



Where Innovation Flows.



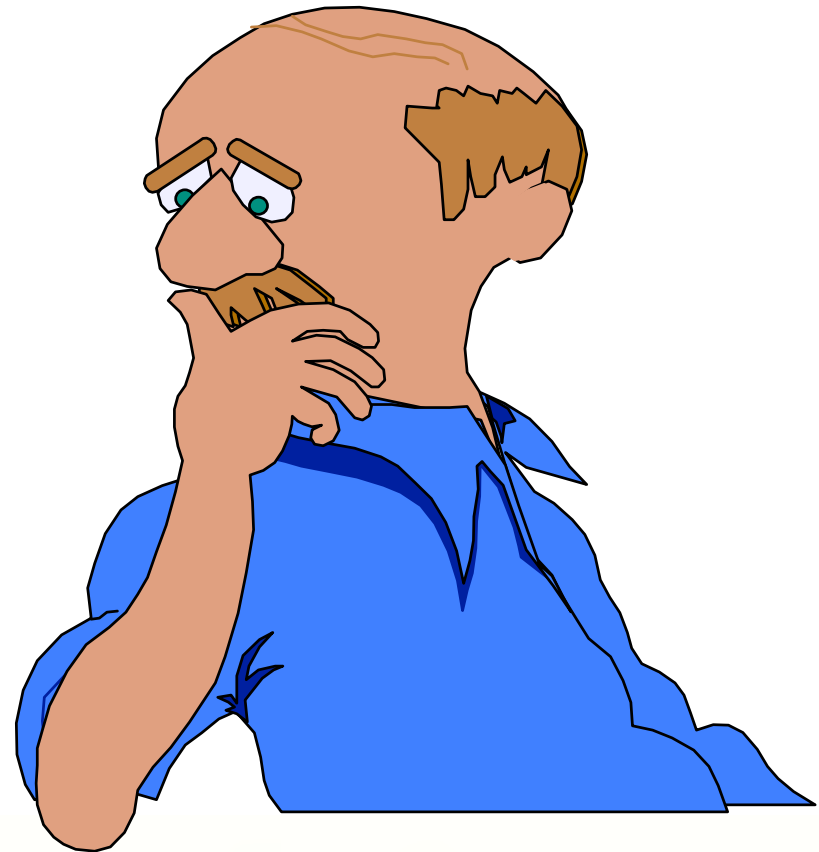
- ABAQUE
- ALMATEC®
- BLACKMER®
- ENVIROGEAR®
- FLUID DYNAMICS™
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# Blackmer Products

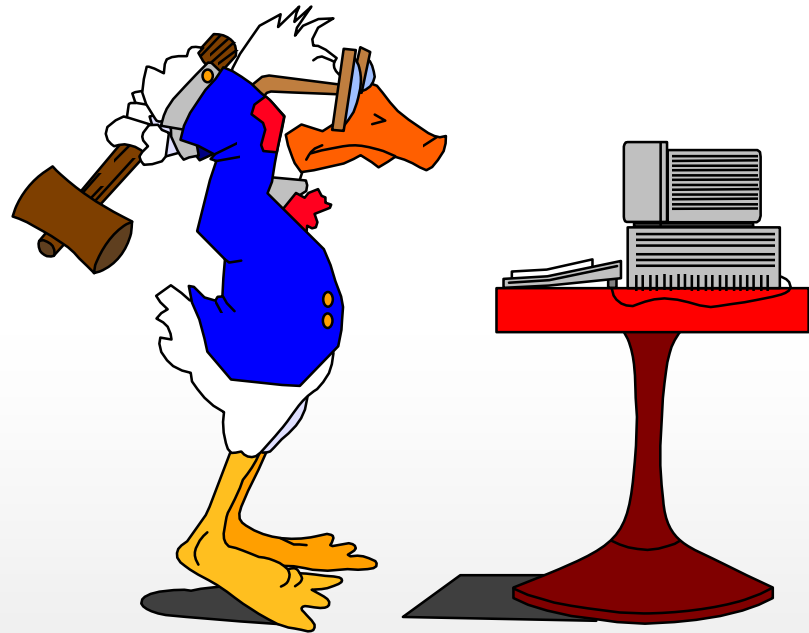
## WYTH'S LAW

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.

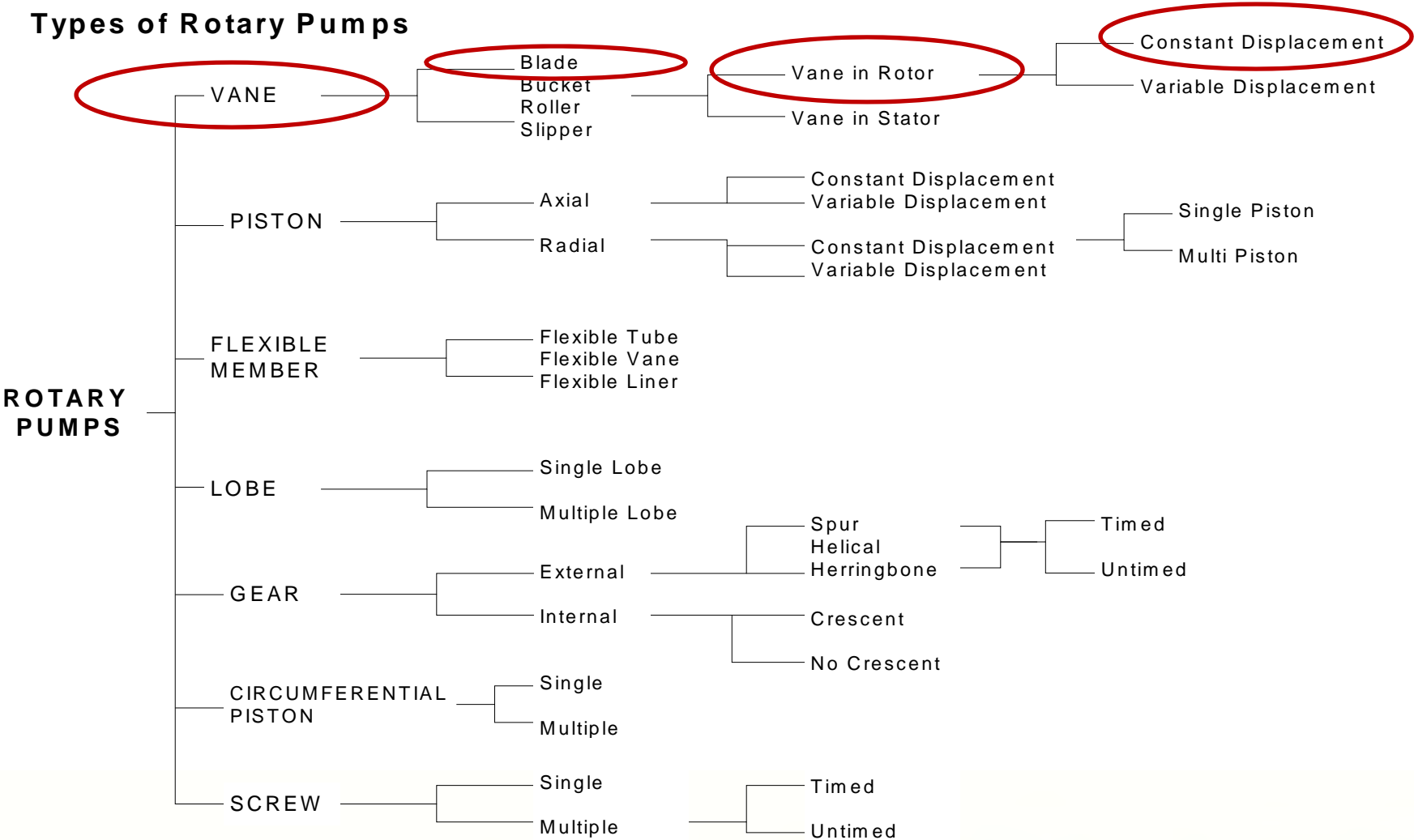


### **Pump Definition:**

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**

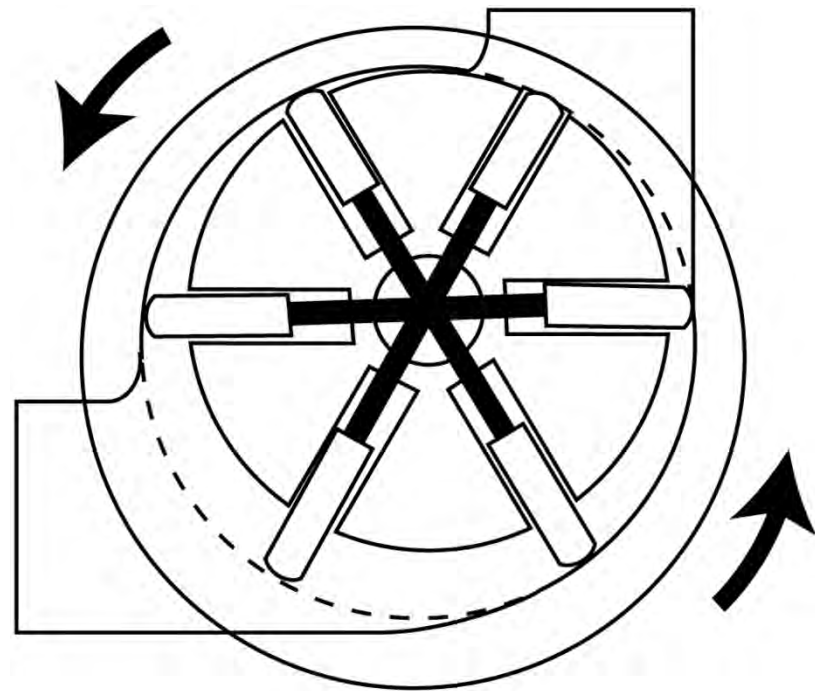
A constant volume of liquid is moved with each revolution of the pump.

- **Sliding-Vane Pumps**

Vanes slide in and out of a rotor.

## 3 Forces in Blackmer pumps

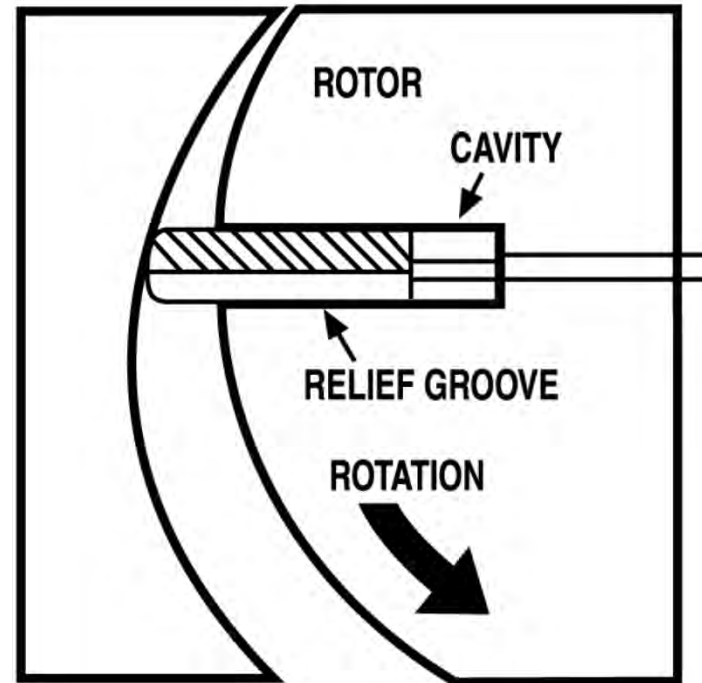
- CENTRIFUGAL FORCE
- PUSH RODS
- LIQUID PRESSURE





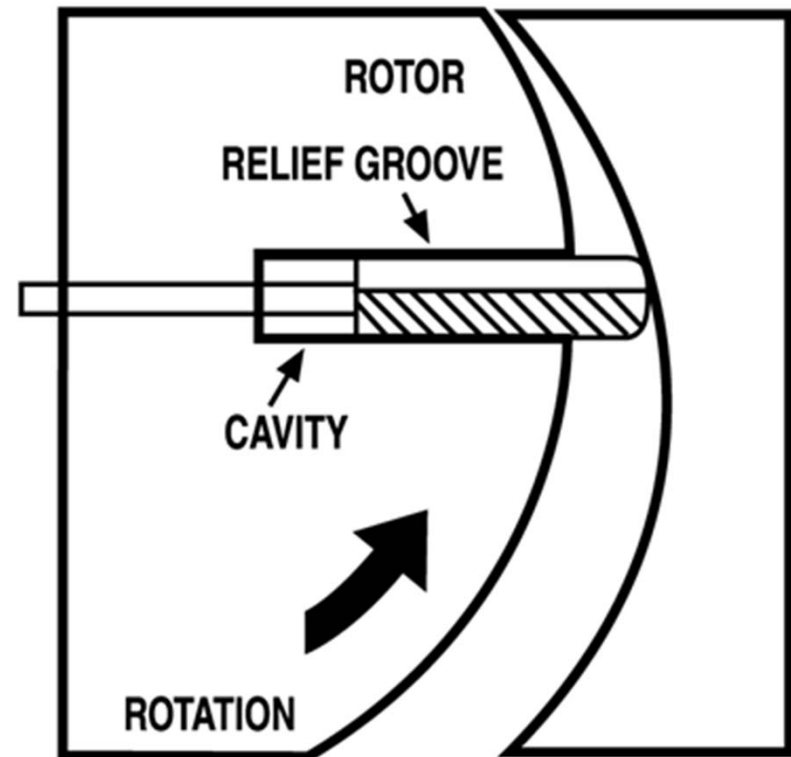
# Operating Principles

- 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.



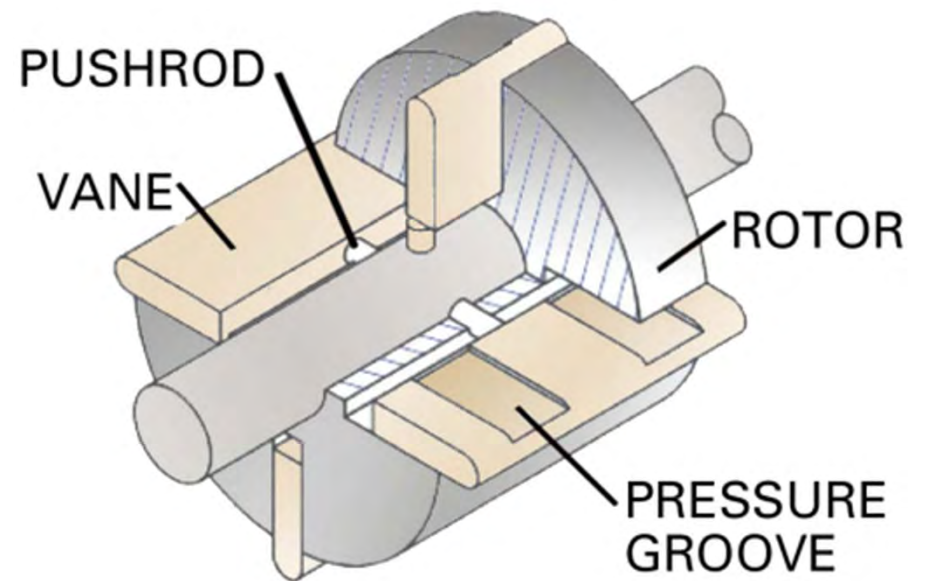
# Operating Principles

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

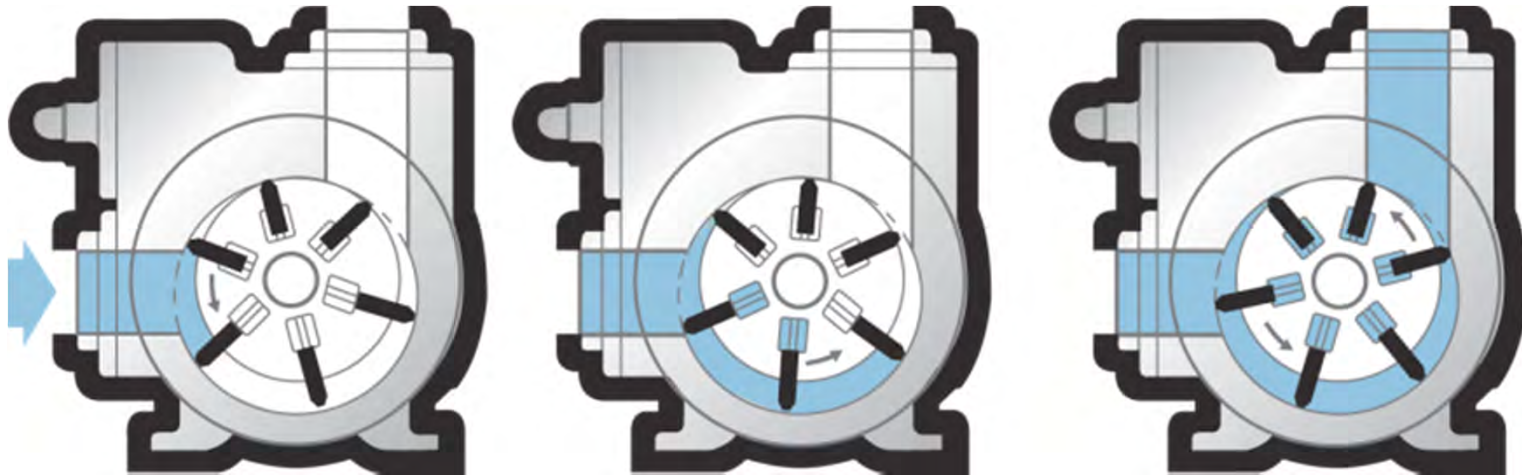


# Operating Principles

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

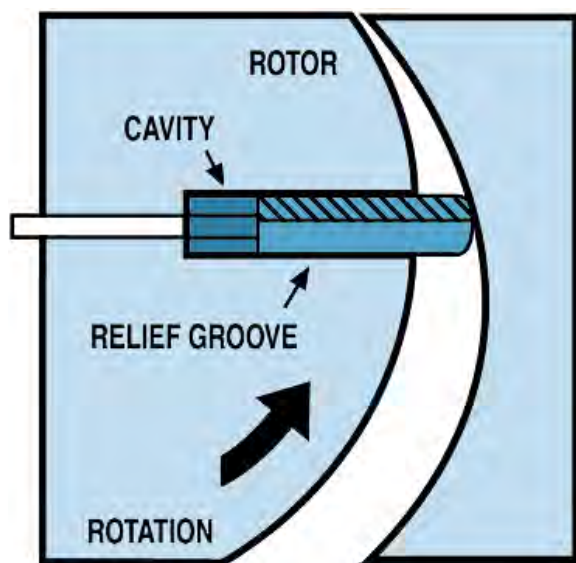
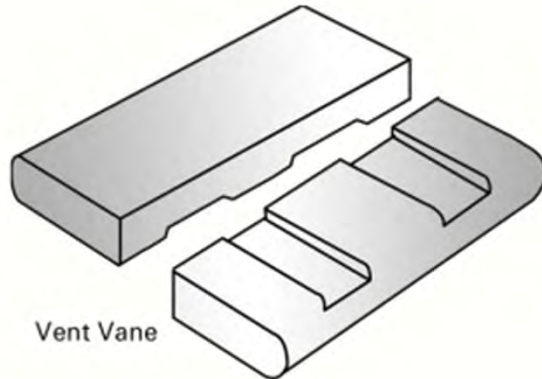


# Blackmer Pumps



- 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).

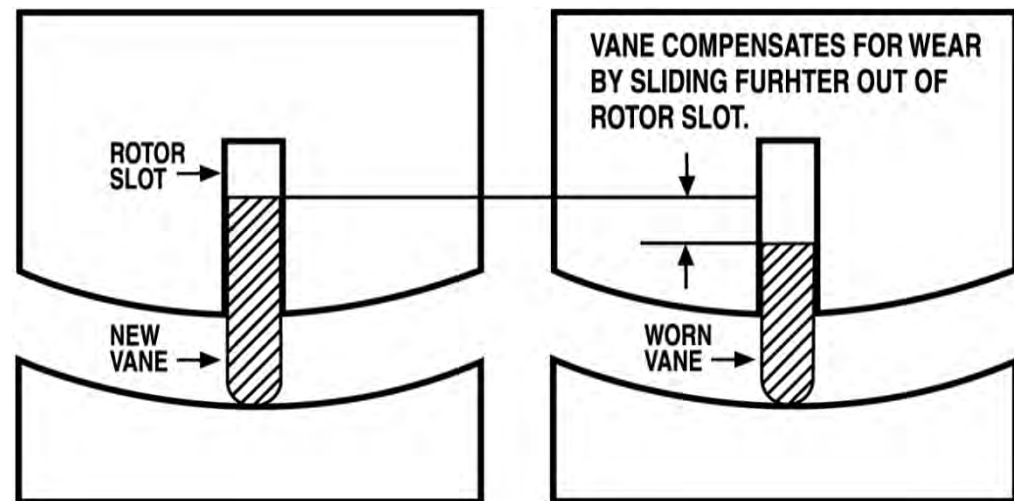
# Operating Principles



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

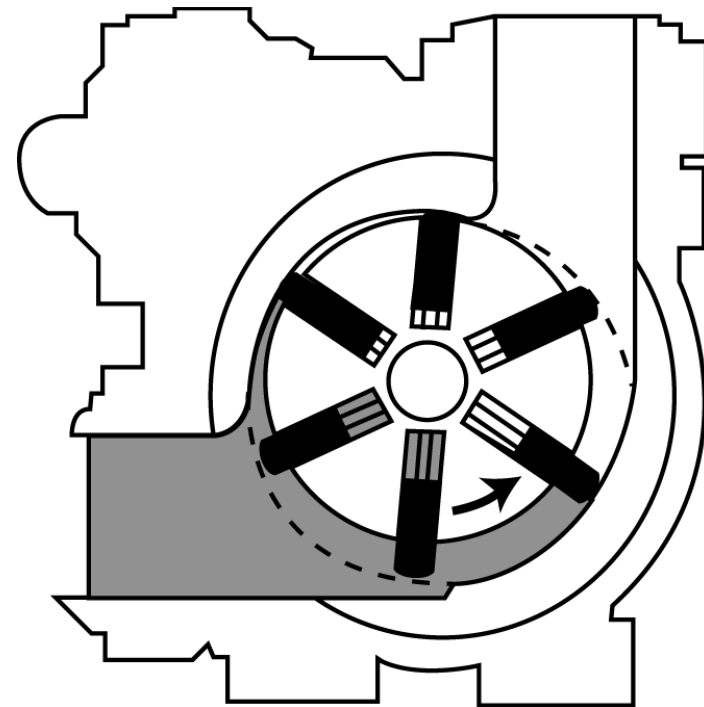
# Sliding Vanes

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



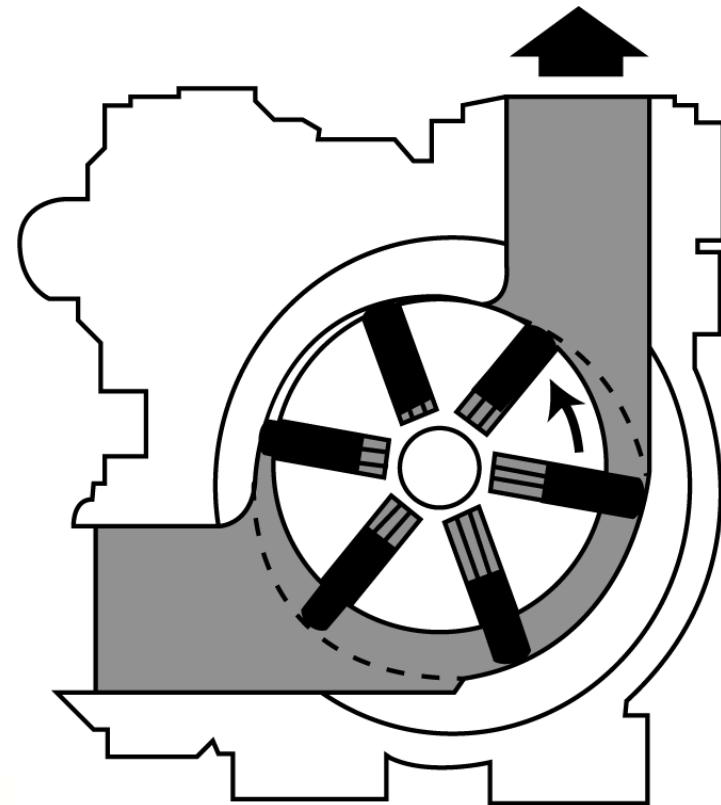
# Operating Principles

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



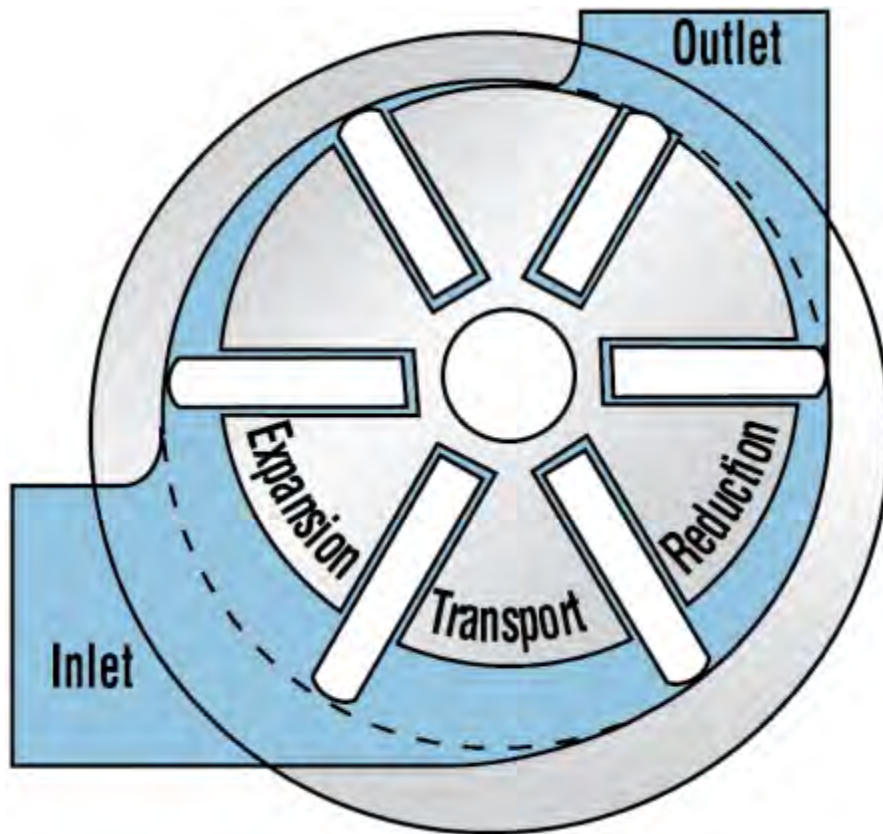
# Operating Principles

- 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.





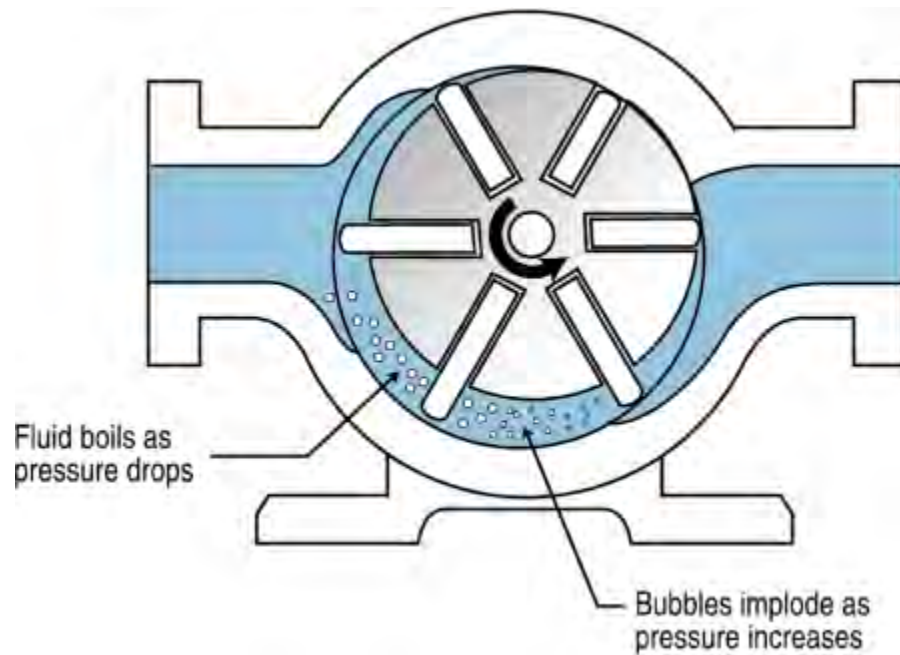
# Pumping Chamber Areas



**Fluid flow through the pump:**

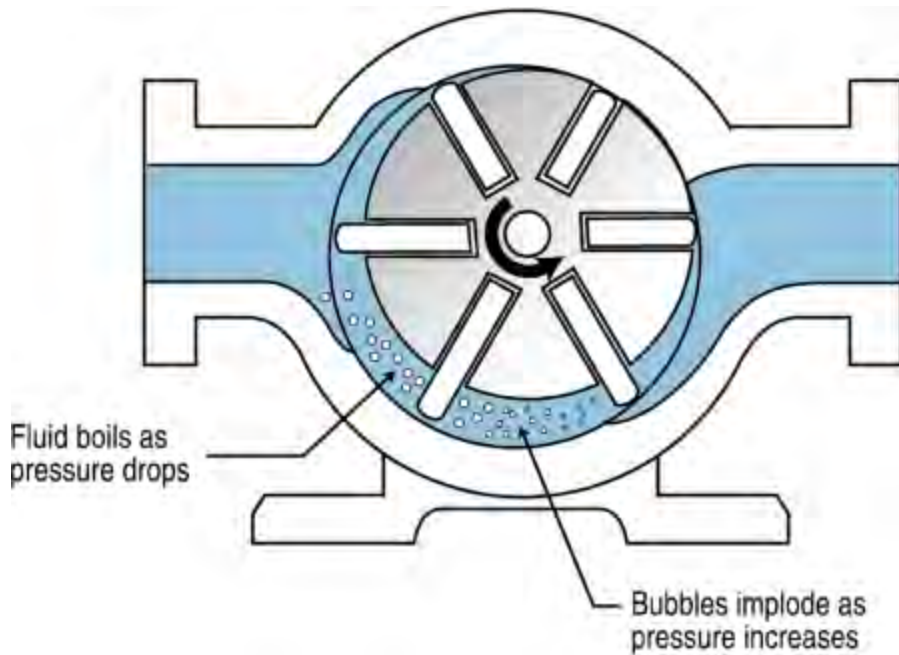
- **Inlet** - Expansion
- **Transport** - Static
- **Outlet** - Reduction

# Cavitation



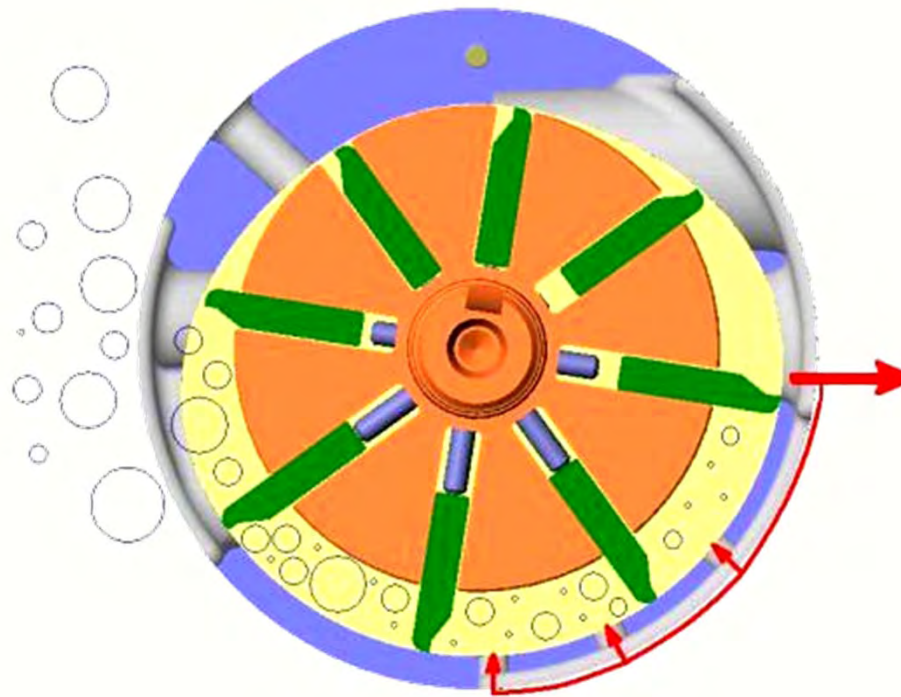
- Cavitation occurs when the pressure at the pump inlet drops below the fluid vapor pressure.
- The fluid then “boils.”
- Cavitation is the formation of “vapor” bubbles at the pump inlet.
- When the vapor bubbles return to liquid, the vapor collapses violently...  
***Implosion***

# Results of Cavitation



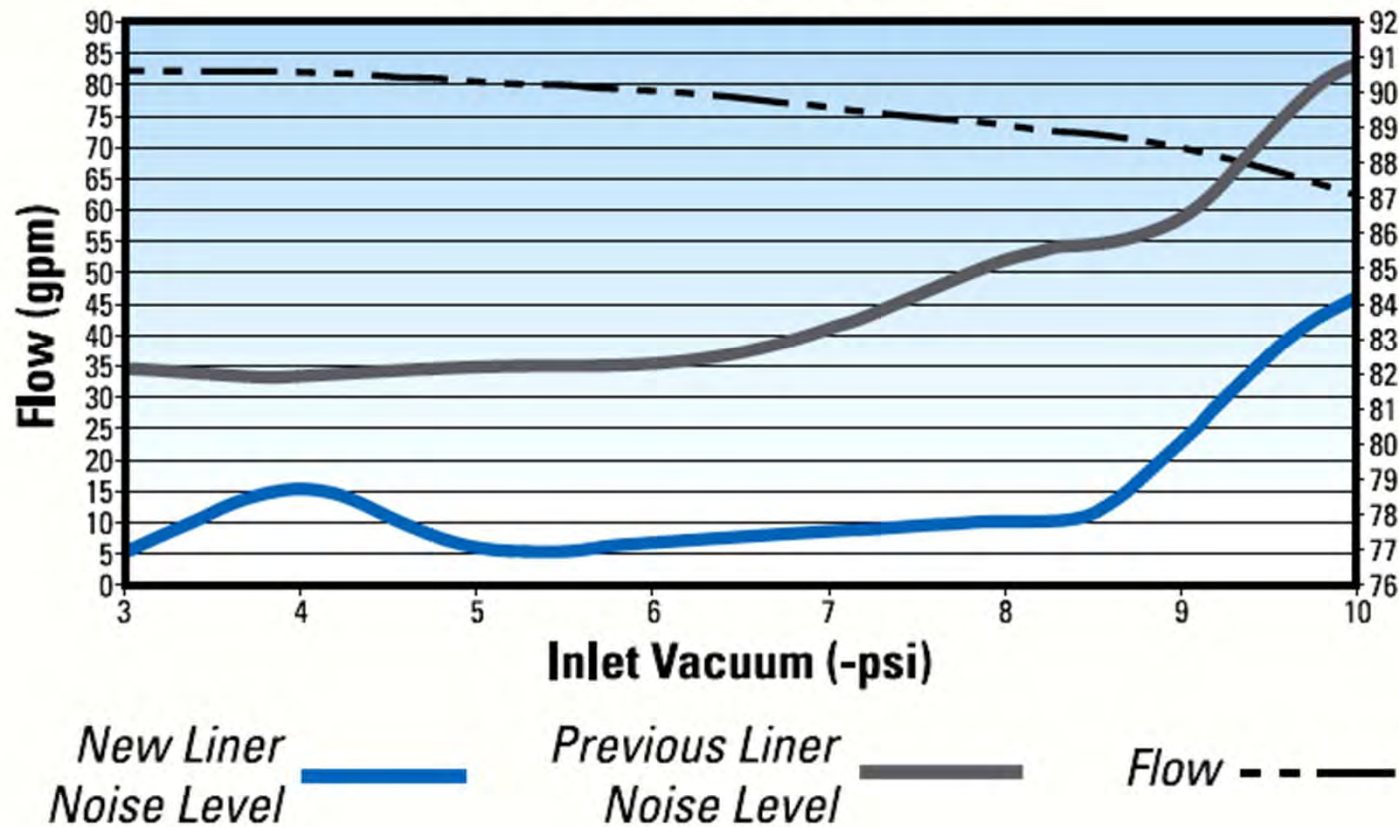
- Noise
- Vibration
- Damage to pump and piping
- Reduced flow

## Cavitation Suppression Liners Standard in all LGL pumps

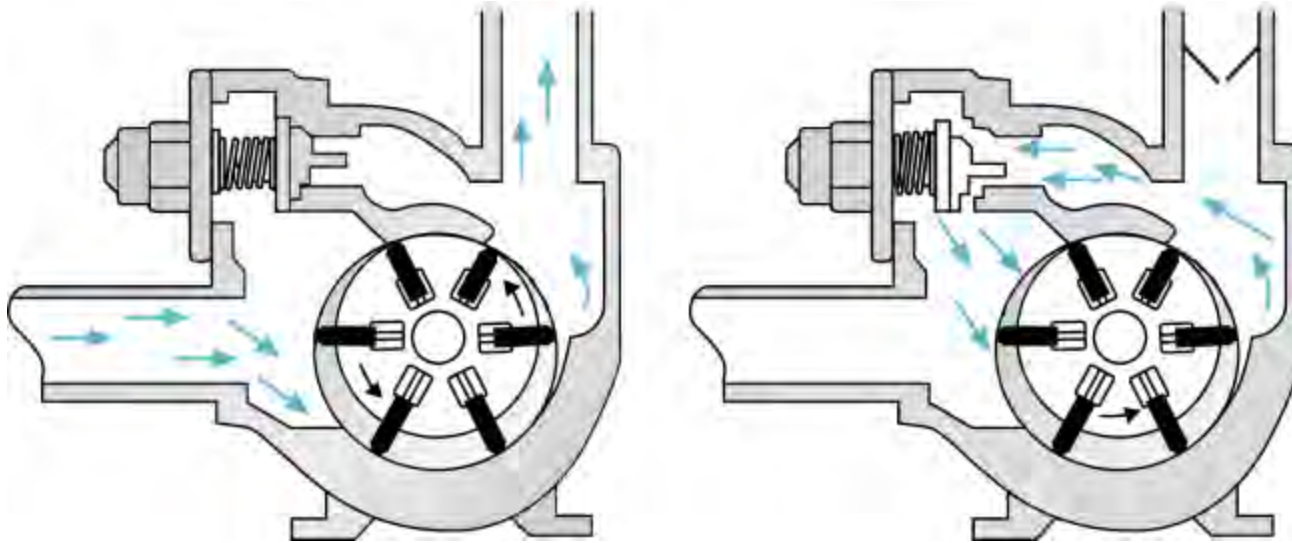


# Cavitation Suppression Liners

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

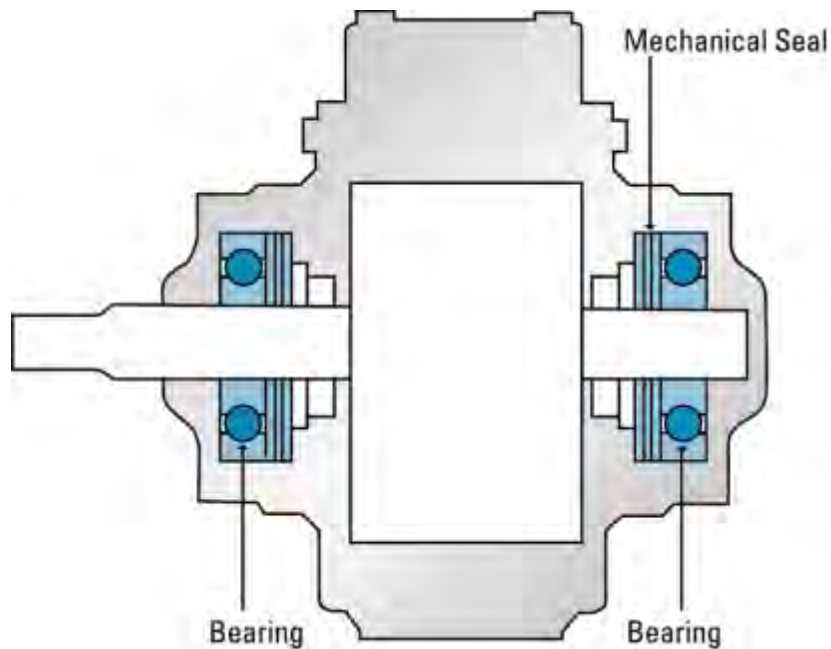


# Relief Valves



- 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?**

