

The Decibel – A Few Important Basics

The decibel (dB) can be used to describe electrical or acoustical levels. The technical description of the Decibel can be described as a unit for expressing the ratio between two physical quantities (meaning the electrical / acoustical characteristics of signals and signal changes). The decibel is also used for measuring the “relative loudness” of sounds. The Decibel is also extremely complicated so we will only cover the basic information that you will need to know to understand basic audio.

What you should understand about the Decibel (dB) and Sound Pressure Level

- A +1dB change in Sound Pressure level is the smallest perceptible change that can be heard by the human ear, and is extremely difficult to hear when listening to music.
- A +3dB change in Sound Pressure level is the minimal practical change that can be easily heard by most listeners.
- A +6dB change in Sound Pressure level is very easy for listeners to hear. This change is considered the “Goal” for changes in system levels.
- A +10dB change in Sound Pressure level would be considered “Twice as Loud?” And if you need to “Half” the loudness, it would require a -10dB change in Sound Pressure level.

Understanding how the Decibel (dB) relates to Amplifier Size

Since a +3dB change in Sound Pressure level is the minimal practical change that can be easily heard by most listeners – to produce this +3dB change you would need to “double” the power (wattage) of your amplifier.

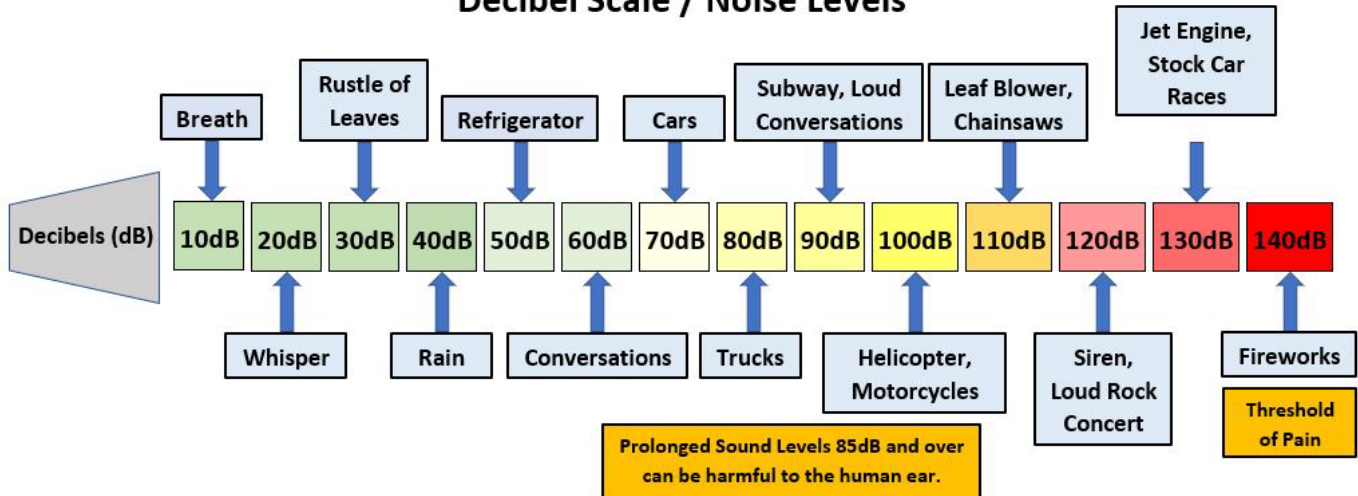
Example: If you have a 200-watt amplifier, you would need a 400-watt amplifier to get the extra 3dB of sound pressure level. That’s all doubling the power amplifier wattage will give you. With this being said – A 300W amplifier and a 350W amplifier would be relatively the same!

- A +6dB change in Sound Pressure level is very easy for listeners to hear. This change is considered the “Goal” for changes in system levels. To produce a +6dB change you need to increase the power by “4 times” the current power (wattage) of your amplifier. Ex: If you have a 200-watt amplifier, you would need an 800-watt amplifier to get the extra 6dB of sound pressure level you are needing.

Do you need your system to be “Twice as Loud?” This will require a +10dB change in Sound Pressure level. To produce a +10dB change you need to increase the power by “10 times” the current power (wattage) of your amplifier. Ex: If you have a 200-watt amplifier, you would need a 2000-watt amplifier to get the extra 10dB of sound pressure level you are needing to hear the system as “Twice as Loud.” If you want to “Half” the loudness, you would require a -10dB change in Sound Pressure level.

Warning – Certain Audio Levels can be Harmful! Avoid prolonged exposure to noise / audio related levels that go above 85dB as they can be considered harmful to human hearing. Loud noise and / or sound levels above 120dB can be immediately harmful to human ears. Any loud noise and / or audio levels above 150dB can cause serious health issues and organ damage. A 7Hz “infrasound” (which is the frequency of our brains and internal organs) will affect the central nervous system and can cause nausea, rupture of organs, and possible death. Loud explosions above 185-190dB can kill a human being instantly. See the diagram on the following page for more details.

Decibel Scale / Noise Levels



The basic Decibel Scale is helpful for audio technicians and sound board operators for a couple of reasons:

1. Understanding the limits of the system they are operating.
2. Understand how sound levels can and will damage the listeners hearing.

It is very important to have an SPL Meter at the sound board to monitor the levels. Be mindful that as the night goes on your ears will “De-Sensitize” and many sound board operators keep turning the system up to compensate.