Chapter 13 Pump selection and Applications
(We skipped chapter 12)

In Chapter 7, we introduced the general energy equation.

It included a term h_A – energy added by a pump.

h_A is also called "total head on the pump"

Some pump manufacturers refer to this as "the total dynamic head."

We also had the power delivered to the fluid by the pump:

$$P_A = h_A \gamma Q$$

We also had the concept of efficiency:

$$e_M = \frac{P_A}{P_I}$$

Parameters involved in pump selection:

1. The nature of the fluid to be pumped
2. The required capacity (volume flow rate)
3. The conditions on the suction side (inlet) of the pump
4. The conditions on the discharge side (outlet) of the pump
5. The total head on the pump
6. The type of system to which the pump is delivering the fluid.
7. The type of power source (electric motor, diesel engine, steam turbine, etc.)
8. Space, weight, and position limitations
9. Environmental conditions
10. Cost of pump purchase and installation
11. Cost of pump operation
12. Governing codes and standards

Based on these parameters you are in position to select a pump

Need to do:

1. Type of pump and manufacturer
2. Size of pump
3. Size of suction connection and type (flanged, screwed, etc.)
4. Size and type of discharge connection
5. Speed of operation
6. Specification for driver (electric motor – power required, voltage, phase, frequency, etc.)
7. Coupling type, manufacturer, and model numbers
8. Mounting details
9. Special materials and accessories required, if any
10. Snap seal design and seal materials

Types of Pumps:

Pumps are typically classified as either positive displacement or kinetic pumps.

[TODO - Picture of positive displacement]

Positive displacement pumps – Ideally deliver a fixed quantity of fluid with each revolution of the pump rotor or drive shaft.

Most positive-displacement pumps can handle a wide variety of fluids in terms of viscosity.

Disadvantage – pulsating output

Reciprocating pumps – employ a piston that draws fluid into a cylinder through an intake valve as the piston draws away from the valve.

Then, as the piston moves forward, the intake valve closes and the fluid is pushed out through the discharge valve.

Such a pump is called "simplex"

[TODO – picture of simplex pump graph]

Kinetic Pumps – add energy to the fluid by accelerating it through the action of a rotating impeller.

Centrifugal pump is the most common type of kinetic pump..