22. ***REASONING*** The average power dissipated is that dissipated in the resistor and is $\overline{P} = I_{\text{rms}}^2 R$, according to Equation 20.15b. We are given the current I_{rms} but need to find the resistance R. Since the inductive reactance X_{L} is known, we can find the resistance from the impedance, which is $Z = \sqrt{R^2 + X_{\text{L}}^2}$, according to Equation 23.7. Since the voltage and the current are known, we can obtain the impedance from Equation 23.6 as $Z = V_{\text{rms}}/I_{\text{rms}}$.

SOLUTION From Equation 23.7, we can determine the resistance as $R = \sqrt{Z^2 - X_{\text{L}}^2}$. With this expression for the resistance, Equation 20.15b for the power becomes

$$\overline{P} = I_{\text{rms}}^2 R = I_{\text{rms}}^2 \sqrt{Z^2 - X_{\text{L}}^2}$$

Using Equation 23.6 to express the impedance, we obtain the following value for the dissipated power

$$\overline{P} = I_{\text{rms}}^2 \sqrt{Z^2 - X_{\text{L}}^2} = I_{\text{rms}}^2 \sqrt{\left(\frac{V_{\text{rms}}}{I_{\text{rms}}}\right)^2 - X_{\text{L}}^2}$$

$$= (1.75\ \text{A})^2 \sqrt{\left(\frac{115\ \text{V}}{1.75\ \text{A}}\right)^2 - (52.0\ \Omega)^2} = \boxed{123\ \text{W}}$$