
Intensity and Relative Intensity Level (SwiftStudy Printable)

Key Formulas

$$I = \frac{P}{4\pi r^2}$$

I	intensity	W/m ²
P	power of sound source	W
r	distance from sound source	m

$$\beta = 10 \log \frac{I}{I_0}$$

β	relative intensity level	decibels (dB)
I	intensity	W/m ²
I_0	threshold of hearing = 10 ⁻¹² W/m ²	

Tips to Remember

- ▶ Relative intensity level is less formally referred to as the “decibel level” of a sound. It is not the same as intensity; relative intensity level uses a logarithmic scale to more accurately reflect how humans perceive loudness.
- ▶ When you enter 10⁻¹² into your calculator for the threshold of hearing, enter either “10^-12” or, if you use the scientific notation button, “1E-12.” Do not enter “10E-12” if you use the scientific notation button, because that would really be 10 × 10⁻¹², or 10⁻¹¹.
- ▶ Don't be surprised if the problems you encounter have seemingly low sound powers. Your normal speaking voice produces only about a millionth of a watt of sound; our ears are just so sensitive that that's enough.

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