

37.52 800gpm of gasoline ($SG = 0.72$) is transported through an 18in steel pipe. The kinematic viscosity of gasoline is $6 \times 10^{-6} \frac{ft^2}{s}$. What is the Reynolds number?

- A. 1,800
- B. 180,000
- C. 250,000
- D. 350,000

Use the volume flow rate and diameter to calculate the velocity of gasoline through the pipe. For larger pipes, there is no need to distinguish nominal from actual size.

$$Q = vA$$

$$v = \frac{Q}{A} = \frac{\left(800 \frac{gal}{min}\right) \left(\frac{1ft^3}{7.48gal}\right) \left(\frac{1min}{60s}\right)}{\frac{\pi}{4} (1.5ft)^2} = 1.01 \frac{ft}{s}$$

Use the kinematic viscosity, diameter, and velocity to determine the **Reynolds Number**. The specific gravity is extra information and should be ignored.

$$Re = \frac{vD}{\nu}$$

$$Re = \frac{\left(1.01 \frac{ft}{s}\right) (1.5ft)}{\left(6 \times 10^{-6} \frac{ft^2}{s}\right)} = 252,177$$

Answer C