



# High tech hearing protection

## *We test the best in electronic earmuffs*

by Dave Brown

Tactical is the new cool. There is even a word for it: “tacticool.” It seems everything needs to be tactical these days – from weapons and accessories to camouflage underwear for your wife or girlfriend.

Perhaps my view is a little more simplistic. To me, tactical should not be just marketing labels lining the aisles of sporting goods stores; tactical means combat-ready

gear made to higher standards, for use when equipment failure can lead to mission failure. Tactical means ensuring users make it home alive at the end of every shift or tour. Tactical means it just has to work.

### The ‘clap’ test

Earmuffs that use electronic circuits to reproduce ambient sounds and cut off the damaging frequencies of gunshots have been around for awhile, but it is only recently that companies have been able to develop “intelligent” versions. Early models were heavy, expensive, ungainly and irritating to work with, especially on busy shooting ranges with multiple shots going off at random times.

The latest combat-ready tactical hearing protection not only electronically amplifies sounds but also very smoothly drops the damaging frequencies of gunshots in microseconds instead of seconds, making them almost transparent to the user.

The ultimate test of these latest earmuffs is the handclap test. Put them on, make them comfortable and clap your hands as hard as you can in front of your face. The ‘clap’ should sound quite distant (it actually approximates the damaging frequencies of gunshots). Now turn them on, turn up the volume and try the same test. You should be able to hear even the faintest sounds clearly, but a handclap will sound almost as muffled as it did with the electronics off.

Now for the ultimate test. Try carrying on a steady conversation with the muffs on and then clap your hands. The clap should sound distant, but the conversation should be almost seamless. This is known as a soft cut-off. Early designs would simply shut the entire circuitry off for a few seconds, leading to annoying dropouts in conversations.

### Selection criteria

While there are many variations on hearing

protection that could be labelled “tactical,” this article will focus specifically on electronic earmuffs. They not only allow outside sounds to be heard through internal speakers in the ear cups but can also amplify ambient sounds. (This would allow, for example, SWAT teams to be able to hear whispers on the other side of a wall.)

This head-to-head comparison test also focuses on compact hearing protection that will fit under a typical combat helmet and is contoured for correct cheek placement on weapon stocks. To be selected, models needed to have a communication port input designed to integrate with radio systems and a NRR (noise reduction rating) of 18 decibels or more.

All of our test samples use the latest technology in impulse noise control, which provides a so-called “soft” cut-off to loud noises such as gunshots – plus, they look cool and cost a lot of money; both necessary components for anything considered to be both “tactical” and “tacticool.”

### Testing procedure

Each test model was subjected to a battery of subjective tests and then rated on a scale of 1 to 5, with 5 being the highest. Impulse noise control was evaluated using pistols and shotguns on both indoor and outdoor shooting ranges, all with typical safety glasses or protective goggles in place.

Each model was then exposed to three different sound frequency tones (250, 440 and 1000 Hz) with amplification off and evaluated for its ability to block out those specific parts of the frequency spectrum, both with and without safety glasses.

It should be noted that, like most everything else in life, hearing protection is a compromise between differing and often conflicting requirements. Many models that did not meet our test criteria would do a better job of blocking gunshot noise but are not compact enough to fit under a combat helmet. Plus, even the most inexpensive passive earmuffs block more gunshot noise than most of these compact models, but they rely on tight head pressure to achieve these results. Passive muffs designed for short-term use would not be very comfortable for longer periods of wear.

There are also less expensive models of electronic earmuffs that use a “hard” cut-off to control impulse noises, but this results in a very irritating (and potentially dangerous, in tactical situations) complete dropout of all sound amplification for up to two or three seconds at a time. If multiple shots were fired, they would be almost useless. (See sidebar.)

All test samples were purchased at retail from authorized factory dealers. (Special thanks to Seals Action Gear in Calgary for the Peltor models, Peltor Communications for responding to my inquires and for rigging up a custom two-way radio patch cord and to SRS Tactical in Calgary for the MSA-Sordin model, plus the optional gel ear cushions.)

### Final results

**Third place** – The Peltor SportTac was designed more for the hunter and target shooter than the tacticool operator – they even come with replaceable ear cups in blaze orange! – but also use some of Peltor’s latest technology in intelligent noise control and soft cut-offs for impulse noise reduction. They had virtually no lag time and loud gunshots were reduced to comfortable levels without seeming to affect any other sounds. Comfortable for long-term use, one could easily carry on a conversation on an active shooting range with these muffs in place and not notice any annoying dropouts in sound.



The reason these muffs finished in third place, however, was the ear cushion seals. They may have been comfortable to wear but they let more sound in than the other two models – which probably relates to their rather soft clamping pressure. When worn with safety glasses, they were so potentially damaging that I had to terminate the test on the indoor shooting range to prevent my ears from ringing too badly.

Sound leaked in through the foam ear cushions, both in front where the arms of the safety glasses entered, and underneath and behind where the back of the eyeglass arms would push the foam cushions slightly away from the ears. Due to the nature of gunshot sounds and how they tend to curl around the shooter, the gap at the rear of the cushions was probably the most damaging.

Suspecting that the foam was at fault, Blue Line contacted Peltor for its view and talked to Tom Lavalle, business development and marketing manager for Peltor North America. He felt that shooters needed to purchase earmuffs and shooting glasses as an integrated system and that Peltor-branded glasses may not show this problem as much. He was nice enough to respond to our inquires and direct them as far as the engineers who designed the muffs.

The reality is that these muffs are probably less suitable for indoor shooting ranges and more directed toward the outdoor enthusiast shooter and hunter. The foam cushions are noticeably stiffer than the ones in the more expensive Peltor ComTac and MSA-Sordin Supreme Pro-X muffs.

The SportTac muffs do use the latest

sound suppression technology though and I liked them so much that I sought other solutions. First, changing from thick-framed to thin wire framed shooting glasses made a significant difference in their livability. Secondly, based on a recommendation from SRS, I tried Peltor’s optional gel cushions. This made such an improvement that I decided to retest the SportTacs, both with the stock foam ear cushions and with the optional gel cushions.

The SportTac muffs are the least expensive ones in this test. They may have finished in third place, but they are the ones that live in my range bag and are entirely suitable for a lot of my outdoor training activities.

I even switched to the bright orange ear cups for a distinctive look when working – hoping none of my students seem to be attracted to a brighter target, of course.

**Second place** – The Peltor ComTac was the company’s very first tactical combat earmuff design and still performs very well today. (Peltor also makes a ComTac II, which has improved ergonomics and a better optional microphone boom system.)



The sound clarity from the ComTac was a significant step up from the SportTac and this reflects their combat heritage. All sounds were clear and there was much less hiss in background noise, even when turned up high. Two-way radio signals sounded more like music from really good headphones than the tinny sound from speakers built in to most two-way radios.

Although these muffs are a few years old, the foam ear cushions remain pliable and comfortable. I never felt the need to try the optional gel cushions, either indoors or outdoors.

On/off and volume is controlled by two small pushbuttons on the side of the muffs. To turn them on or off, one has to hold both buttons down for a few seconds. It was difficult to feel how hard to push them and often required two or three attempts. They amplified the sounds very well, but the volume button only has four steps from faint to loud.

The Peltor Comtac and ComTac II are probably the widest-used electronic earmuffs in combat operations. They integrate with two-way radios using professional-level J22 plugs and Peltor sells optional boom microphones and a variety of push-to-talk interfaces that are as water resistant and combat-hardened as the muffs themselves. They even

Ergonomics					
	Weight (with battery)	Comfort	Controls	Sound clarity	Sound amplification
Peltor ComTac	367 grams	4	2	4	4
Peltor SportTac	329 grams	5	4	2	5
Peltor SportTac with gel ear cups	357 grams	5	4	2	5
MSA-Sordin Supreme Pro-X	376 grams	4	5	5	4

Noise Control					
	Impulse noise reduction (indoors)	Impulse noise reduction (outdoors)	Impulse noise reduction (with safety glasses)	Impulse noise lag time	Sound frequency tests
Peltor ComTac	4	5	4	4	3
Peltor SportTac	1	3	0	5	1
Peltor SportTac with gel ear cups	2	4	2	5	2
MSA-Sordin Supreme Pro-X	4	4	4	5	4

	Cumulative score	Impulse noise control method	ANSI NRR (noise reduction rating)
Peltor ComTac	34	soft	20
Peltor SportTac	26	soft	20
Peltor SportTac with gel ear cups	31	soft	20
MSA-Sordin Supreme Pro-X	39	soft	18

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custom-built an interface so I could plug them into a Motorola FRS radio.

**First place** – Like Peltor, Sordin is a Swedish company specializing in face and hearing protection. Rumoured to be started by former Peltor engineers, Sordin was recently bought by Pittsburgh-based Mine Safety Appliances Inc. and the name was changed to MSA-Sordin.



Their Supreme Pro-X electronic muffs use three buttons on the side to control power and volume. Turning them on or off is quick and positive and, like the other two models in this comparison, there is a responsive beep when powering up or down.

While their actual NRR was less than the other two test samples, they tended to block more frequencies than the others when off and were almost hiss- and noise-free when on. (Standards for reporting noise reduction ratings for ear protection are currently scheduled for change and there have been several different standards over the years. One should look at more factors besides the simple NRR number for electronic earmuffs.)

Unlike the Peltor models, the MSA-Sordin muffs use a standard mono 3.5mm mini-plug for radio input, which means I wanted to immediately try plugging in my iPod. Listening to tunes while awaiting your turn on a shooting range and being able to carry on a conversation with a person beside you while blocking out damaging frequencies of gunshots just seems like such an elegant way to spend an afternoon.

I was amazed. The Supreme Pro-X are mono, of course, but were nearly as good fidelity as my best stereo headphones. The Pro-X model is also waterproofed to IP67 standards and I could listen to the tunes in my head in the cold, pouring rain all day long if I wanted to (although I suspect MSA-Sordin was looking more at combat conditions than some idiot like me standing in the rain listening to his iPod.)

They were the heaviest and most expensive electronic muffs in this test, but were significantly better in many ways. If one needs the ultimate in combat-ready electronic earmuffs, they are well worth considering.

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# Just how much is your hearing worth?

## What can you buy for \$50?

by Dave Brown

If it is made anywhere in the world, you can bet that someone in China is knocking it off for half the price. One can buy a large variety of cheap brands of electronic earmuffs, but what do you get for the price?

The good news is that they are at least as good as any inexpensive passive earmuff. The bad news is that they are only as good as any inexpensive passive earmuff.

They all use what I term a "hard cut-off" to reduce loud impulse noises such as gunshots. This means that they don't smoothly 'ramp' down and then up to reduce gunshots, they cut out completely. Carrying on a conversation on an active shooting range is an exercise in frustration and you might as well be talking to yourself, because – most of the time, it will seem like you are. These earmuffs didn't have a wired connection between the two sides, so they required independent on/off and volume control buttons and, for some reason,



the left side will cut out for at least a second longer than the right side after a gunshot.

They are even advertised as having an audio input and touted as great way to listen to music on a shooting range. If you're old enough to remember the inexpensive 'crystal radio' kits that kids used to assemble, then you would recognize the tinny distorted screeches they produce – only recognizable as music if all your experience was beating on hollowed-out logs and plucking strings attached to a stick on an upside-down washtub.

Actually, in retrospect, that is probably an insult to washtub musicians.

Just for fun, I submitted a typical Chinese-made knock off set of electronic earmuffs to the same tests as the other samples, but after awhile I began to feel nauseous from the chemical smell of the vinyl headband. (One can only imagine the working conditions and environmental impact of these factories in China.)

Instead of spending your money on this simple little integrated circuit board and tiny, toy walkie-talkie style speakers, just get some good passive earmuffs – because the reality is, this is what you will be listening to most of the time anyway.

**CHALLENGE YOURSELF EVERY DAY**