

**36.63** 30gpm of 120°F water flows through a nominal 1-½ inch schedule 40 steel pipe. What is the Reynolds number?

- A. 52,000
- B. 97,000
- C. 104,000
- D. 1,250,000

Look up **Reynolds Number** in the reference handbook and use the equation below, where  $v$  is velocity,  $D$  is diameter, and  $\nu$  is kinematic viscosity.

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

Use the **Steel Pipe Friction Tables** and find the diameter of nominal 1½ inch pipe. Convert to feet.

$$D = \frac{1.61in}{12\frac{in}{ft}} = .1342ft$$

In the same table, look up the velocity of 30gpm through a 1½ inch pipe.

$$v = 4.73\frac{ft}{s}$$

Lookup **Properties of Water** and find a table that provides kinematic viscosity as a function of temperature. Read the value for 120°F.

$$\nu = .609 \times 10^{-5} \frac{ft^2}{s}$$

Apply the Reynolds Number formula. Note the Reynolds Number is unitless.

$$Re = \frac{vD}{\nu} = \frac{\left(4.73\frac{ft}{s}\right) (.1342ft)}{\left(.609 \times 10^{-5} \frac{ft^2}{s}\right)} \approx 104,000$$

**Answer C**