Gunfighter Wisdom: Ear Pro

A consequence of hearing loss, other than a progressive inability to hear is Tinnitus. Tinnitus is a permanent subjective ringing of the ears experienced most commonly by those with hearing damage. Tinnitus is extremely annoying at times and there is no effective treatment for it to date. Once you get it, you have it for life.

If you already have Tinnitus or hearing damage, this does not make your ears "hardened". You will continue to experience hearing damage at high dB levels, although you may have a higher sound pain threshold due to your already damaged ears.

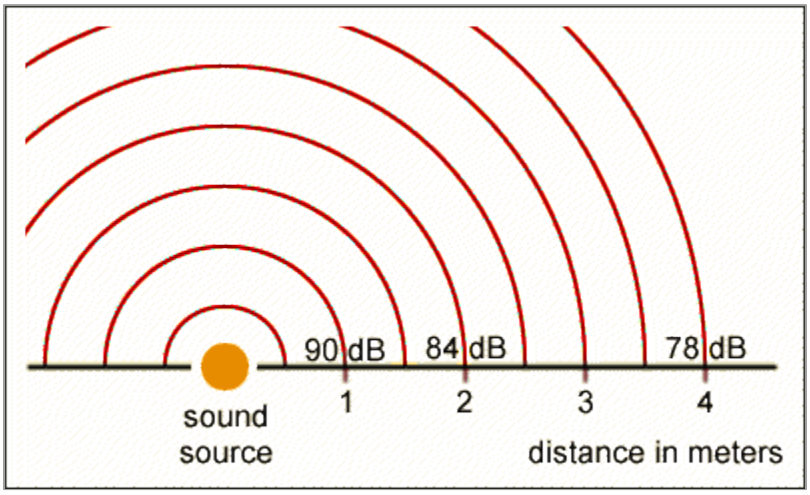
Sound intensity, Duration, and Protecting Your Hearing

The decibel (dB) is a logarithmic unit with a base of ten used to measure the power/intensity of a sound. A change in power by a factor of 10 is a 10 dB change in level, therefore a 90 dB sound has time times the power of a 80 dB sound and 100 times the power of a 70 dB sound. A change in power by a factor of two is approximately a 3 dB change. For example, a 76 dB sound has twice the power of 73 dB. That said, *small shifts in dB level are comparatively large shifts in power*.

Sound diminishes in strength the further from the source is travels.

The sound pressure level decreases *6 dB for each time the distance from the point source is doubled*. This is a common way of expressing the inverse-square law in acoustics.

Taking this fact into account, typically measurements are taken 1 meter from the source.



Sound Pressure and Your Hearing

The threshold for pain is reported to be within the rather large range of 120-140 decibels, however sound begins to damage our hearing when it is above 85 dB. This is obviously well below the threshold for pain. Noise-induced hearing loss can result from a one-time exposure to a very loud sound, blast, impulse, or by listening to loud sounds (at or above 85 decibels) over an extended period. The louder the sound, the shorter the time period before hearing damage occurs.

According to OSHA, the threshold for a hearing safe impulse noise is 140 dB. Without hearing protection, exposure to any impulse noise over 140dB causes immediate permanent noise induced hearing loss.

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Sound, Intensity and Exposure Limits

source: http://www.cdc.gov/ and http://www.nonoise.org/

Source	Intensity (Decibels)	Exposure Limit before permanent damage sets in
Busy City Traffic	85	8 hours
Diesel Truck	90	2 Hours
Snowmobile, Power tools	100	15 Minutes
Chainsaw	110	1.5 Minutes
Baby Crying	115	28 seconds
Ambulance Siren	120	9 seconds
Firecrackers	140	Immediate damage

Gun Decibel Chart

Source: http://www.usacarry.com and http://www.freehearingtest.com

Pistols	Shotgun & Rifle
• .25 ACP - 155.0 dB • .32 ACP - 153.5 dB • .380 - 157.7 dB • **9mm - 159.8 dB** • .38 S&W - 153.5 dB • .38 Spl - 156.3 dB • .357 Magnum - 164.3 dB • .40 S&W - 156.5 dB • .44 S&W Magnum - 164.5 dB • .45 ACP - 157.0 dB Note: *A **muzzle brake** will add **5-10 decibels***	• 12 Gauge Shotgun - 155 dB • **.22 Pistol or Rifle - 140 dB** • **.223 18" barrel - 155.5dB** • .243 in 22" barrel - 155.9dB • .30-30 in 20" barrel - 156.0dB • 7mm Magnum in 20" barrel - 157.5dB • **.308 in 24" barrel - 156.2dB** • .30-06 in 24" barrel - 158.5dB • .30-06 in 18" barrel - 163.2dB • .375 18" barrel with muzzle brake - 170 dB

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Ear Protection and Noise Reduction Rating

Noise Reduction Rating (NRR) is the measurement, in decibels, of how well a hearing protector reduces noise as specified by the Environmental Protection Agency. The higher the NRR number the greater the noise reduction. While wearing hearing protection your exposure to noise is equal to the total noise level (in dB) minus the NRR of the hearing protectors in use. For example, if you were exposed to 80 dB of noise but were wearing earplugs with an NRR of 29, your actual noise exposure would only be 51 dB.

NRR of commonly used Ear Pro

- Howard Leight impact sport NRR 22
- MSA Sordin Supreme NRR 18
- foam earplugs 29-32 db

If you are wearing foam ear plugs (NRR 29-32) and firing a 9mm handgun (159.8 dB), each time you pull the trigger you subject your ears to an impulse of roughly 130 decibels. While this is not at the 140 dB required for instant hearing damage, it is very close. If you fire 300 rounds in a range session, that equates to 300 impulses to the ear which will likely be enough to cause permanent hearing damage. At an indoor range, where the sound pressure has no place to escape this will be amplified.

The bottom line is that if you walk away from the range after a day of shooting with ringing in your ears you have experienced permanent hearing damage and should take additional measures to protect your ears.

"Doubling up" on Ear Pro

source: http://www.elvex.com/

When dual protectors are used, the combined NRR provides *approximately 5 - 10 decibels more than the higher rated of the two devices*. For example, using foam ear plugs (NRR 29dB) with Sordin Ear muffs (NRR 18dB) would provide a Noise Reduction Rating of approximately 39 decibels. This would be adequate to protect your ears while firing a 9mm handgun (159 dB – 39 dB = 120 dB, which is equal to an ambulance siren and can be sustained for 9 seconds continuous)

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Additional hearing related reading:

http://www.animations.physics.unsw.edu.au/jw/dB.htm#logs

http://www.sengpielaudio.com/calculator-levelchange.htm

http://www.starkey.com/hearing-loss-and-treatment/learn-about-hearing-loss/hearing-loss-prevention

http://americansilencerassociation.com/education/