

Solutions

1. $\theta = 50^\circ$

$$A = 2.3 \text{ m}^2$$

$$\dot{Q} = 251 \text{ W}$$

$$\dot{E}_B'' = 750 \text{ W/m}^2$$

$$SHGC_\theta = \frac{\dot{Q}/A}{\dot{E}_B'' \cdot \cos \theta} = \frac{251 \text{ W}/2.3 \text{ m}^2}{(750 \text{ W/m}^2) \cdot \cos 50^\circ} = \frac{109.1}{482.1} = 0.226$$

2. At 20° , $SHGC_\theta \approx 0.64$

$$SHGC_{DR} = 0.56$$

$$\dot{Q}_B'' = (700 \text{ W/m}^2) (\cos 20^\circ)(0.64) \approx 421 \text{ W/m}^2$$

$$\dot{Q}_{DR}'' = (200 \text{ W/m}^2) (0.56) = 112 \text{ W/m}^2$$

$$\dot{Q}_T'' = \dot{Q}_B'' + \dot{Q}_{DR}'' = 533 \text{ W/m}^2$$