

55. We refer to the polyurethane foam with subscript p and silver with subscript s . We use Eq 19-32 to find $L = kR$.

(a) From Table 19-6 we find $k_p = 0.024 \text{ W/m}\cdot\text{K}$ so

$$\begin{aligned} L_p &= k_p R_p \\ &= (0.024 \text{ W/m}\cdot\text{K})(30 \text{ ft}^2 \cdot \text{F}^\circ \cdot \text{h/Btu})(1 \text{ m}/3.281 \text{ ft})^2(5\text{C}^\circ/9\text{F}^\circ)(3600 \text{ s/h})(1 \text{ Btu}/1055 \text{ J}) \\ &= 0.13 \text{ m} . \end{aligned}$$

(b) For silver $k_s = 428 \text{ W/m}\cdot\text{K}$, so

$$L_s = k_s R_s = \left(\frac{k_s R_s}{k_p R_p} \right) L_p = \left[\frac{428(30)}{0.024(30)} \right] (0.13 \text{ m}) = 2.3 \times 10^3 \text{ m} .$$