Pump 1

K.A

$P_{in} = 16\,HP = \frac{16\,lb_F \cdot ft}{s}$

$\Delta P = 34 \frac{lbf}{in^2} = 34\,PSI$

$Q = 2.139\ m^3/min$

$$\frac{lbf/in^2 \cdot m^3/min}{\Delta P \quad lbf \cdot ft/s \quad Q \quad P_{in}}$$

$$\frac{lbf}{in^2} \cdot \frac{m^3}{min} \cdot \frac{P_{in}}{lbf \cdot FT}$$

$$P_{in} = 16\,HP \times \frac{550\ lbf \cdot ft}{s \cdot HP} \times \frac{60\,s}{min} \times \frac{12\,in}{ft}$$

$$= 6336000\ \frac{lbf \cdot in}{min}$$

$$Q = 2.139\ \frac{m^3}{min} \times \frac{35.315\,ft^3}{1\,m^3} \times \frac{1728\,in^3}{1\,ft^3} = 130531.0\ \frac{in^3}{min}$$

units: $\frac{lbf}{in^2} \cdot \frac{in^3}{min} \cdot \frac{min}{lbf \cdot in} = \frac{lbf \cdot in^3 \cdot min}{in^2 \cdot min \cdot lbf}$

$$\frac{34\ lbf/in^2 \cdot 130531.0205\ in^3/min}{6336000\ lbf \cdot in/min} = 0.700450552$$

$\eta = 0.70$

$= 70\%$