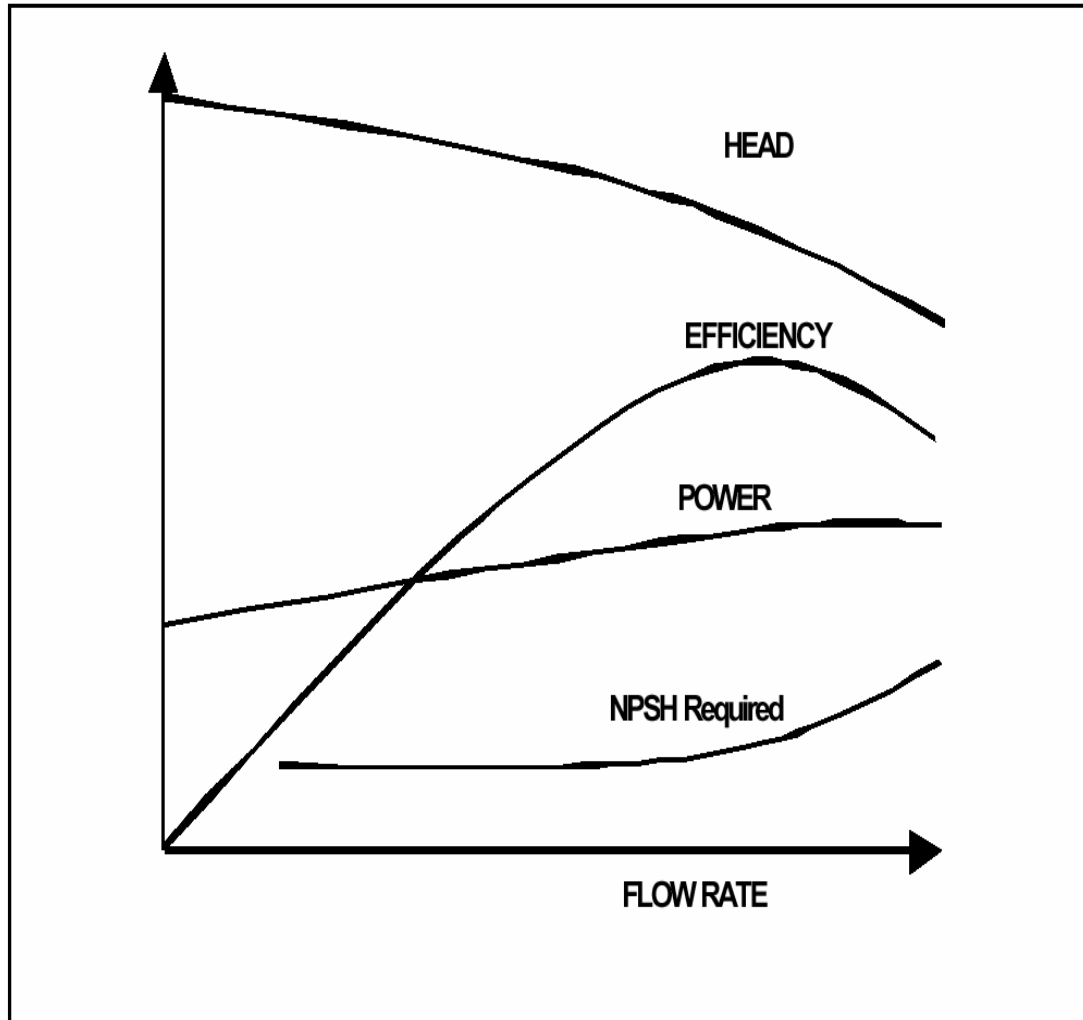


# PUMP PERFORMANCE CURVE



# PUMPS

- The head and capacity are the main factors, which affect the horsepower size of the motor to be used.
- **Head** - impeller diameter, number of impellers, - size of impeller eye & shaft speed.
- **Capacity** - exit width of the impeller.

# PUMPS

- **Total developed head,  $H$** = The difference of discharge and suction pressure
- The pump head represents the net work done on unit weights of a liquid in passing from
- inlet of the pump to the discharge of the pump.
- There are three heads in common use in pumps namely
- (i) Static head
- (ii) Velocity head
- (iii) Friction head
- The frictional head in a system of pipes, valves and fittings varies as a function (roughly as the square) of the capacity flow through the system.
- **System resistance:** The sum of frictional head in

# HYDRAULIC POWER, PUMP SHAFT POWER AND ELECTRICAL INPUT POWER

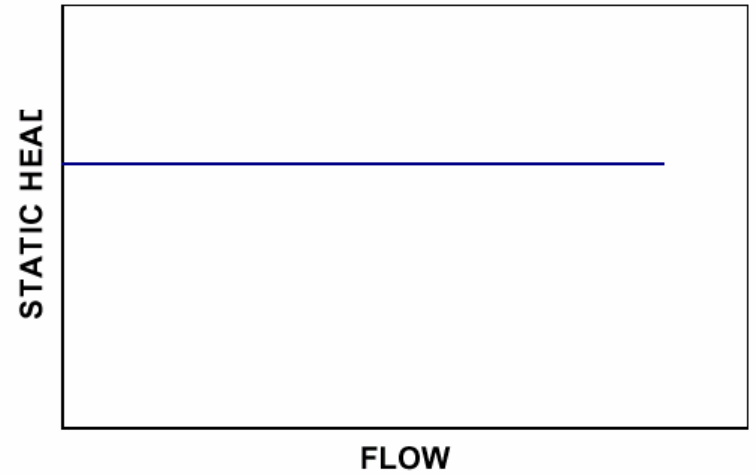
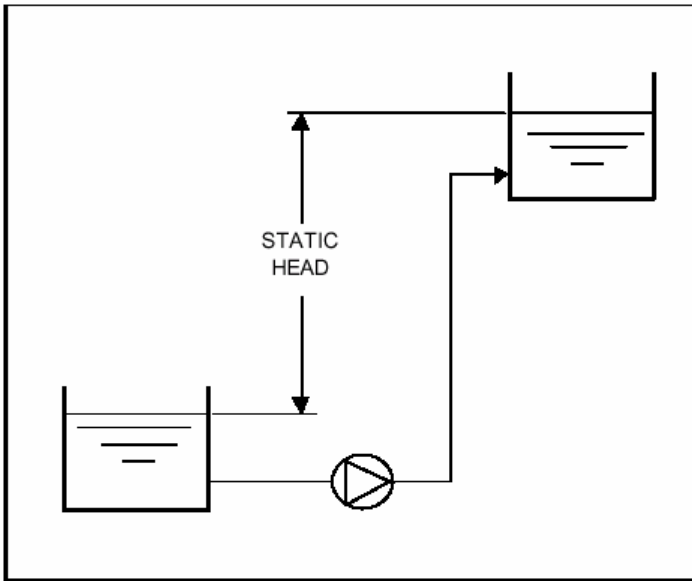
$$\text{Hydraulic power } P_h = \frac{Q(\text{m}^3/\text{s}) \times \text{Total head, } h_d - h_s (\text{m}) \times \rho (\text{kg}/\text{m}^3) \times g (\text{m}^2/\text{s}^2)}{1000}$$

Where  $h_d$  - discharge head,  $h_s$  - suction head,  $\rho$  - density of the fluid,  
 $g$  - acceleration due to gravity

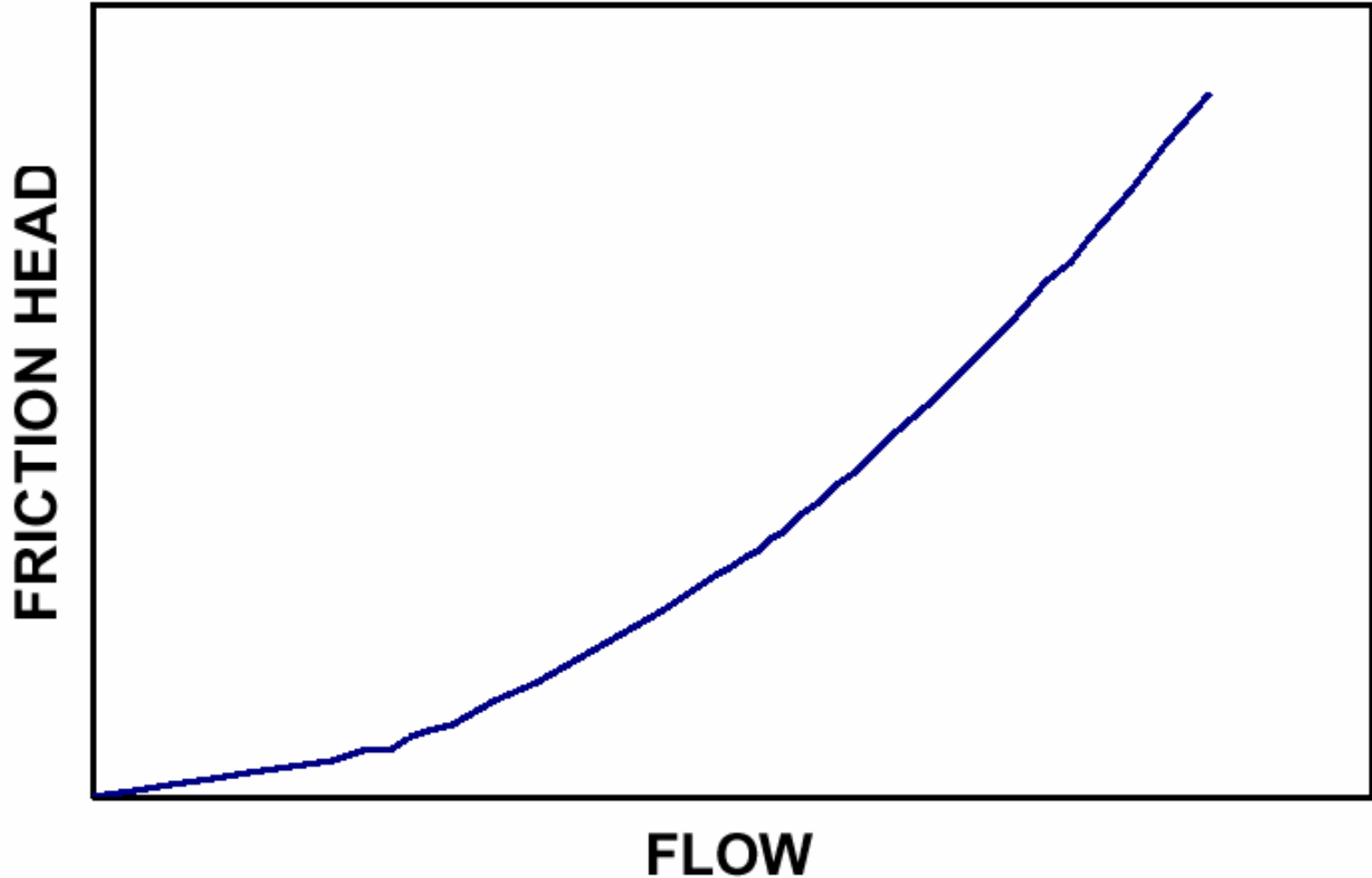
$$\text{Pump shaft power } P_s = \frac{\text{Hydraulic power, } P_h}{\text{pump efficiency, } \eta_{\text{Pump}}}$$

$$\text{Electrical input power} = \frac{\text{Pump shaft power } P}{\eta_{\text{OTORM}}}$$

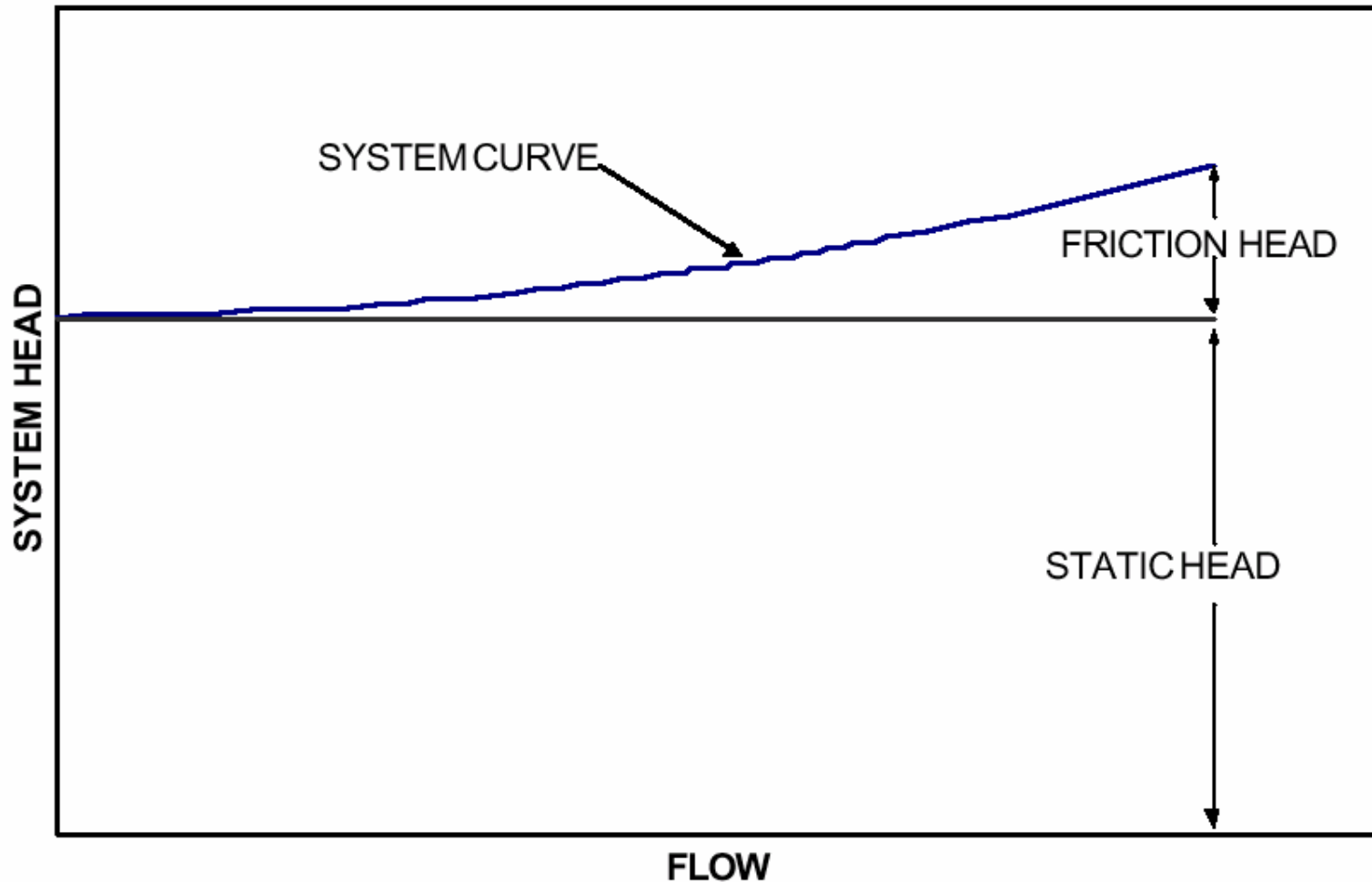
# STATIC HEAD



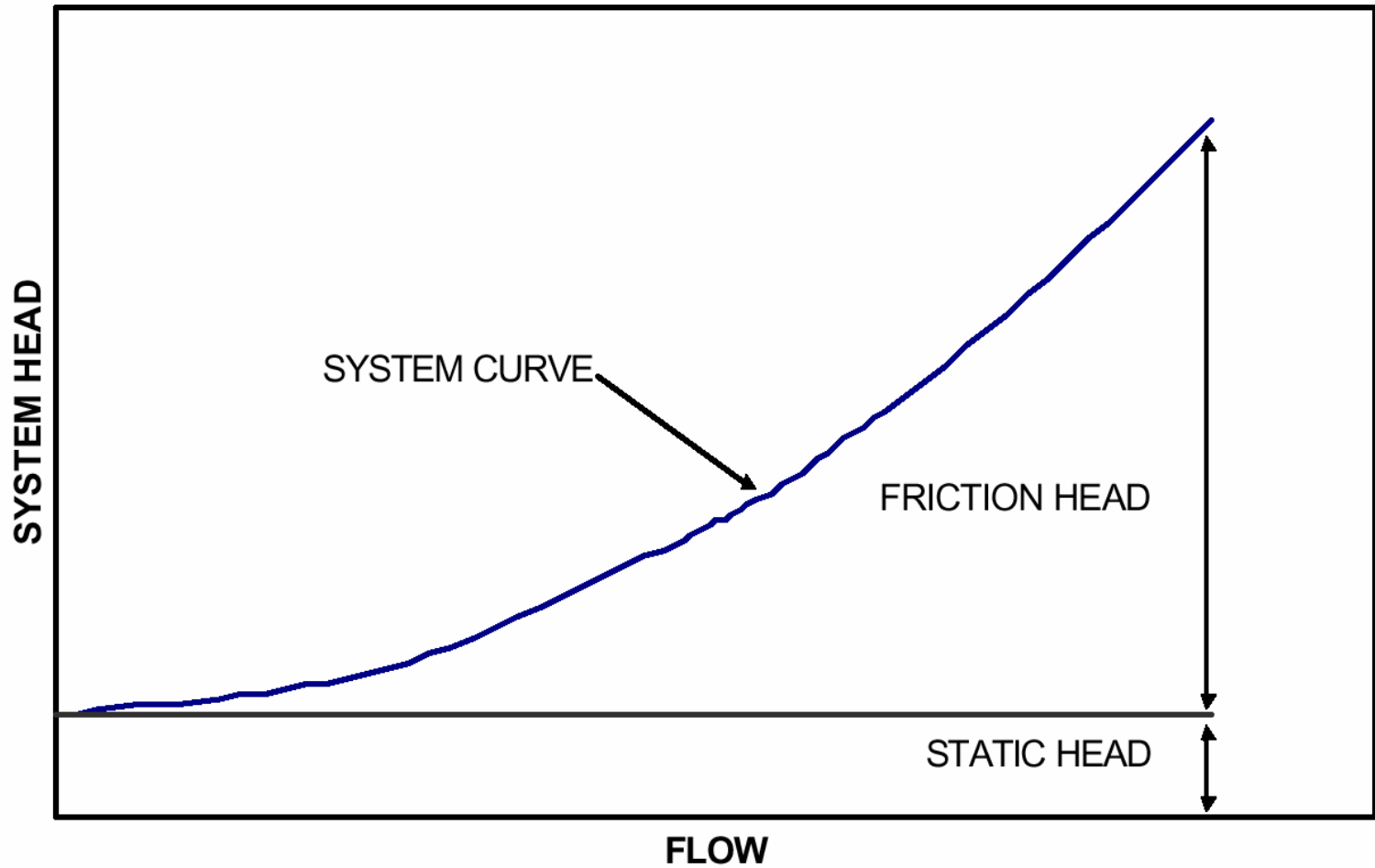
# DYNAMIC (FRICTION) HEAD



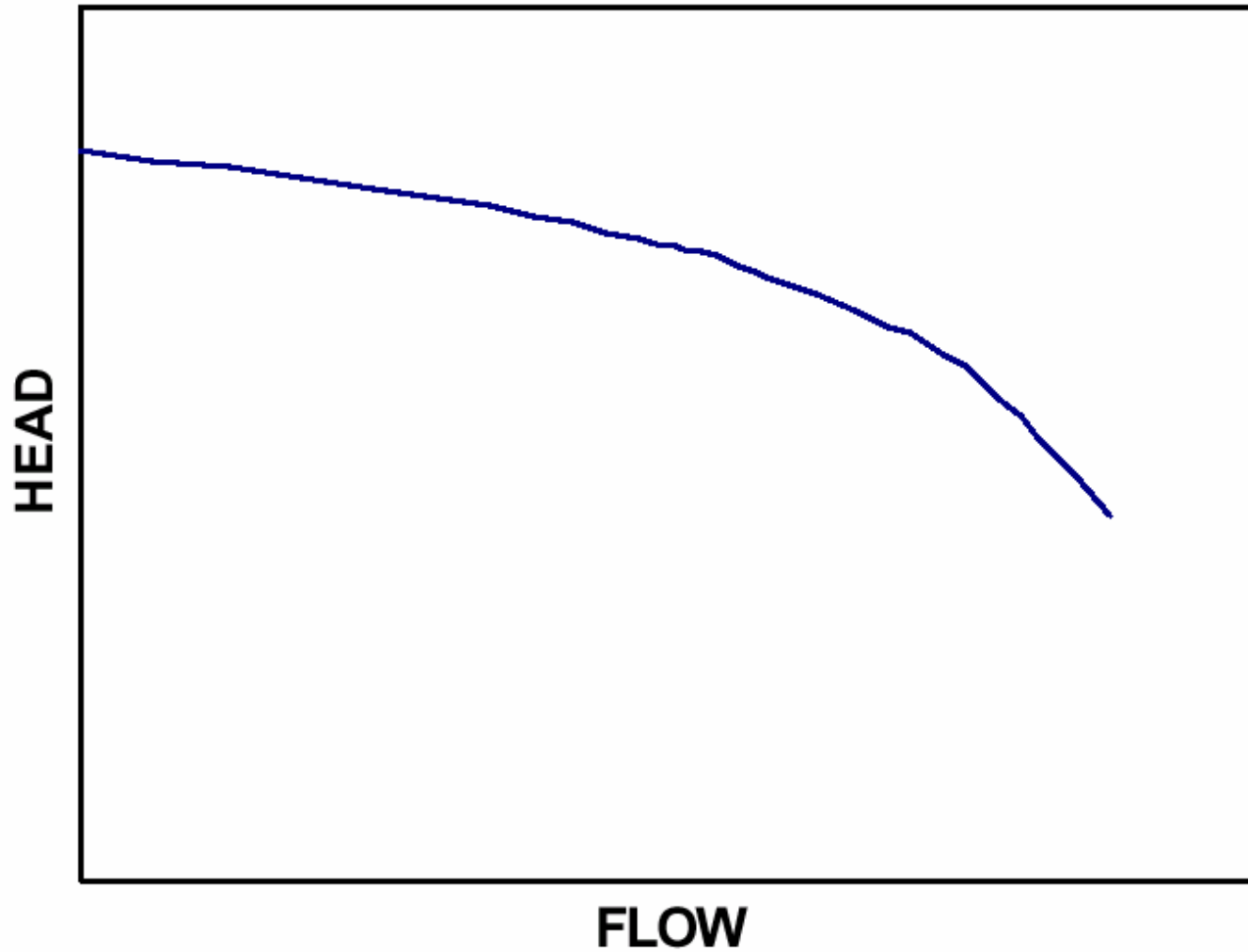
# SYSTEM WITH HIGH STATIC HEAD



# SYSTEM WITH LOW STATIC HEAD



# PUMP CURVE



# PUMP OPERATING POINT

