

# Constant Pressure Water Systems

Recent Developments in Water  
Systems

# Types of Water Systems

- Elevated Storage, (water towers)
- Hydropneumatic
- Flat Storage
- Constant Pressure Systems
  - Constant Pressure Valve
  - Variable Speed

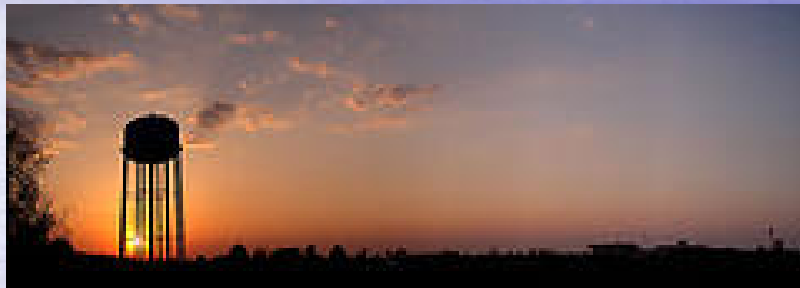


Water  
Tower

Not like  
this



# Water Tower Styles





# Elevated Storage

- Very simple system
- Normally has a water tower in the system
- Common for Municipal System
- Provides storage for peak flows, like fire, periods of high demand
- Provides relatively constant pressure
- Typically has SCADA system to monitor operation

# Hydropneumatic Systems

- Typically has a pressure tank to reduce the number of pump starts
- There is normally a 20 psi pressure differential from pump start to stop





# Hydropneumatic Systems

- Very little storage for system with captive air tanks
- Tank sizing is critical for long pump life



# Flat Storage

- Kind of a hybrid of the elevated system and the Hydropneumatic
- Large storage is provided by tank on ground
- Stored water is pressurized by a pump to the water system
- There may be a 20 psi differential unless a VFD is used on the pump
- Common in large municipal system for peaking or smaller systems with low capacity source



# Constant Pressure Systems

- Two Main Types
  - Pressure Regulating Valve
  - Variable Speed
- Smaller Pressure Tank Required
- Reduced Cycling of Pump

# Pressure Regulating Valve

- Uses a pressure regulating (pressure reducing) valve with a bypass
- Simple mechanical system
- Maintains a constant pressure above a preset flow
- Provides a minimum flow to fill pressure tank and turn of pump



# Pressure Regulating Valve

- Uses Standard Pump and Motor
- Uses standard pressure switch and controls
- Pipe between Pump and Valve must be designed to with stand shut off head of pump
- Shut off head minus the system pressure must be less than valves rated pressure differential

# Constant Pressure Valves





# Variable Speed Pumps

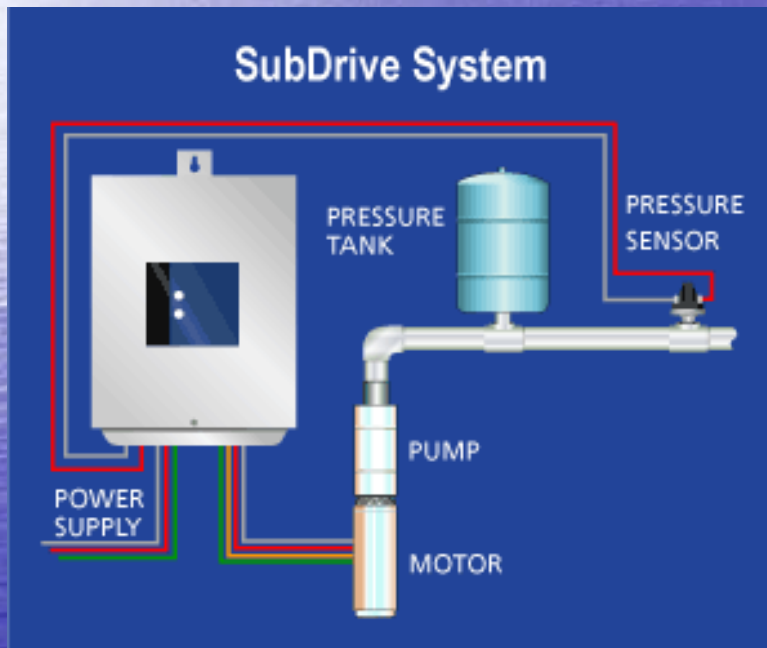
- Pump speed is varied to maintain the pressure at the required demand.
- Pressure Feedback is Needed
  - Pressure Transducer
  - Pressure Sensor
- Soft Starts
- Generally Requires Three Phase Motors

# Variable Speed Pumps

- Some Systems use Proprietary Motors and or Pumps
- Different Sizes of Pumps can be used for the same Task
- Can be any type, Generally centrifugal

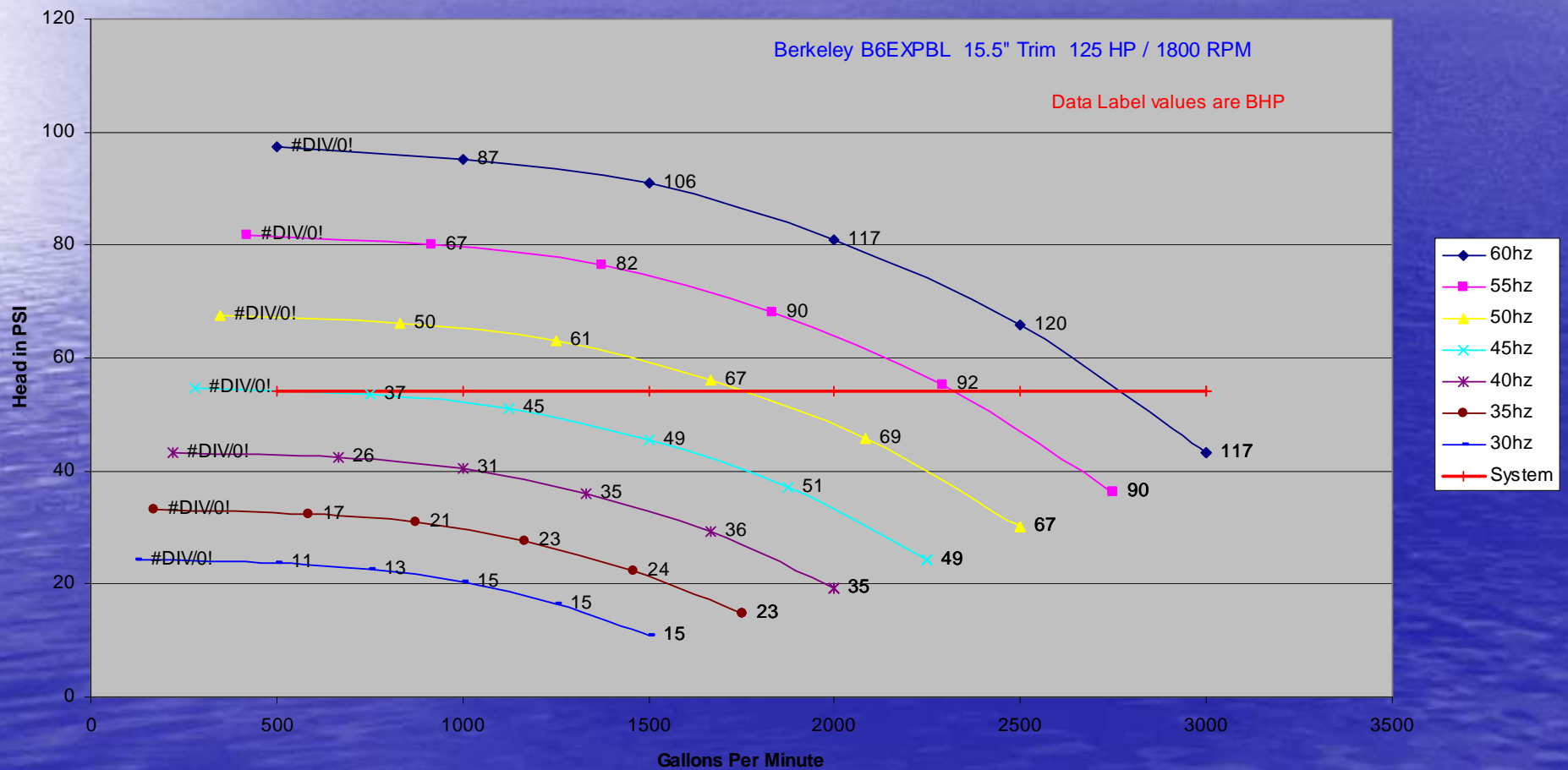


# Variable Speed Drives



# Variable Speed Curves

VFD Control (PSI)





# Other Uses for VFD's

- Water Level Control
- Water Temperature Control
- Soft Starts, reduced demand charges
- Convert Single Phase Power to Three Phase Power so large Pumps can be Operated Where Only Single Phase is Available

# Typical Installations





# Another Way of Constant Pressure

- Install Hydropneumatic system
- Set Pressure Switch cycle above the highest pressure desired.
- Install Pressure Reducing Valve at Desired Pressure
- Pressure will remain constant, except for slight pressure drop as flow increases

# Conclusions

- Constant Pressure Systems produce the water needed at a more constant pressure than Hydropneumatic Systems
- They require smaller pressure tanks
- This results in less expensive and easier installations
- Constant Pressure systems if properly installed reduce water hammer.



# Conclusions

- If properly installed, Constant Pressure Systems extend pump and motor life
- VFD's greatest benefits result in systems with dynamic head characteristics

# Good Sites For More Info

- <http://www.pumped101.com>
- <http://www.cyclestopvalves.com>