

CHE 4253

Chemical Engineering Process Design and Safety, Fall 2018

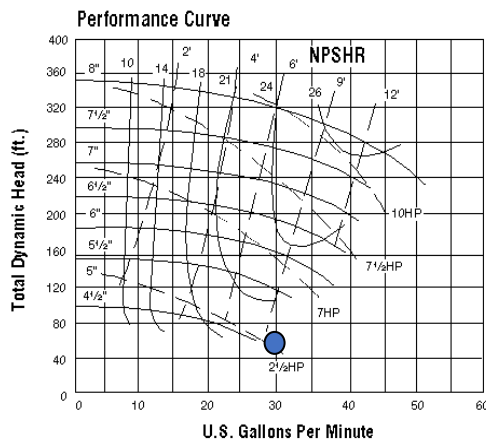
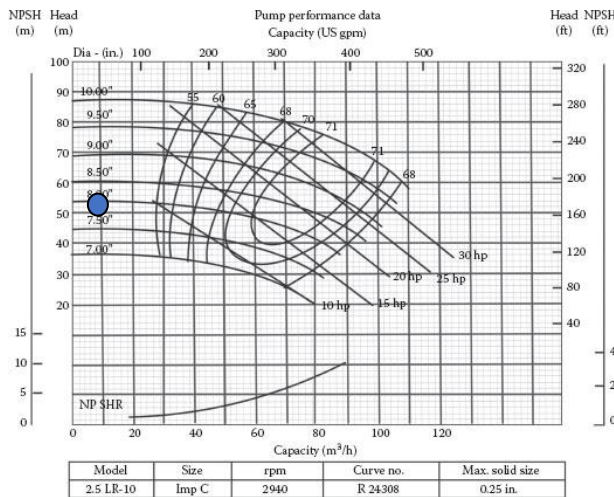
QUIZ # 6- Canvas Part III

Multiple Choice part: (5 minutes total) (20 points)

Assume that the system curve is given by

$$\Delta p_{\text{sys}}(\text{ft}) = 10 \text{ ft} + 0.06 Q(\text{gpm})^2 \text{ and the available NPHSA} = 10 \text{ ft.}$$

For $Q = 50 \text{ gpm}$, Which pump is best?



ANSWER

$$\text{Flowrate} = 30 \text{ gpm} \times 3.78 \text{ Lt/m} \times 10^{-3} \text{ m}^3/\text{Lt} \times 60 \text{ m/h} = 6.8 \text{ m}^3/\text{h};$$

$$\Delta p_{\text{sys}}(\text{ft}) = 10 \text{ ft} + 0.06 Q(\text{gpm})^2 = 10 \text{ ft} + 0.06 (30 \text{ gpm})^2 = 54 \text{ ft}$$

Operating points are indicated in the figure

From the point of view of smaller power, pump 2 wins!! (Powers are: 7 HP vs 15 HP for pump 1). Pump 2 has NPHSR = 9.5' < 10 NPHSA. PUMP2 WINS