

Pump Efficiency

Types of pumps

- ▶ ANSI centrifugal
- ▶ Lobe sanitary
- ▶ Self-priming centrifugal
- ▶ Rotary gear
- ▶ Horizontal split case
- ▶ Metering/dosing
- ▶ Reciprocating plunger/piston
- ▶ Air operated
- ▶ High pressure
- ▶ Multi-stage
- ▶ Progressive
- ▶ Cavity
- ▶ Submersible
- ▶ Vertical pumps
- ▶ Diaphragm
- ▶ Magnetically driven



Common uses for pumps today

- ▶ Irrigation
- ▶ Water supply
- ▶ A/C systems
- ▶ Refrigerant
- ▶ Chemical movement
- ▶ Sewage movement
- ▶ Flood control
- ▶ Marine services

Primary functions of a pump

- ▶ Transfer energy from a power source to fluid, and as a result create flow, lift, and greater pressure on fluid.
- ▶ Impart three types of hydraulic energy to fluid including lift, pressure, and velocity.

Ways to improve pump efficiency

- ▶ Change to more efficient pump.
- ▶ Example: switch air pump to electric driven.
- ▶ Add VFD if the flow is variable and being throttled.
- ▶ Pump efficiency changes exponentially with speed (affinity laws only apply to centrifugal pumps - 80% speed, 50% power).
- ▶ Exponent of 3 is theoretical; real-world best case is ~2.2.
- ▶ Pump staging.
- ▶ Use minimum pump power to meet flow requirement.
- ▶ Trim impeller — if reduced, but constant flow is needed.

