DeciBel Ratings

- Every sound is characterized by a deciBel rating that provides a measure of how intense the sound is.
- A more intense sound has a higher deciBel rating and is perceived by a person as being louder.
- To understand the concept of deciBels, you must know these two things.

The DeciBel Scale is a Logarithmic Scale

- It is based on powers of 10
- It is much different than other measurement scales, like those of length:



80 cm is 2 times longer than 40 cm

- An 80 deciBel sound is NOT twice as intense as a 40 deciBel sound.
- Instead, it is 4 powers of 10 more intense 10 000 X more intense – than a 40 deciBel sound.
- To understand why, you must also know that ...



40 deciBel → 4 Bel

70 deciBel → 7 Bel

100 deciBel → 10 Bel

120 deciBel → 12 Bel

95 deciBel → 9.5 Bel

The Meaning of Deci-

- The deci- of deciBel is a Greek prefix.
- It works much like the milli- of milliliter or the centi- of centimeter or the kilo- of kilogram.
- Centi- means 1/100th, which is why an 80 centi-meter length is equivalent to 0.80 meters.
- Deci- means 1/10th, so an 80 deciBel sound is an 8 bel sound.

Intensity Comparison – Example 1

How does the intensity of an 80-dB sound compare to that of a 40-dB sound?



80 dB is 10⁴ times more intense than 40 dB.

Intensity Comparison – Example 2

How does the intensity of an 110-dB sound compare to that of a 50-dB sound?



110 dB is 10⁶ times more intense than 50 dB.

Summary

- 1. Convert deciBels to Bels.
- 2. Determine the difference in Bels for the two sounds. This is "x".
- 3. The higher deciBel sound is 10^x times more intense.