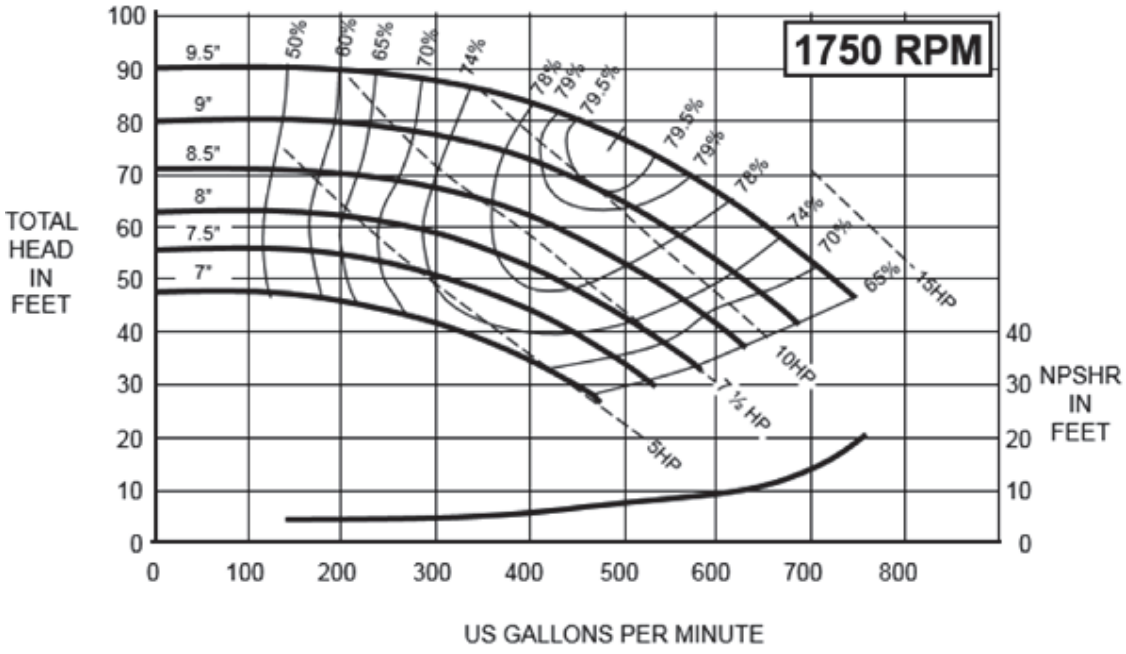
36.50 The flow rate at the operating point of a $7\frac{1}{2}HP$ pump described by the pump curve below is $300gpm$. What is the amount of pump head needed at the pump shaft?



A. $59ft$

B. $69ft$

C. $74ft$

D. $79ft$

Reading the Pump Performance Curve, follow the $7\frac{1}{2}HP$ curve until it intersects with $300gpm$. This is the operating point. Use the vertical axis to obtain the total head in ft at the operating point. This represents the head added to the fluid by the pump.

$$h_{added} \approx 59ft$$

The head needed *at the shaft* is greater than the head added to the fluid because the pump is not 100% efficient. Read the efficiency at the operating point.

$$\eta_{pump} \approx 75\%$$

Find the amount of head needed at the pump shaft.

$$h_{shaft} = \frac{h_{added}}{\eta_{pump}} = \frac{59ft}{0.75} = 78.7ft$$

Answer D