

# Serenity

## Practical recommendations for shooters and hunters using hearing protection devices in impulse noise

### Overview

This document is designed to help users of Phonak hearing protection devices (HPDs) better understand the danger that gunshots pose to their hearing. It recommends how many shots per day can be considered safe based upon the type of weapon used and the level of hearing protection worn.

### "Impulse" noise: an introduction

Hearing protection against continuous noise is subject to clear rules and regulations, which are now widely understood and followed.

However when it comes to hearing protection against short, sharp noises such as gun shots (i.e. 'impulse' noises), the situation is less clear. Current regulations require the use of hearing protection when a user is exposed to maximum volume levels, called 'peak' values, above 135 - 140 decibels (see table).

Country	Impulse noise limits :
EU / CH	137 dBCpeak
Australia	140 dBCpeak
Canada	140 dBCpeak
New Zealand	140 dBCpeak
South Africa	135 dBCpeak
USA	140 dBCpeak

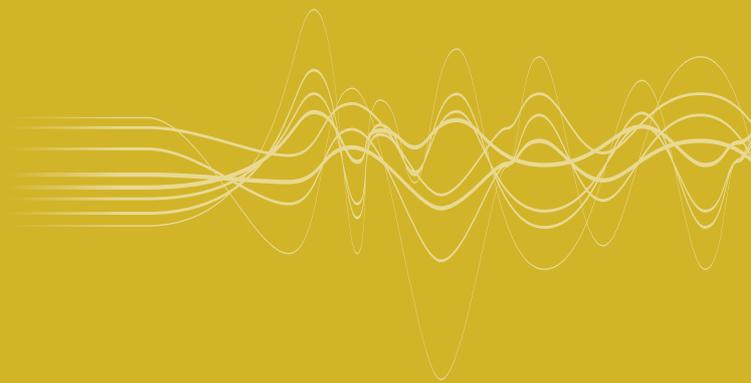
Nevertheless there is no widely-accepted method available of calculating a persons' permitted exposure to impulse noise when wearing hearing protection with a particular protection rating (known in Europe as the product's Single Number Rating or 'SNR').

**The key rule to always remember is that the effect of shots is cumulative, meaning the greater the number of impulse noises your ears are exposed to one after another, the greater the danger to your hearing.**

Disclaimer : the information mentioned in this document is based on research carried out and approved by the Swiss institution SUVA ([www.suva.ch](http://www.suva.ch)). Before acting upon this information, please be sure to verify the local provisions in your country. Phonak Communications AG declines any liability due to opposing research views.

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## Our approach

To help Phonak HPD users assess how many shots it is safe to fire during one day and what level of protection to use, we have adopted Swiss association SUVA's impulse noise recommendations. These are not only based on the 'peak' volume levels of gunshots, but also the short term energy (or sound exposure level) of these impulse noises.

The table below lists commonly used weapons, the levels of their impulse noises when fired (as measured by SUVA), and the Phonak-recommended maximum number of 'shots per day' when wearing protection with the SNR shown.

**Note:** If you use Phonak's SafetyMeter system to verify your protections, it is possible to replace the SNR figure below with your Personal Attenuation Rating (PAR) using the ratio PAR-3dB.

Permitted maximum shots per day assuming a hearing protection system with an SNR of:

Weapon	Peak value of the impulse noise (L <sub>peak</sub> in dBC)	Sound exposure level of the impulse noise (L <sub>E</sub> in dBA)	Distance of muzzle from ear	SNR = 24 dB Phonak HPDs: Serenity Classic XC92YE or XC92BR Serenity SP 100YE or 1050R Serenity DP/DPC primero DPC	SNR = 28 dB Phonak HPDs: Serenity Classic XC92WH Serenity SP 110WH
<b>Rifles</b>					
Assault rifle 57 (7.5mm)	168	129	1m	30	80
Assault rifle 90 (5.6mm)	157	123	1m	125	316
Standard rifle	156	124	1m	100	251
Shotgun	152	120	1m	250	630
<b>Pistols</b>					
Pistol 9mm	160	120	At ear (0m)	250	630
Revolver S&W .44 / UMC	165	133	1m	12	30
Air pistol	119	84	1m	1,000,000	2,500,000