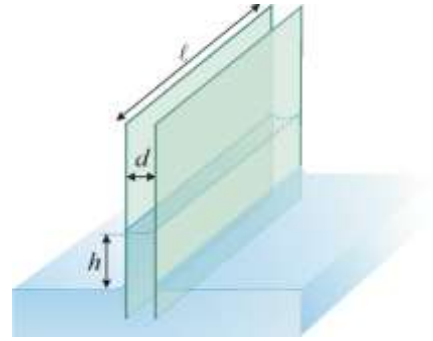


Problem 14-05 Capillary elevation between planar surfaces

Calculate the elevation h between two plane-parallel plates separated by a distance $d = 0.6$ mm, partially immersed into the liquid (see the attached illustration). The surface tension of the liquid is 45.6 mN m^{-1} and its density 0.886 g cm^{-3} . Suppose that the plates are so large, that the end effects are negligible and contact angle is zero.

$$[h = 17.5 \text{ mm}]$$



Solution:

$$\theta = 0^\circ$$

$$d = 0.6 \text{ mm} = 6 \cdot 10^{-4} \text{ m}$$

$$\gamma = 45.6 \text{ mN m}^{-1} = 0.0456 \text{ N m}^{-1}$$

$$\rho = 0.886 \text{ g cm}^{-3} = 886 \text{ kg m}^{-3}$$

$$2 \cdot \ell \cdot \gamma = \ell \cdot h \cdot d \cdot \rho \cdot g$$

$$h = \frac{2\gamma}{d \cdot \rho \cdot g} = \frac{2 \cdot 0.0456}{6 \cdot 10^{-4} \cdot 886 \cdot 9.81} = 0.017488$$

$$h = 17.5 \text{ mm}$$