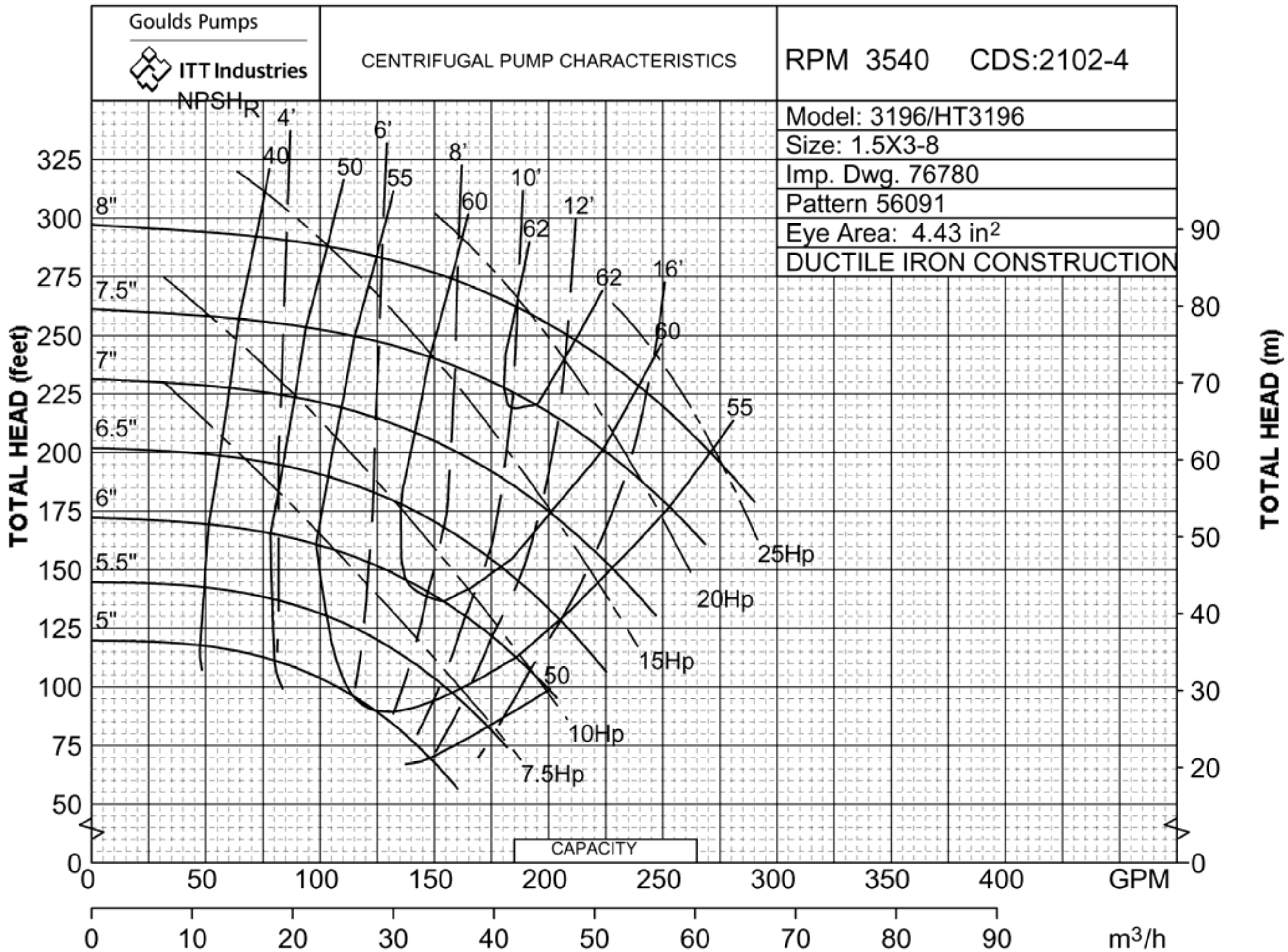
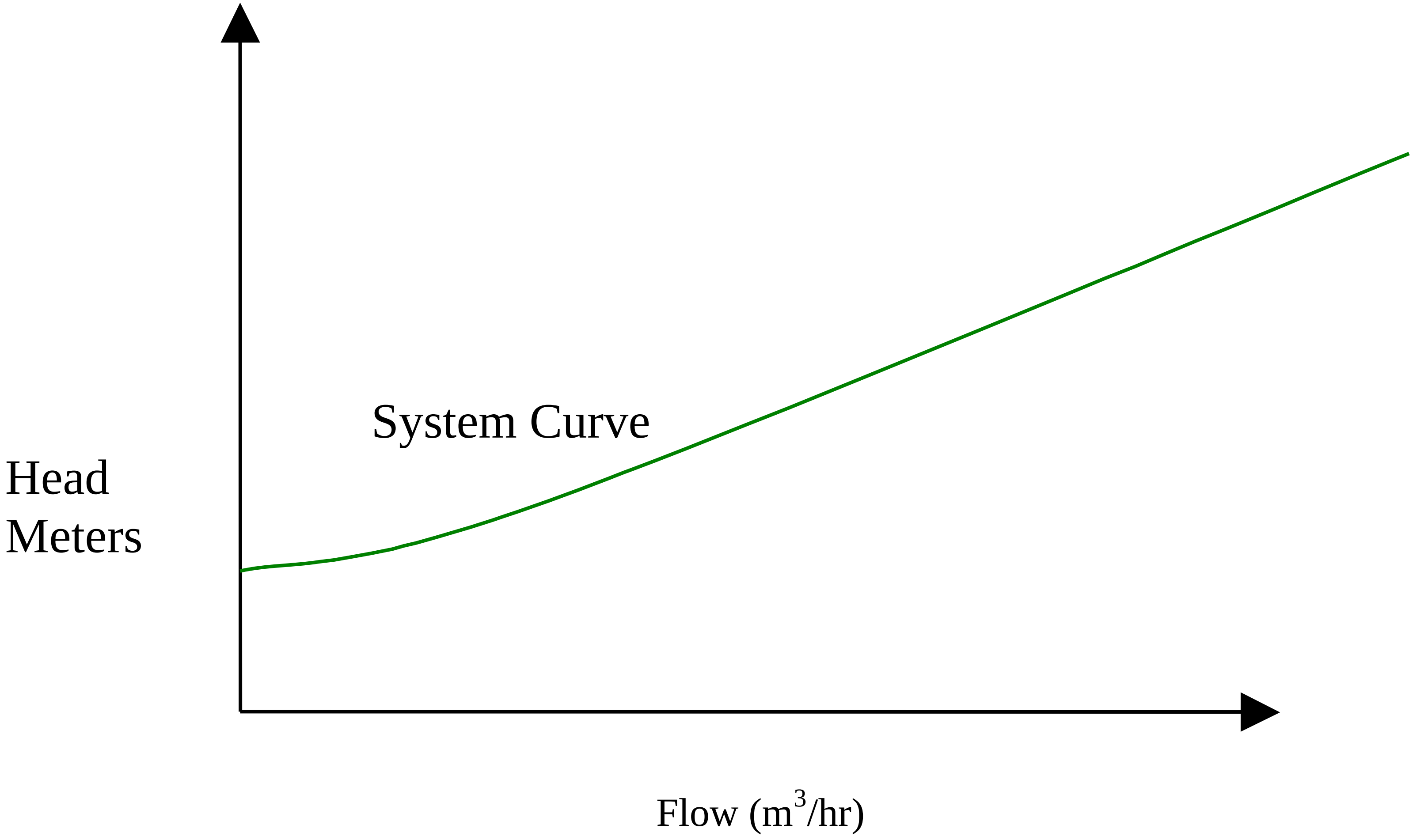
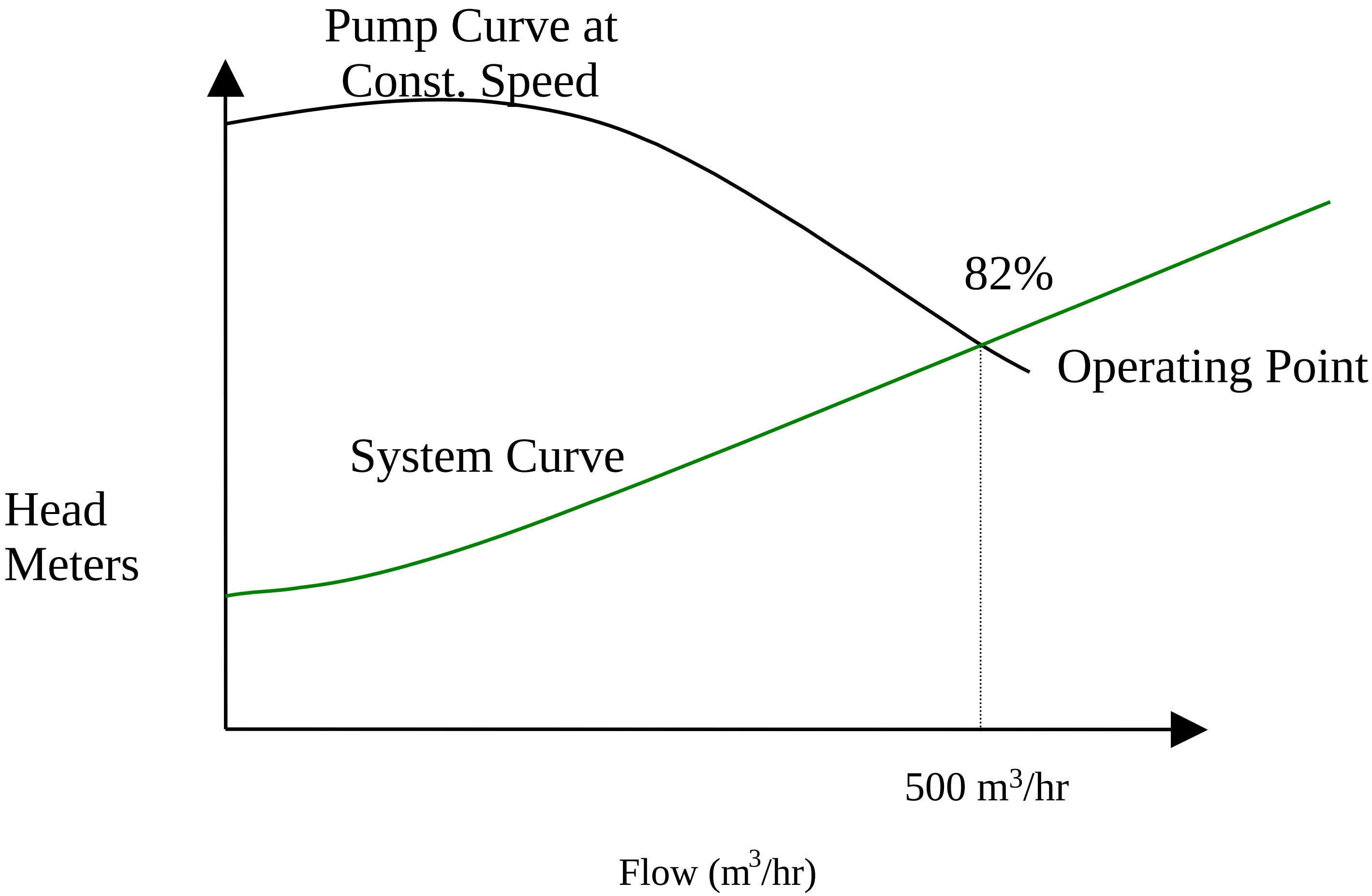
TYPICAL PUMP CHARACTERISTIC CURVES



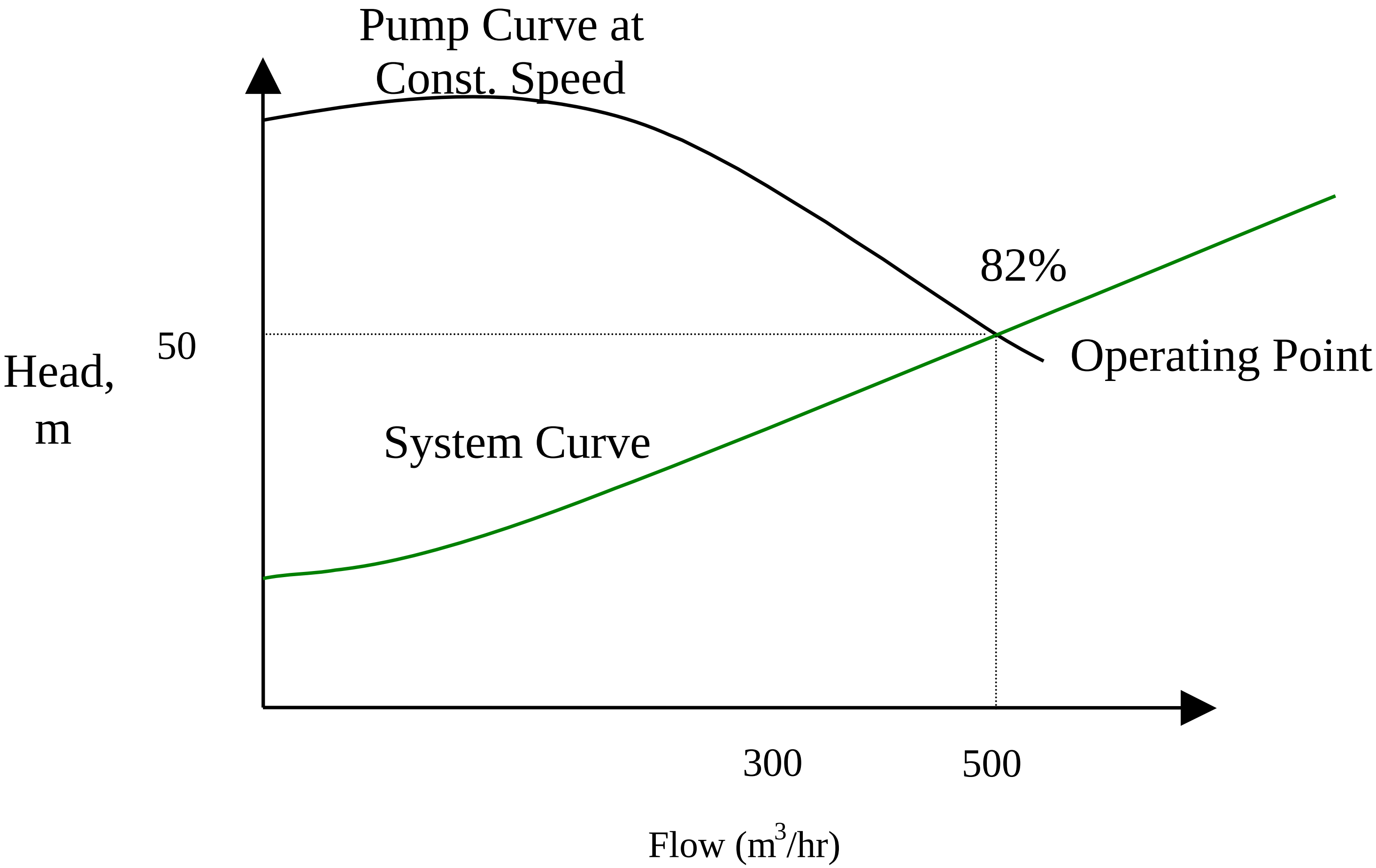
SELECTING A PUMP



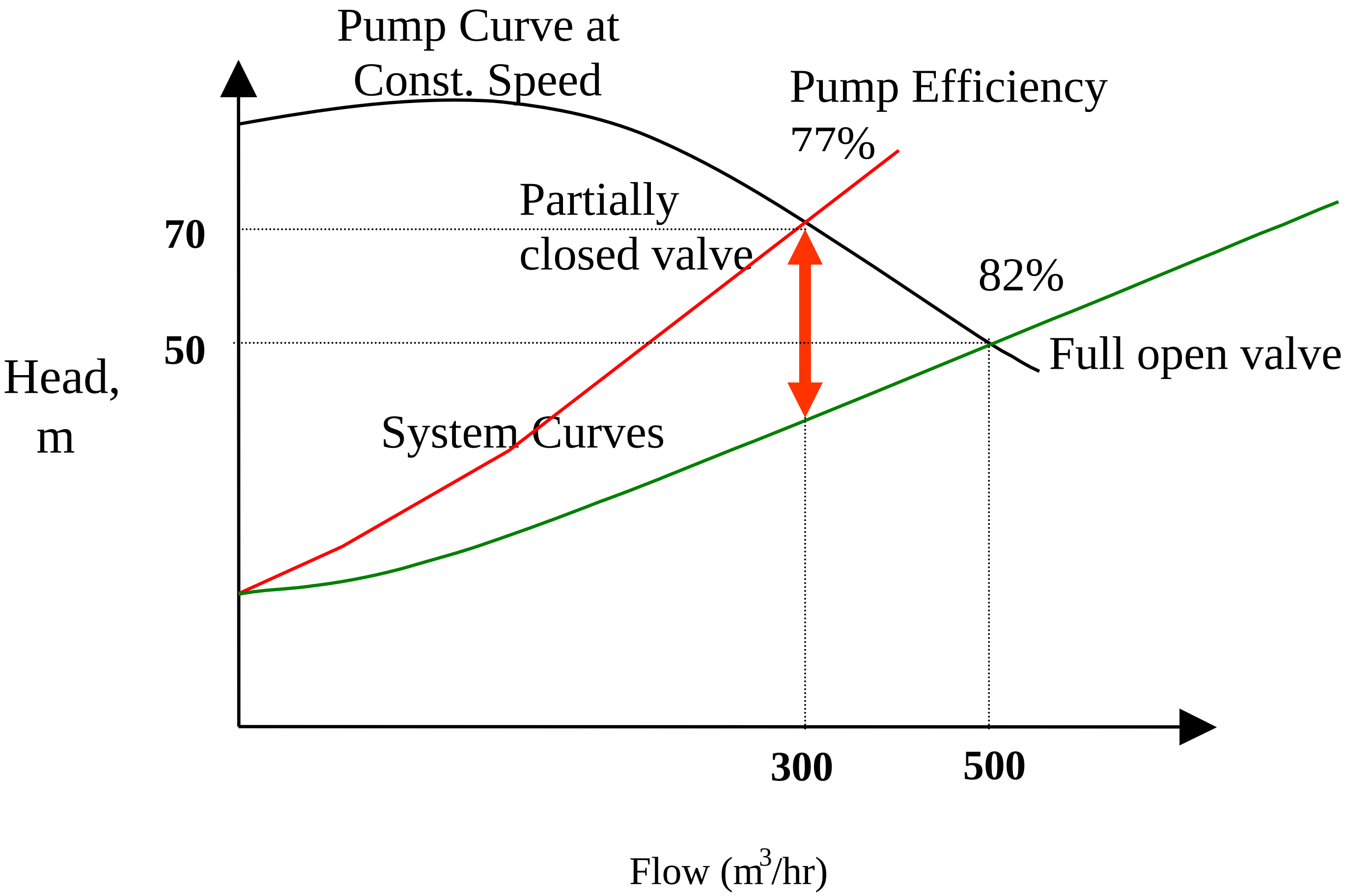
SELECTING A PUMP



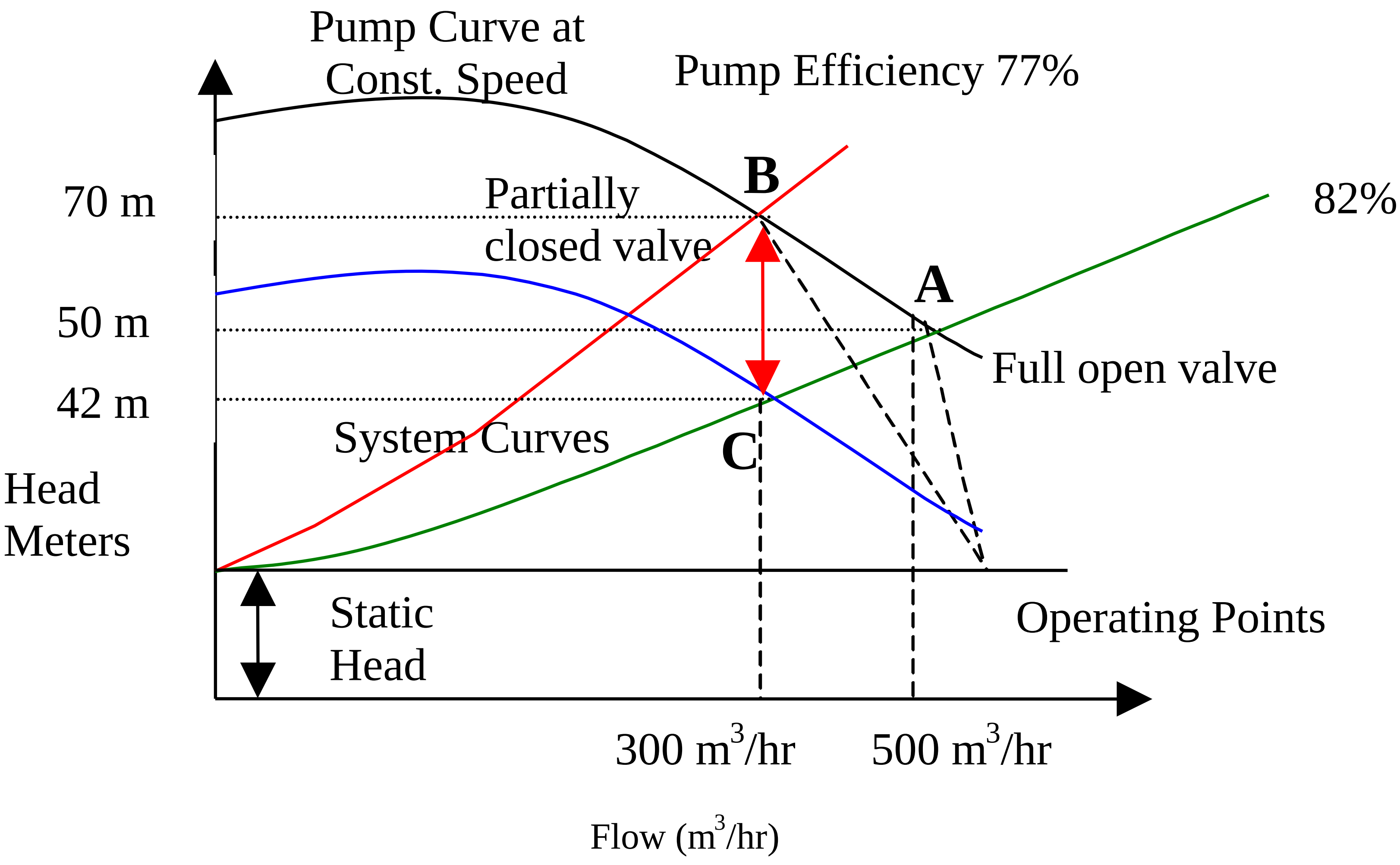
SELECTING A PUMP



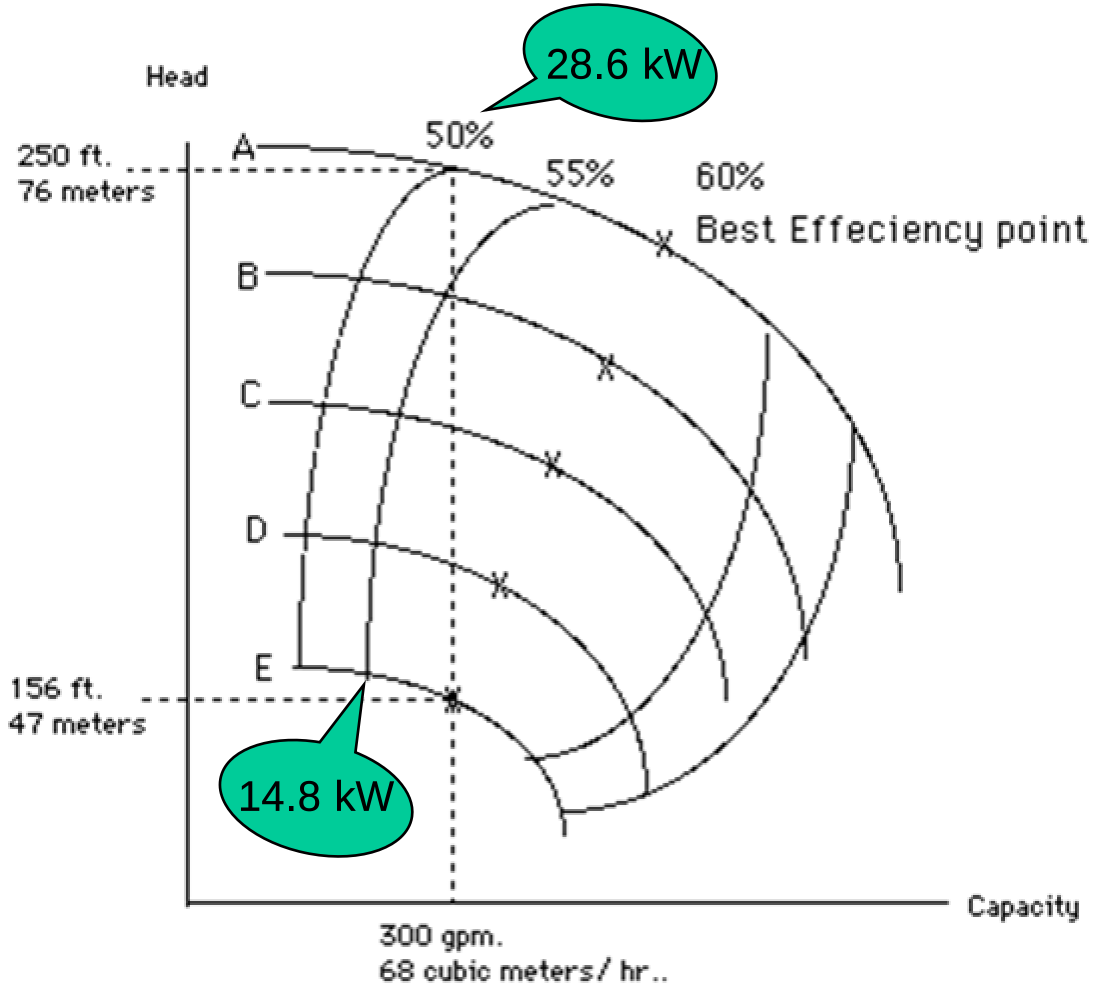
SELECTING A PUMP



SELECTING A PUMP



EFFICIENCY CURVES



IF WE SELECT E, THEN THE PUMP EFFICIENCY IS 60%

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

  $= \frac{(68/3600) \times 47 \times 1000 \times 9.81}{1000}$

  = 8.7 kW

- Shaft Power - 8.7 / 0.60 = 14.5 Kw
- Motor Power - 14.8 / 0.9 = 16.1Kw (considering a motor efficiency of 90%)

IF WE SELECT A, THEN THE PUMP EFFICIENCY IS 50%

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

$$\frac{(68/3600) \times 76 \times 1000 \times 9.81}{1000}$$

= 14 kW

Shaft Power - 14 / 0.50 = 28 Kw

Motor Power - 28 / 0.9 = 31 Kw (considering a motor efficiency of 90%)

USING OVERSIZED PUMP !

As shown in the drawing, we should be using impeller "E" to do this, but we have an oversized pump so we are using the larger impeller "A" with the pump discharge valve throttled back to 68 cubic meters per hour, giving us an actual head of 76 meters.

•Hence, additional power drawn by A over E is 31 –16.1 = 14.9 kW.

•Extra energy used - 8760 hrs/yr x 14.9 = 1,30,524 kw.

= Rs. 5,22,096/annum

In this example, the extra cost of the electricity is more than the cost of purchasing a new pump.