

$$D. \quad E = \frac{P_{A_2}}{A_{\text{pixel}}} = \frac{\frac{1}{2500} L d A_2}{1} = \frac{L d A_2}{2500}$$

$$2. \quad d = 2000 \text{ mm}, \quad A_{\text{pixel}} = 1 \text{ mm}, \quad f = 50 \text{ mm}, \quad \theta_1 = 60^\circ.$$

$$dA_1 = \frac{d^2 A_{\text{pixel}}}{f^2 \cos \theta_1} = 3200 \text{ mm}^2$$

$$P_{A_2} = \frac{L}{d^2} dA_1 dA_2 \cos \theta_1 = \frac{L d A_2}{2500}$$

$$E = \frac{P_{A_2}}{A_{\text{pixel}}} = \frac{L d A_2}{2500}$$

$$3. \quad d = 4000 \text{ mm}, \quad A_{\text{pixel}} = 1 \text{ mm}, \quad f = 50 \text{ mm}, \quad \theta_1 = 60^\circ$$

$$dA_1 = \frac{d^2 A_{\text{pixel}}}{f^2 \cos \theta_1} = 12800 \text{ mm}^2$$

$$P_{A_2} = \frac{L}{d^2} dA_1 dA_2 \cos \theta_1 = \frac{1}{2500} dA_2 L \cos \theta_1$$

$$E = \frac{P_{A_2}}{A_{\text{pixel}}} = \frac{L d A_2}{2500} \text{ W/mm}^2$$

4. Image irradiance doesn't change with the increase of distance from the wall to the pinhole.