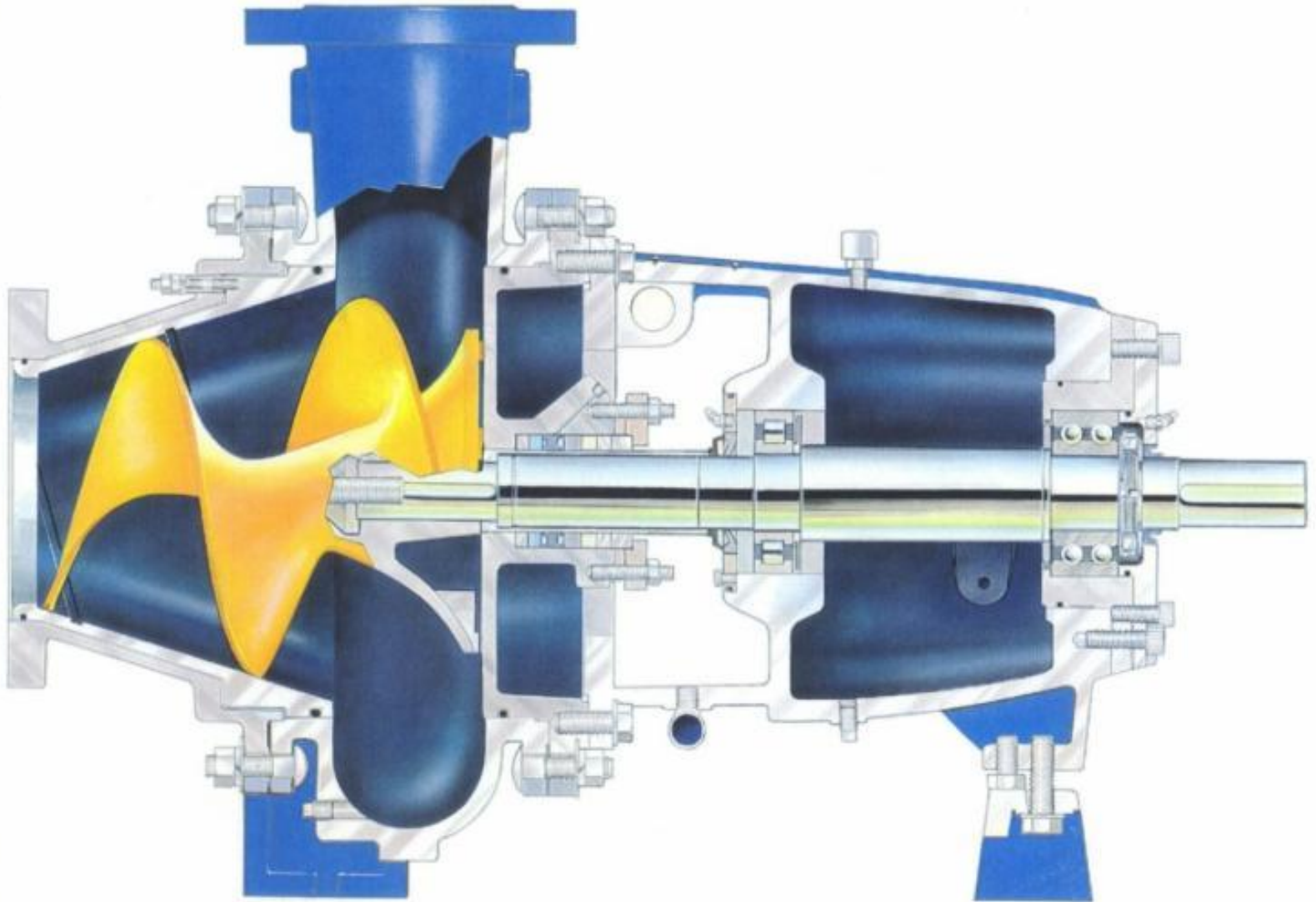
Topics Covered:

- The internal working mechanism of a **Screw Centrifugal Pump** – How it Works.
- Why this design is able to **pass large solids** and prevent rags and wipes from getting stuck.
- Why this design is **gentle on the sludge** and non-damaging to the biological floc.
- The internal working mechanism of a traditional **Non-Clog Centrifugal Pump** – 2 or 3 Vane (Closed Vane Design).
- Why **Non-Clog design** is more **susceptible to wipes** and rags “wrapping around” the impeller vanes.
- **Disadvantages** of the **Screw Centrifugal Pump**

XCS Screw Centrifugal Pump



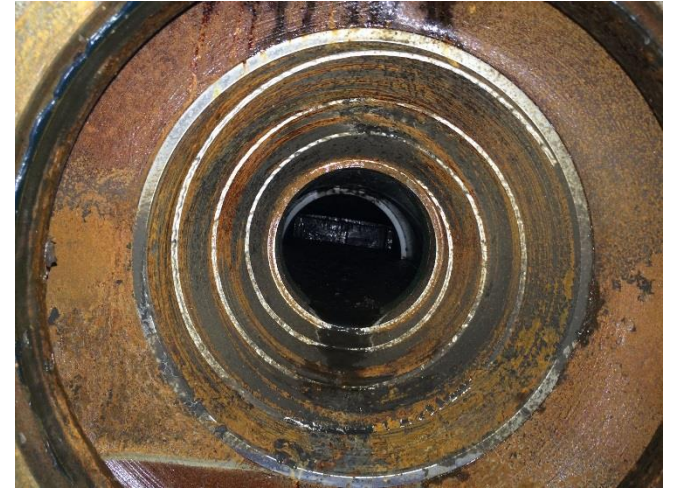
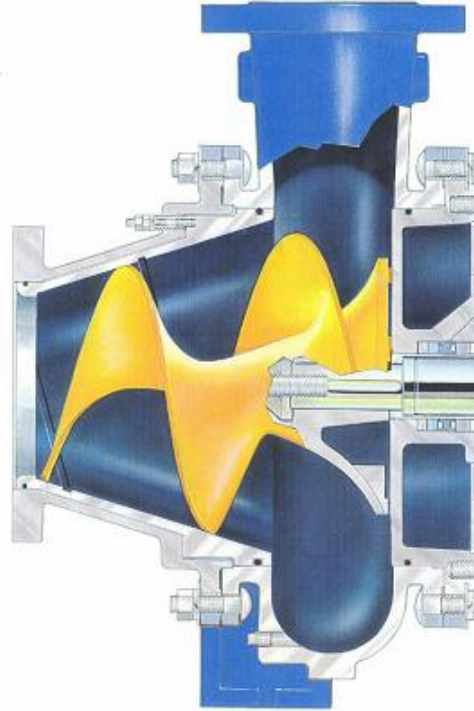
XCS Screw Centrifugal Pump



XCS Screw Centrifugal Pump



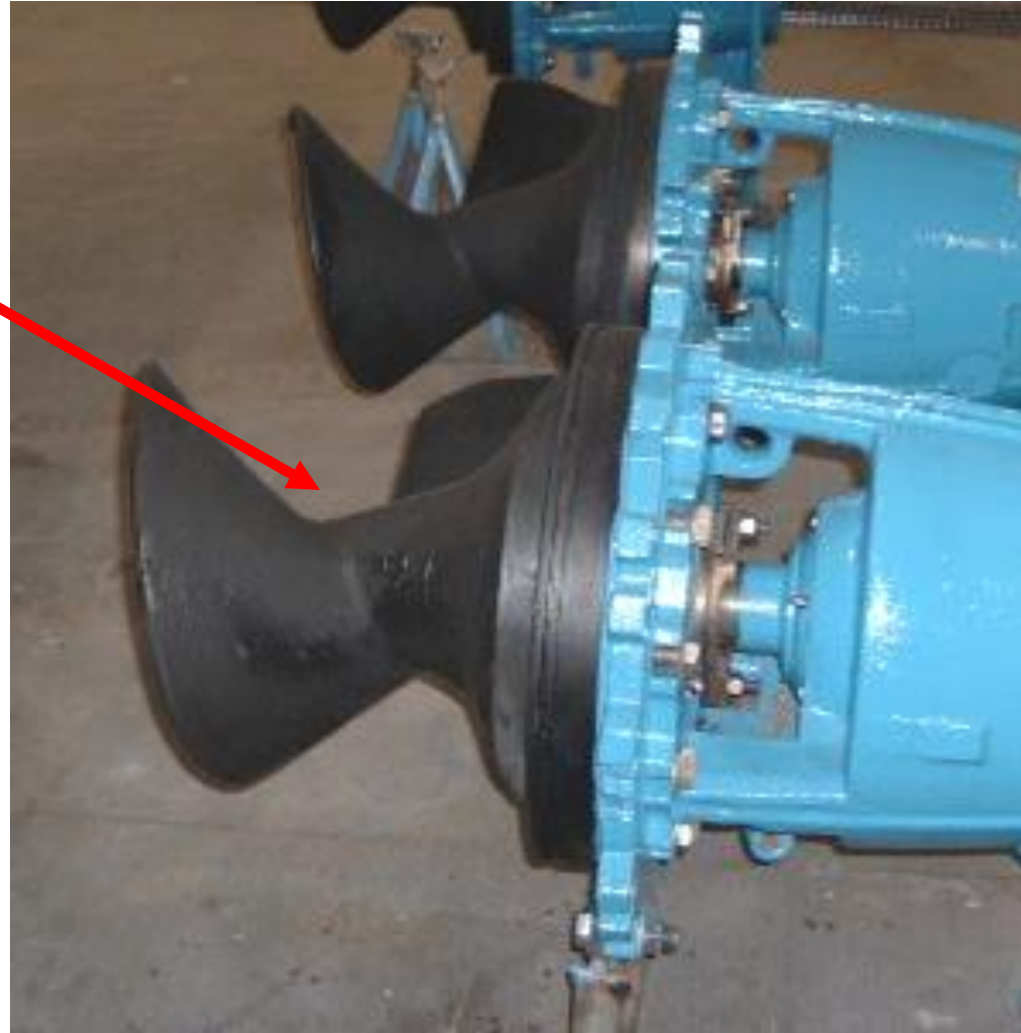
XCS Screw Centrifugal – Moving Solids



- **Spiral Groove** gives solids a place to go
- **Adjust the Clearance** external to the pump (adjusting bolts or split ring shims)

XCS Screw Centrifugal Pump

- Spiral shape and axial length makes **non-rectangular** passage way.
- Single Vane Impeller acts more like a **chute**.
- **Smooth, curved** surfaces.

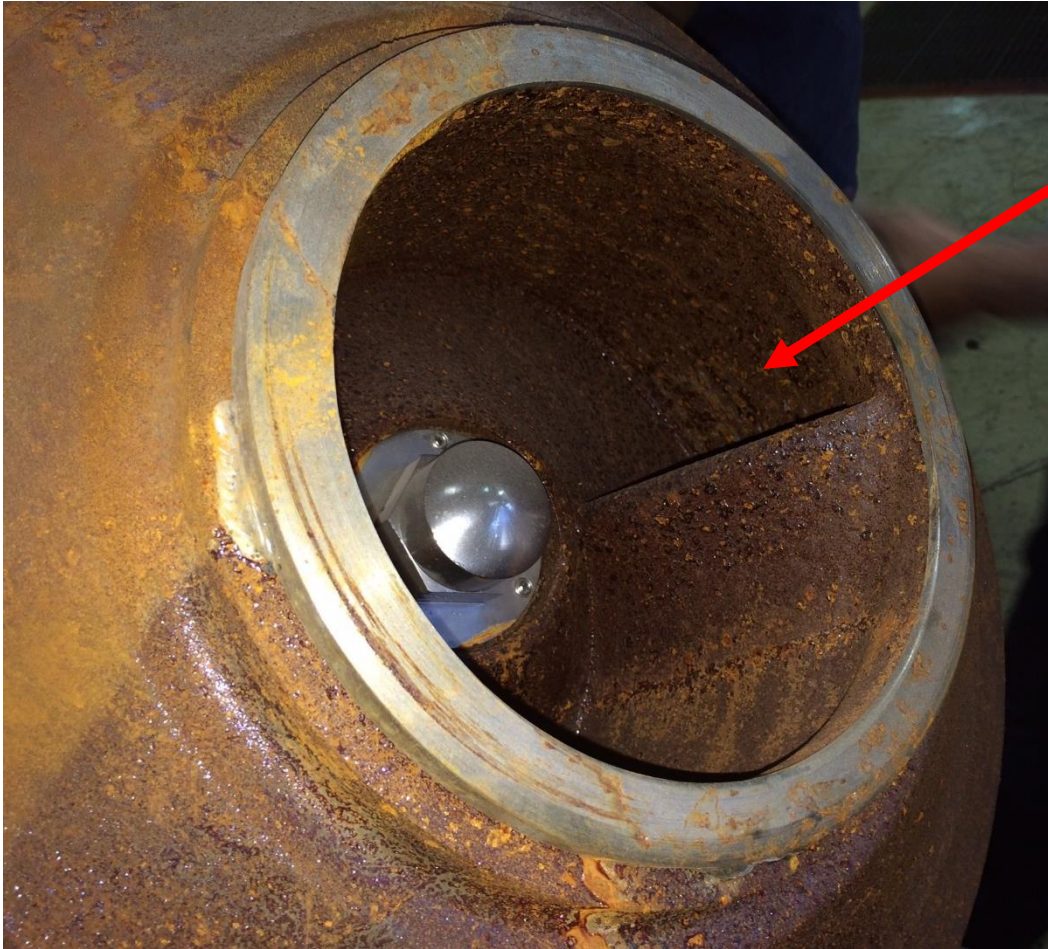


Non Clog Centrifugal – How it Works



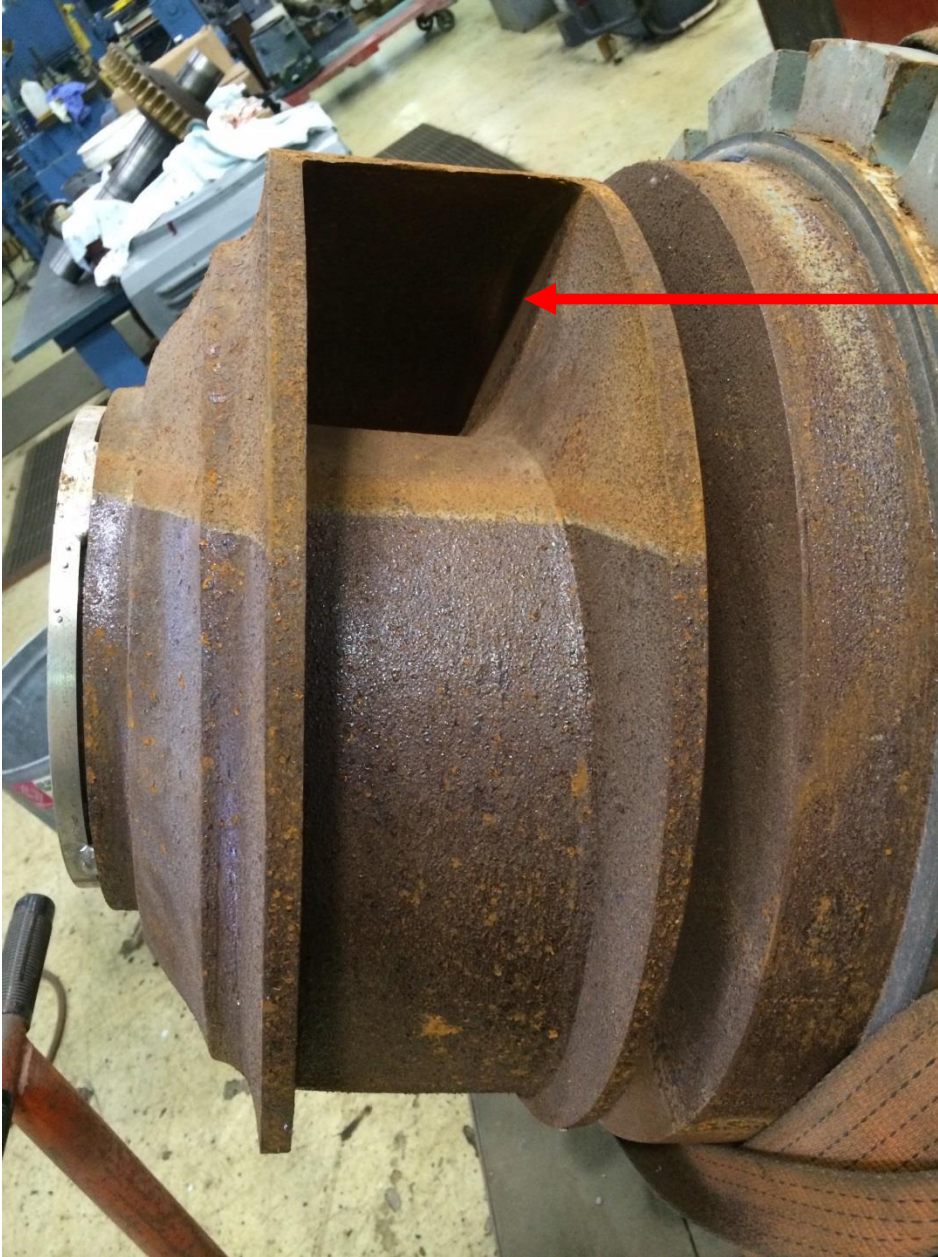
- Inlet on the bottom; exit tangential to the volute
- Good at moving large particles that **don't change shape**
- **Not so good** with rags and **interwoven baby wipes** that change their shape as they flow through fluid

Non Clog Centrifugal – How it Works



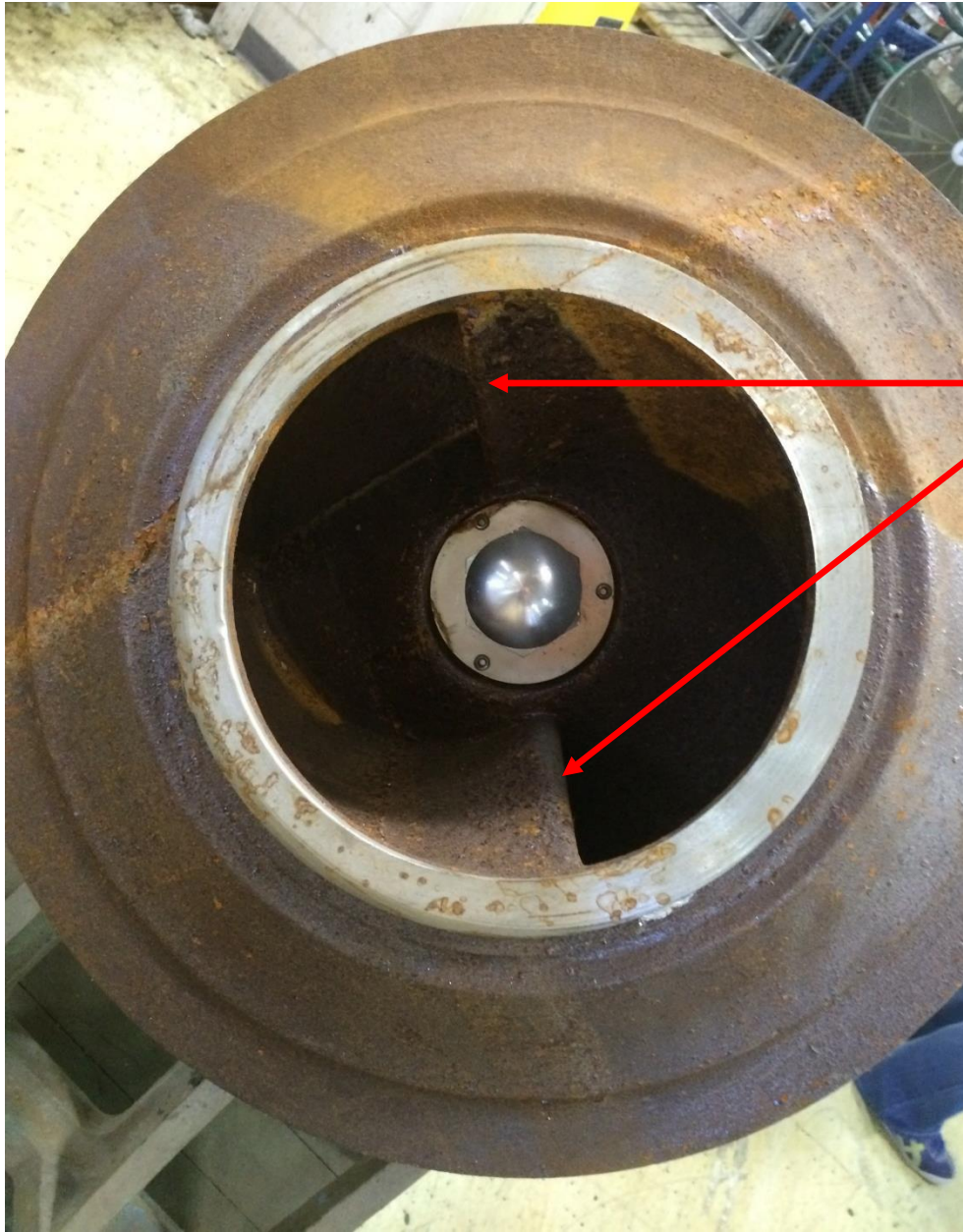
- **Rectangular** Entry way
- Good at moving large particles that **don't change shape**
- **Not so good** with rags and **interwoven baby wipes** that change their shape as they flow through fluid

Non Clog Centrifugal – How it Works



- Rectangular Passage way

Non Clog Centrifugal – How it Works



- Two **Straight vanes** directly exposed to the flow
- Easy for **Rags, Wipes,** or latex gloves to get **caught here.**

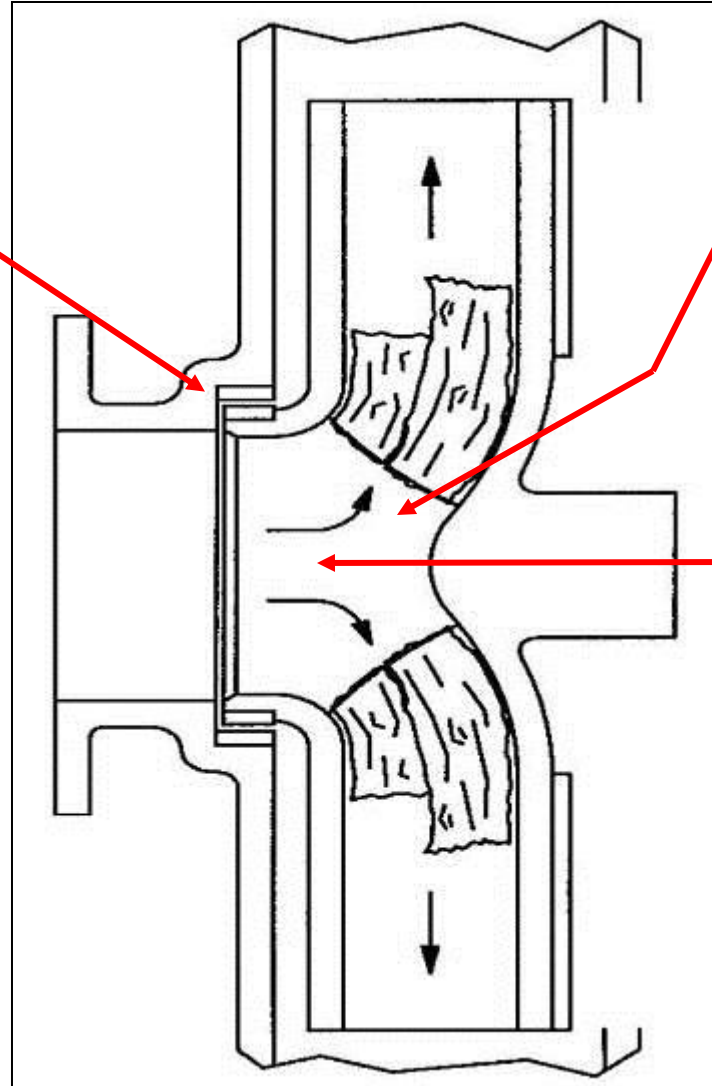
Problems with “Non-clog” designs

Cannot adjust clearance

Cannot expel trapped solids

Not a hard metal design.

Impeller: 200-220 BHN



Abrupt 90 degree turn

Too many vanes

Leading edge of vane exposed directly to incoming flow

XCS Screw Centrifugal Pump

Moves Rags & Wipes through:

- Large spiral opening pushes items through entry and into the volute.
- Spiral, corkscrew pathway is not a rectangular shaped opening. Easy for objects to slide through.
- Coat Hanger Tip of Impeller is hidden by a metal shroud.
- No blunt edge impeller vanes for rags to wrap around.

Non Clog Centrifugal Pump

Difficulty Moving Rags & Wipes:

- Is a standard centrifugal impeller with larger passageways.
- Still a **closed rectangular shaped** pathway. Easy for **objects to get wedged** in place.
- Good at moving large particles **that don't change their shape** = golf ball, tightly wound hair ball, bottle caps, pencils, pens, etc.

Non Clog Centrifugal Pump

Difficulty Moving Rags & Wipes:

- **Front edge of vane** directly exposed to incoming flow.
- Things that deform in shape = rags and interwoven wipes will **wrap around the vane** and get stuck there.
- This will cause pump **shaking forces** = rotating unbalance.

XCS Screw Centrifugal Pump

Main Applications

- **Digester** recirculation and transfer
- Return activated sludge (**RAS**)
- Waste activated sludge (**WAS**)
- **Digester** mixing
- Raw sewage/**influent**

XCS Screw Centrifugal Pump

General Features

- Flow capacity to 10,000 USGPM, heads to 175 feet.
- **Hard metal Construction** = Hi Chrome = 450 BHN
- 4" thru 16" discharge sizes
- Suitable for **municipal sludge** (up to 8% solids)
- High flow / low head applications
- **High efficiency** (75%)
- Impeller **clearance** is externally **adjustable**

