

8.61

8.61 Water flows through the screen in the pipe shown in Fig. P8.61 as indicated. Determine the loss coefficient for the screen.

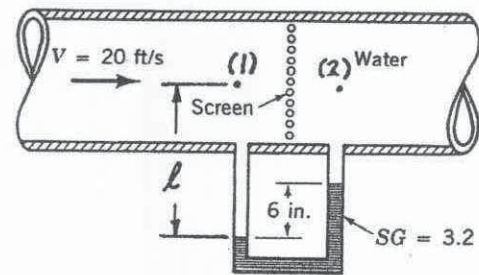


FIGURE P8.61

$$\frac{p_1}{\rho} + \frac{V_1^2}{2g} + z_1 = \frac{p_2}{\rho} + \frac{V_2^2}{2g} + z_2 + K_L \frac{V^2}{2g}, \text{ where } z_1 = z_2, V_1 = V_2 = V = 20 \frac{\text{ft}}{\text{s}}$$

$$\text{Thus, } K_L = \frac{2(p_1 - p_2)}{\rho V^2} \text{ where } p_1 + \rho l = p_2 + \rho(l - 6 \text{ in.}) + SG \rho(6 \text{ in.})$$

$$\text{or } p_1 - p_2 = \rho(SG - 1)(6 \text{ in.})$$

$$\text{Hence, } K_L = \frac{2(62.4 \frac{\text{lb}}{\text{ft}^3})(3.2 - 1)(\frac{6}{12} \text{ ft})}{(1.94 \frac{\text{slugs}}{\text{ft}^3})(20 \frac{\text{ft}}{\text{s}})^2} = \underline{\underline{0.177}}$$