

The difference in actual sound pressure for an increase from 50 to 100 dB(A)

Sound Pressure for 50 dB(A)

$$\text{dB(A)} = 20 * \log [\text{sound pressure}/\text{sound pressure at 0 dB(A)}]$$

$$50 \text{ dB(A)} = 20 * \log [\text{sound pressure}/20]$$

$$50/20 = \log [\text{sound pressure}/20]$$

$$2.25 = \log [\text{sound pressure}/20]$$

$$10^{2.5} = \text{sound pressure}/20$$

$$316.228 * 20 = \text{sound pressure} = \mathbf{6324.55} \text{ micro pascals at 50 dB(A)}$$

Sound Pressure for 100 dB(A)

$$\text{dB(A)} = 20 * \log [\text{sound pressure}/\text{sound pressure at 0 dB(A)}]$$

$$100 \text{ dB(A)} = 20 * \log [\text{sound pressure}/20]$$

$$100/20 = \log [\text{sound pressure}/20]$$

$$5 = \log [\text{sound pressure}/20]$$

$$10^5 = \text{sound pressure}/20$$

$$100,000 * 20 = \text{sound pressure} = \mathbf{2,000,000} \text{ micro pascals at 100 dB(A)}$$

Sound pressure multiplier from 50 to 100 dB(A)

$$2,000,000/6324.55 = \mathbf{316} \text{ times louder}$$