



Where Innovation Flows.



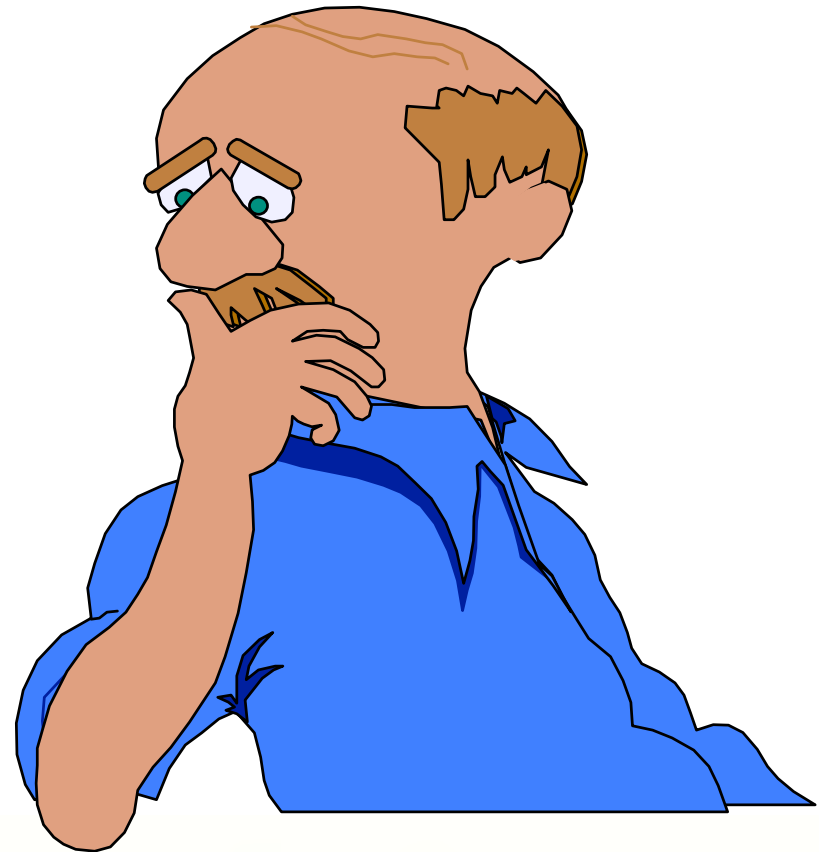
- ABAQUE
- ALMATEC®
- BLACKMER®
- ENVIROGEAR®
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Blackmer Products

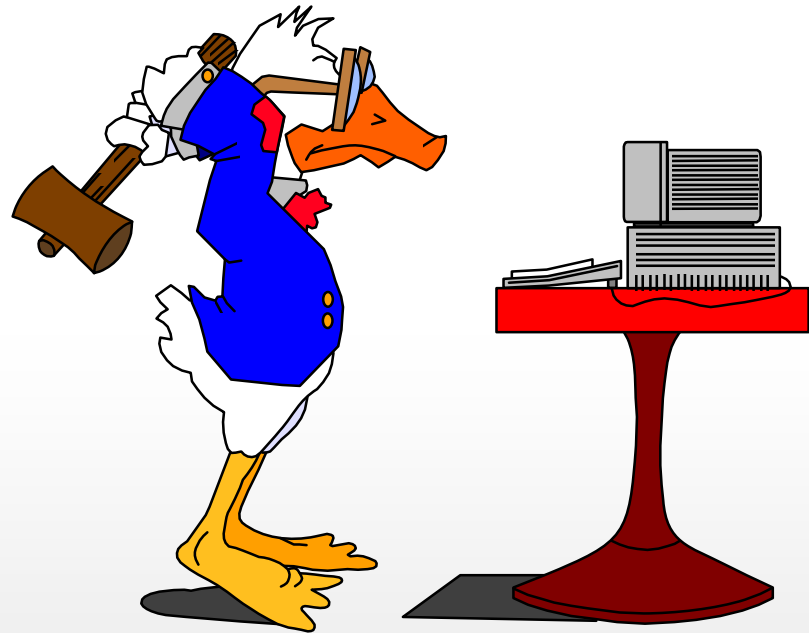
WYTH'S LAW

Under the most rigorously controlled conditions of capacity, pressure, temperature, and other variables, the pump will do as it damn well pleases.



STERN'S ADDITION TO WYTH'S LAW

Any attempts to alter the pump's performance from what it is doing to what you really want- will make it deviate further from the desired point.

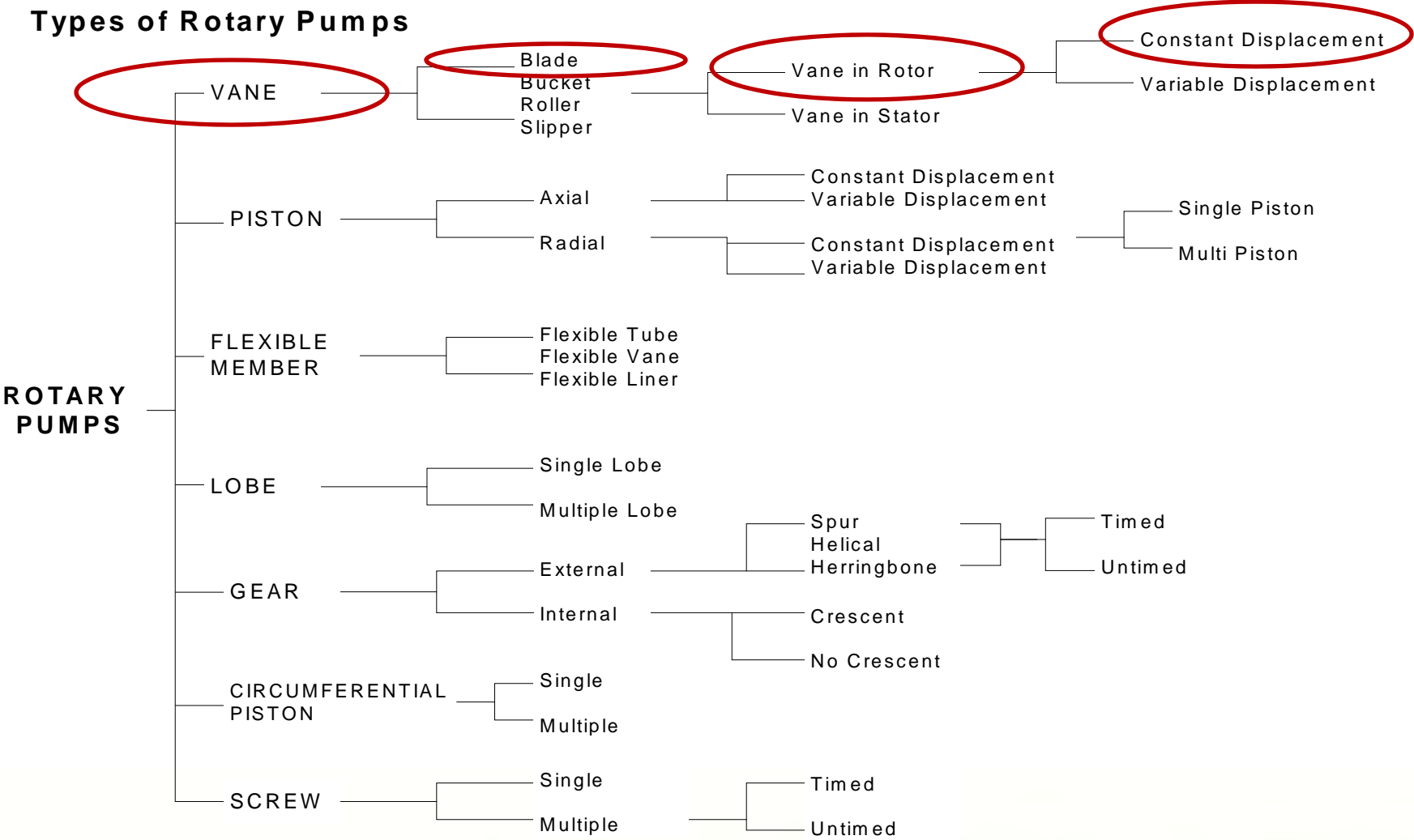


Pump Definition:

A pump is a machine that adds energy existing in a liquid in an increment sufficient for the required service. This service may be the production of velocity or the overcoming of friction or external pressure.

Blackmer Pumps

Types of Rotary Pumps



Blackmer manufactures:

- **Rotary, Positive Displacement, Sliding-Vane Pumps**

Blackmer manufactures:

- **Rotary**

Turns in a circle.

- **Positive Displacement**

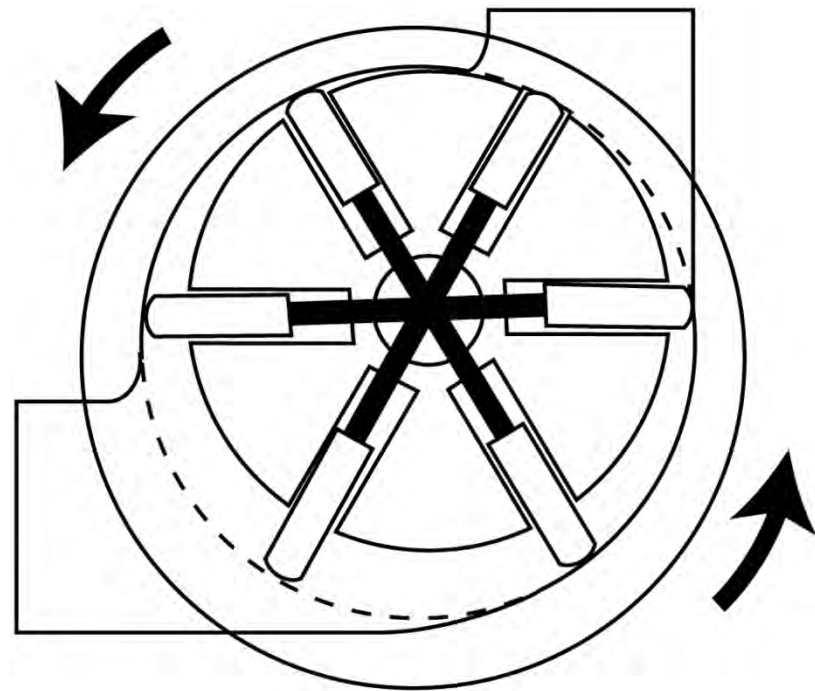
A constant volume of liquid is moved with each revolution of the pump.

- **Sliding-Vane Pumps**

Vanes slide in and out of a rotor.

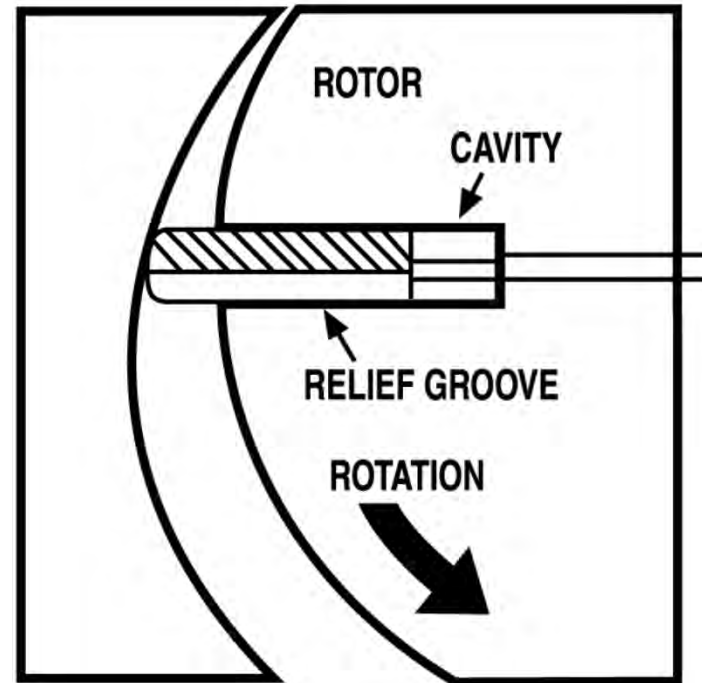
3 Forces in Blackmer pumps

- CENTRIFUGAL FORCE
- PUSH RODS
- LIQUID PRESSURE



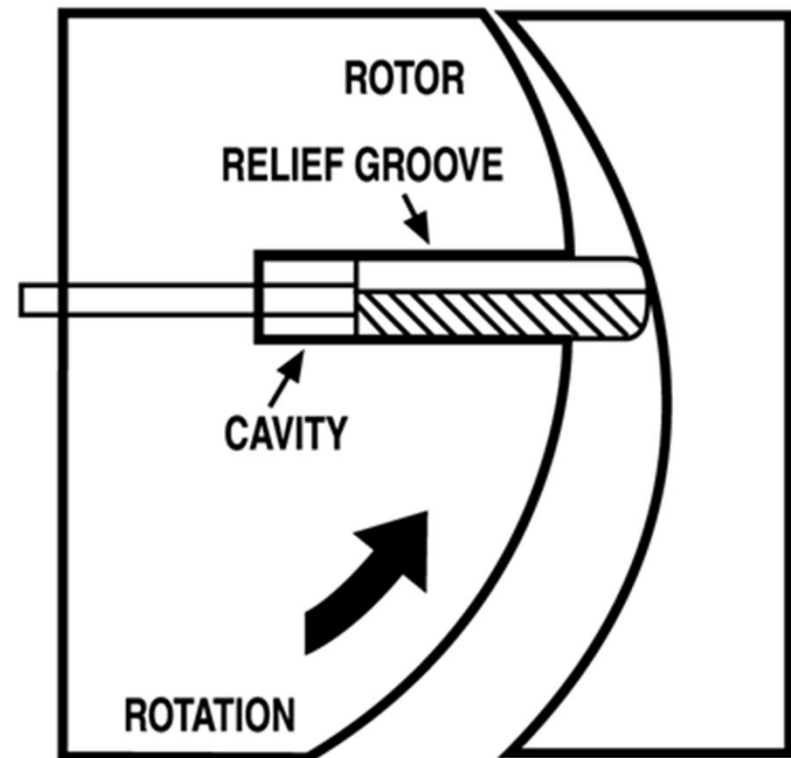
Operating Principles

- Centrifugal force from rotor rotation throw vanes out of rotor slots.
- Push rod operating between opposing vanes help initiate vane movement.
- Liquid pressure entering vane slots act on rear of vane.
 - » Maintains contact with cylinder bore.
 - » Maintains pump efficiency.



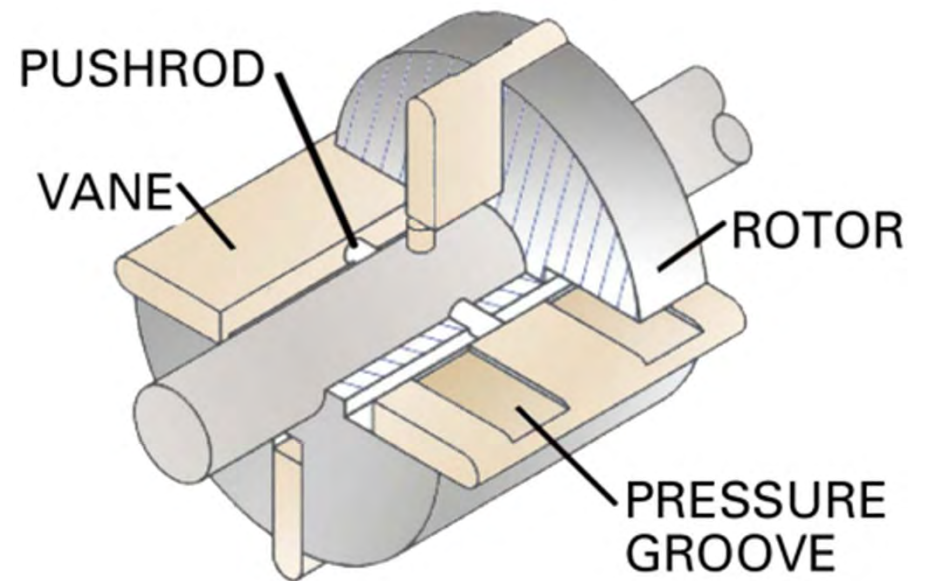
Operating Principles

- Vanes are forced back into the slot as the cylinder bore decreases.

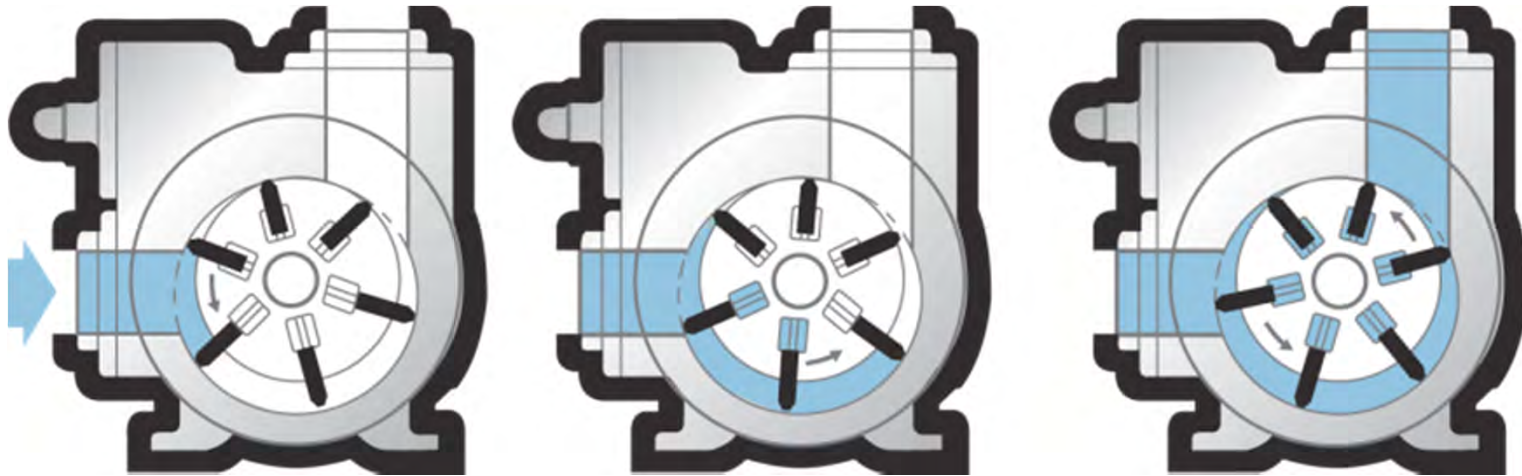


Operating Principles

- The push rod moves through the rotor to initiate movement of the opposing vane.

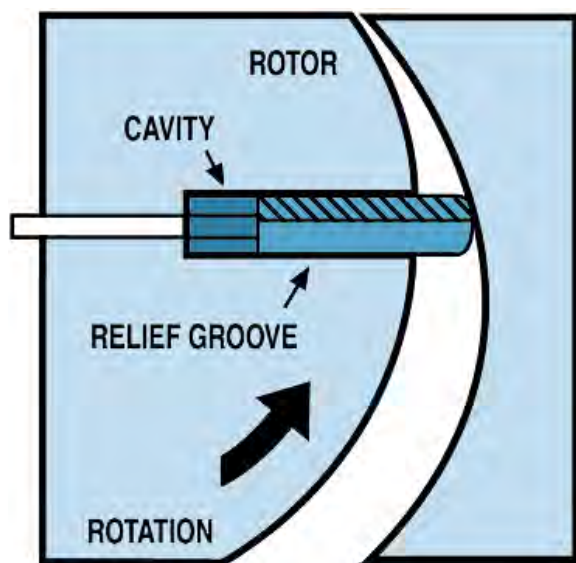
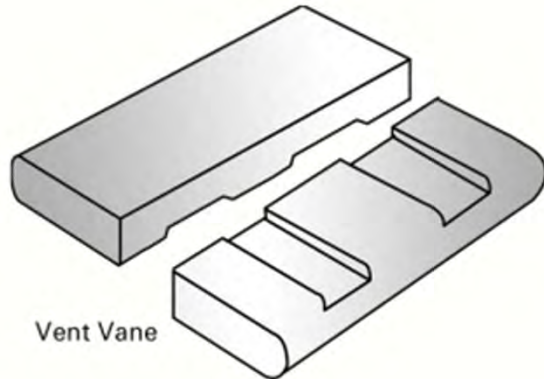


Blackmer Pumps



- As the rotor turns the vane moves outward at the intake port creating a void drawing liquid in.
- Fluid is transferred between the vanes.
- At the outlet, fluid is discharged as pumping chamber area is reduced (and vanes forced back).

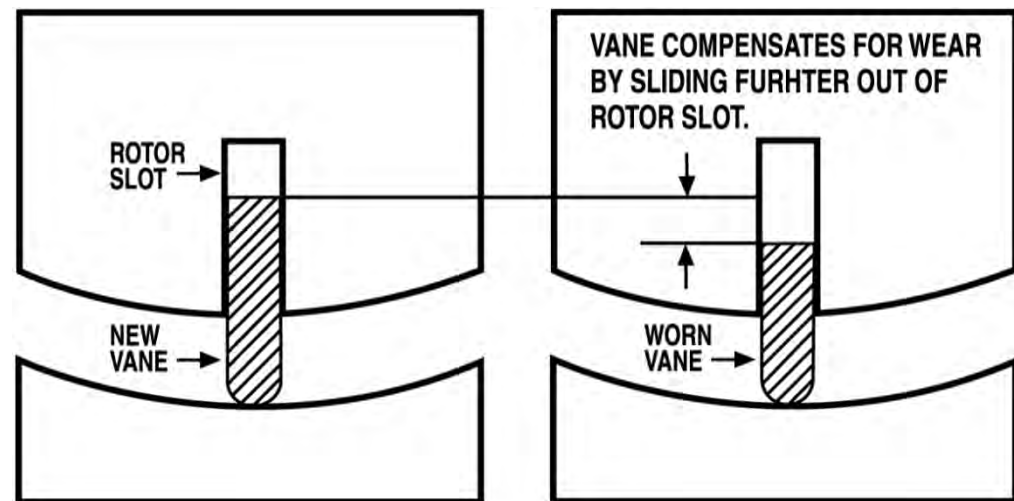
Operating Principles



- What if vanes are in backwards?
- No hydraulic force available
- Reduced flow
 - *30% less flow*
- Fluid pulsation
 - *Hose and piping movement and wear*

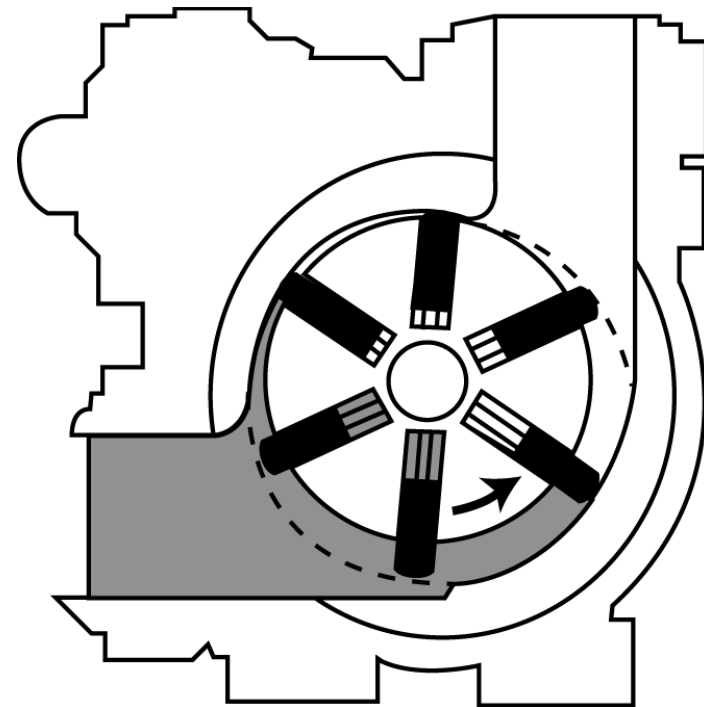
Sliding Vanes

- Vanes **Self-Adjust** to maintain pump efficiency.
- Vanes are the sacrificial wear part.
- Sliding-vane pumps maintain like-new operation.



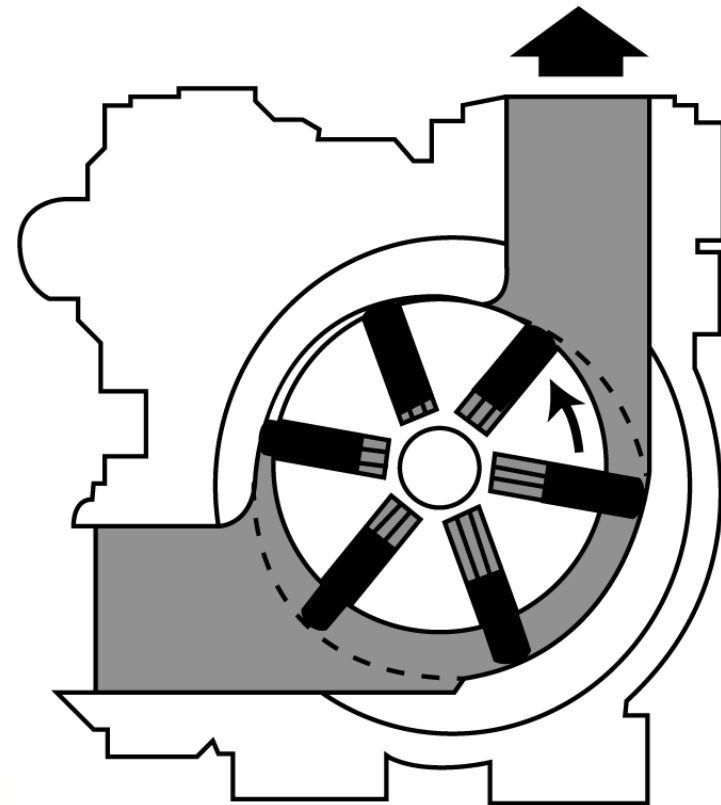
Operating Principles

- During rotation, vanes remain in contact with cylinder.
- Fluid is transferred between vanes from inlet to discharge.
- No Metal to Metal contact.

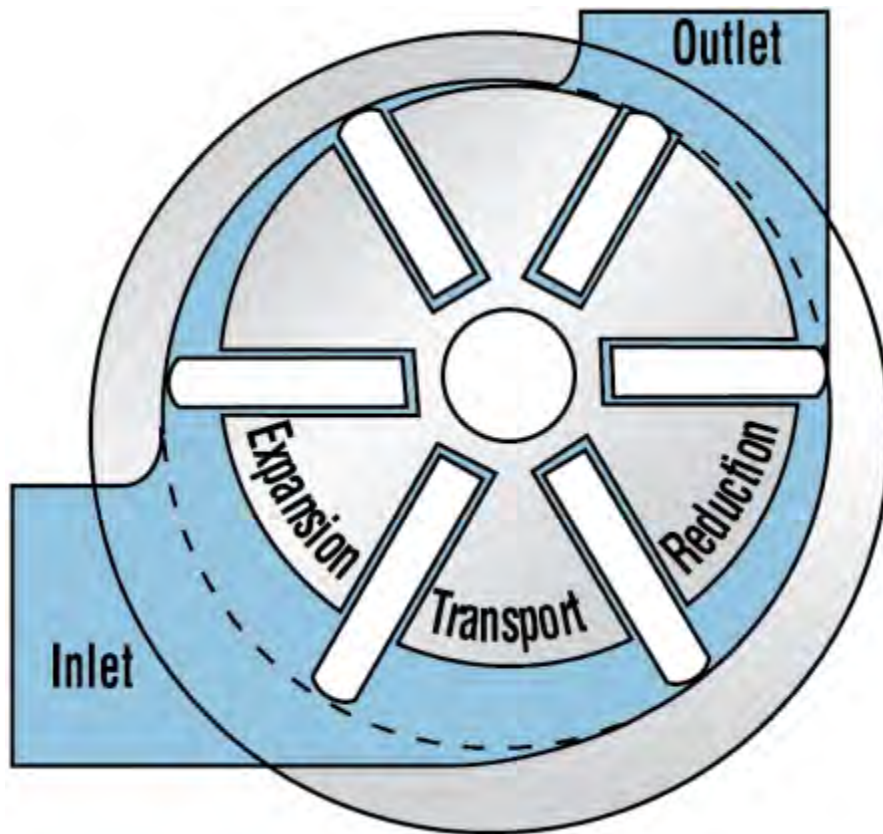


Operating Principles

- At the discharge, fluid is discharged as vanes move into slots & pumping chamber decreases.
- Creates high pressure area that causes fluid to flow out the pump discharge.



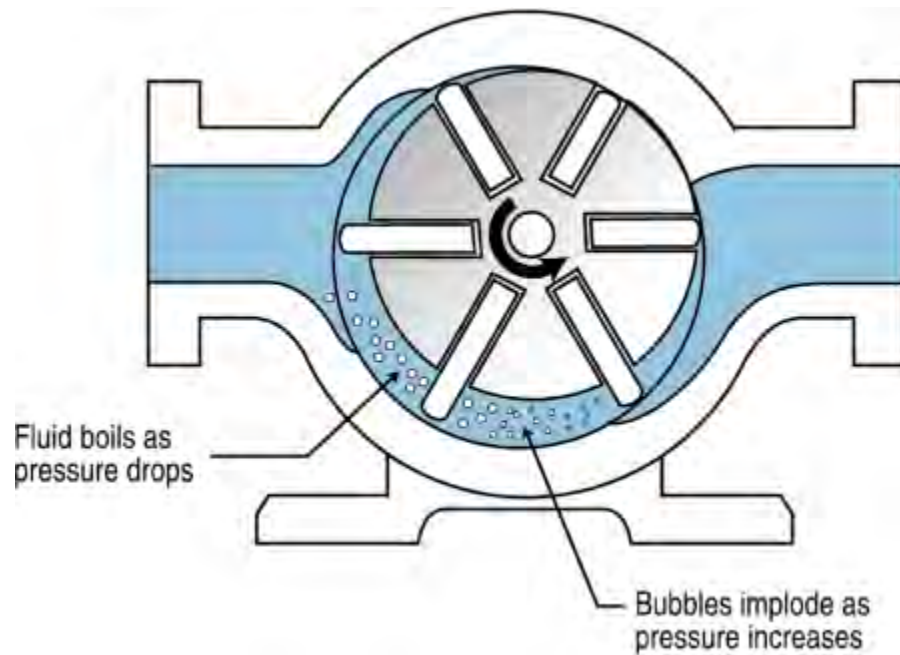
Pumping Chamber Areas



Fluid flow through the pump:

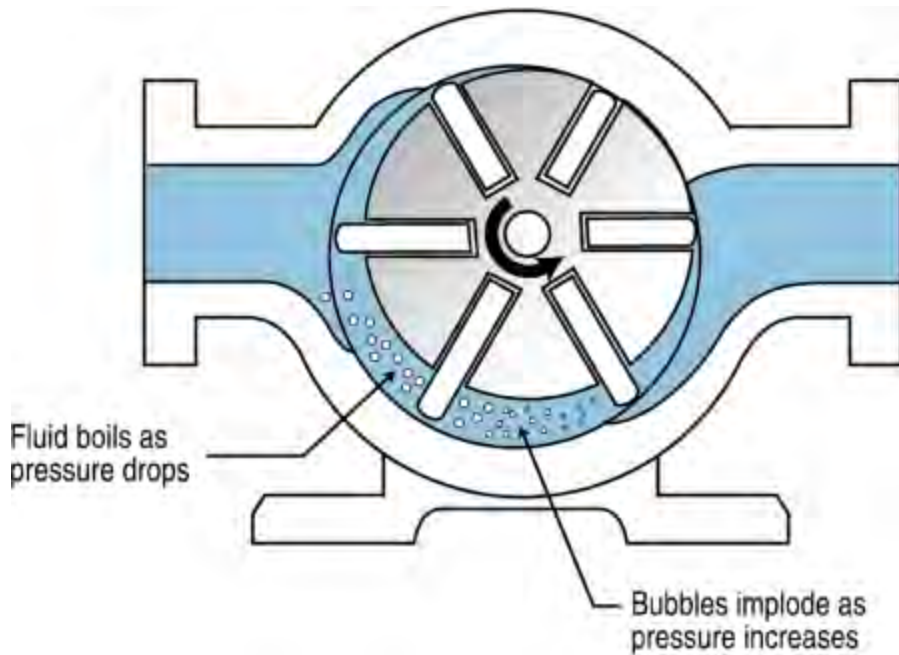
- **Inlet** - Expansion
- **Transport** - Static
- **Outlet** - Reduction

Cavitation



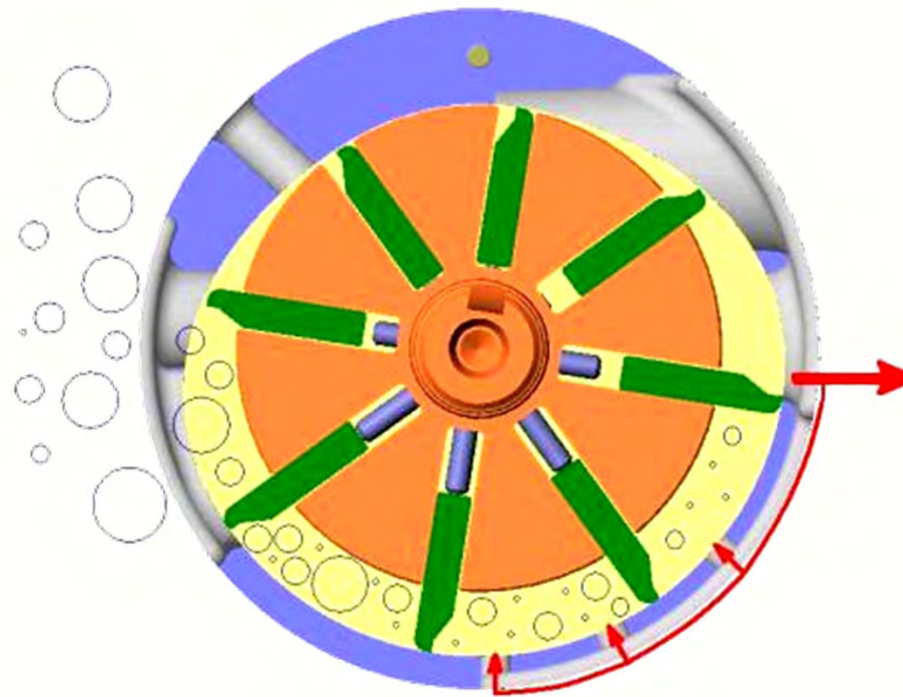
- Cavitation occurs when the pressure at the pump inlet drops below the fluid vapor pressure.
- The fluid then “boils.”
- Cavitation is the formation of “vapor” bubbles at the pump inlet.
- When the vapor bubbles return to liquid, the vapor collapses violently...
Implosion

Results of Cavitation



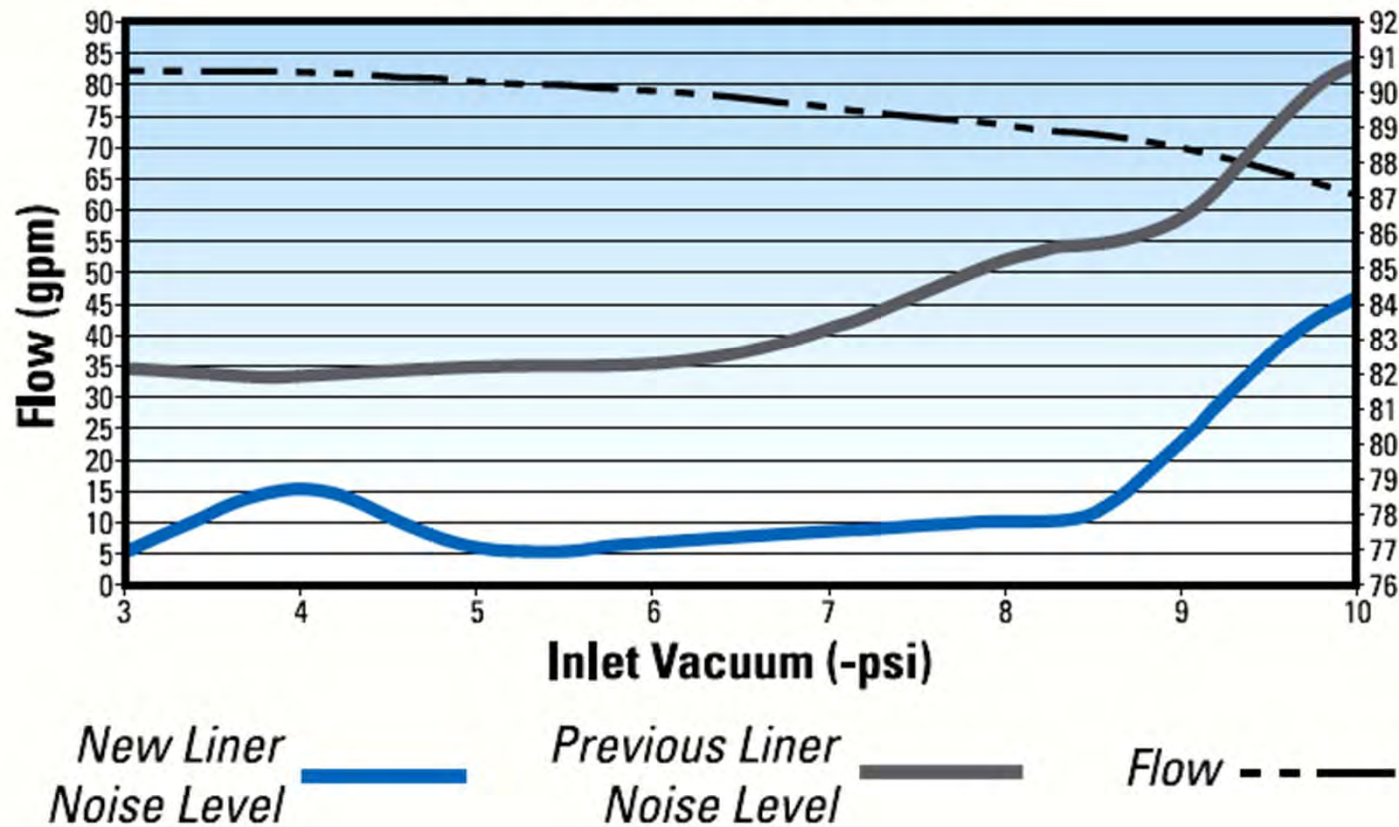
- Noise
- Vibration
- Damage to pump and piping
- Reduced flow

Cavitation Suppression Liners Standard in all LGL pumps

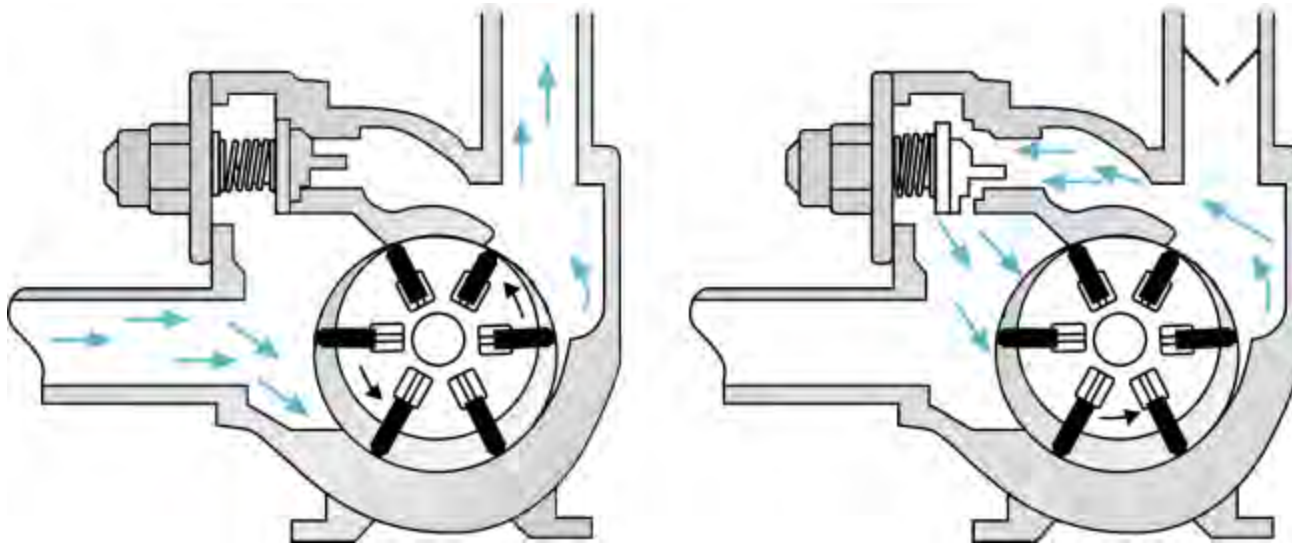


Cavitation Suppression Liners

Flow and Noise vs. Inlet Vacuum
TLGLF3, 125 psi, 640 rpm

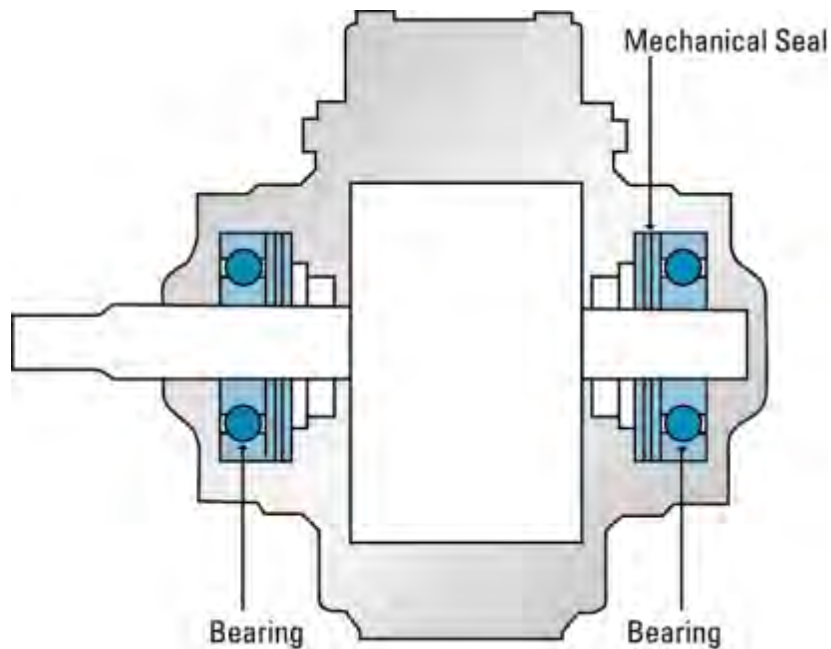


Relief Valves



- Blackmer relief valves protect the **pump**, not the system.
- Always recommend using external Bypass Valves

Ball Bearing Support



- Symmetrical ball bearing support
- Maintains even shaft load for mechanical seals & increased pump life



Why Rotary-Vane Pumps?

- Sustained high-level performance.
- Preferred technology for handling light petroleum fluids
 - like LPG.
- Maintains efficiency – longer pump life
- Easy maintenance.
- Symmetrical bearing loads for long life.
- High energy efficiency – lowers energy costs
- Maximum shaft sealing through:
 - exclusive integral mechanical seal design.
- Two Year Performance Assurance Warranty



Questions?

