

Pump 2

$$1 \text{ mm Hg} = 61.333 \text{ Pa}$$

$$239 \text{ kW} = 239000$$

$$\eta = \frac{Q \Delta P}{P_{in}}$$

$$Q = \text{Cross-sectional Velocity} = m^2 \cdot \frac{in}{min} = \frac{m^3}{s}$$
$$= 1 m^2 \cdot 11811 \frac{m}{min} \cdot 0.00004 \frac{min}{s} = 4.7244 m^3$$

$$\text{units: } \frac{m^3}{s} \cdot \frac{kg}{m \cdot s^2} / \frac{kg \cdot m^2}{s^3} = \frac{m^3 \cdot kg}{s^3 \cdot m} \cdot \frac{s^3}{kg \cdot m^2} = 1$$

$$\eta = \frac{4.7244 \cdot (915 \text{ mm Hg} - 760 \text{ mm Hg}) \cdot 133.3 \text{ Pa}}{239000 \text{ watts}}$$

$$= \frac{4.7244 \cdot 20661.5}{239000 \text{ watts}} = 0.36559247 \hat{=} 37\%$$