

Chapter 17Problem 60

$$\Delta p = 0.5 \text{ Pa} \quad \text{in air}$$

What is the intensity of the wave?

Intensity of sound waves goes as,

$$I = \frac{(\Delta p_{\max})^2}{2\rho v} =$$

$$\text{at } T = 20^\circ \text{C} \quad \rightarrow \quad v = 343 \text{ m/s}$$

$$\text{and} \quad \rho = 1.27 \text{ kg/m}^3$$

$$\text{so} \quad I = \frac{(0.50 \text{ Pa})^2}{2(1.27 \frac{\text{kg}}{\text{m}^3})(343 \text{ m/s})}$$

$$= 2.87 \times 10^{-4} \frac{\text{W}}{\text{m}^2}$$

$$I = 0.287 \frac{\text{mW}}{\text{m}^2}$$