MUZZLE DEVICE AND SUPPRESSOR SOUND SURVEY

What the shooter hears, and what the target hears. Four rifles, eight muzzle configurations, two cartridges. Peak decibel readings, unweighted.

	RIFLE AND CARTRIDGE	LOAD AND MUZZLE VELOCITY	MUZZLE CONFIGURATIONS TESTED
Rifle 1	Sig Cross, 6.5 Creedmoor	140 gr Hornady ELD-M at 2,684 fps	Bare muzzle, TBAC CB muzzle brake
Rifle 2	Sig Cross, 6.5 Creedmoor	140 gr Hornady ELD-M at 2,684 fps	Magnus S-RR, standard TBAC cap
Rifle 3	Sig Cross, 6.5 Creedmoor	140 gr Hornady ELD-M at 2,750 fps	Magnus S-RR, flat end cap, Recoil X brake, Hunt brake*, Recoil Intro brake*
Rifle 4	300 Winchester Magnum	220 gr Sierra MatchKing at 2,750 fps	338 Ultra*

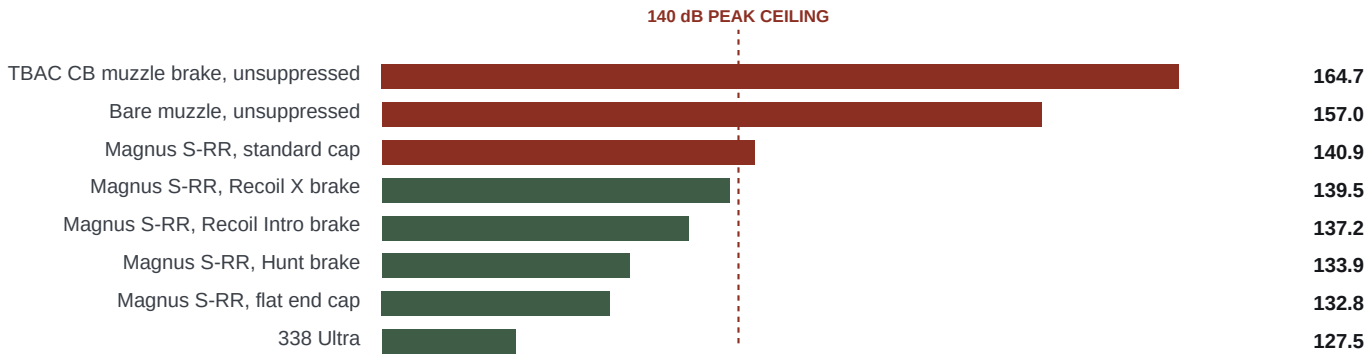
Rifles 1 and 3 had muzzle devices and end caps swapped during testing. Two meter positions were used. One at the shooter's ear. One at the target, with the rifle then fired from 100, 567 and 1,000 yards. The target-side meter records two separate events, the projectile breaking the sound barrier as it passes through the meter's window, and the projectile striking steel. *Unconfirmed, verify before print.

AT THE EAR

Shooter position. This is the number that governs hearing damage and the only position where muzzle device selection produces a meaningful change.

CONFIGURATION	RIFLE	MV (FPS)	RUN 1	RUN 2	AVERAGE	VS BARE MUZZLE
TBAC CB muzzle brake, unsuppressed	1	2,684	164.5	164.9	**164.7**	+7.7
Bare muzzle, unsuppressed	1	2,684	157.0	156.9	**157.0**	baseline
Magnus S-RR, standard cap	2	2,684	141.9	139.8	**140.9**	-16.1
Magnus S-RR, Recoil X brake	3	2,750	139.8	139.2	**139.5**	-17.5
Magnus S-RR, Recoil Intro brake*	3	2,750	137.7	136.6	**137.2**	-19.8
Magnus S-RR, Hunt brake*	3	2,750	133.8	134.0	**133.9**	-23.1
Magnus S-RR, flat end cap	3	2,750	132.5	133.0	**132.8**	-24.2
338 Ultra	4	2,750	126.2	128.8	**127.5**	n/a

All figures in decibels, peak. Rifle 4 is a different cartridge, so its reading is reported on its own and not compared to the 6.5 baseline.



THE HEADLINE

31.9 dB of spread at the ear. Under 3 dB of spread at the target. The muzzle device changes what the shooter hears. It does not change what the target hears.

AT THE TARGET

The meter stayed at the target. The rifle moved. Each row below is one muzzle configuration fired from three different distances.

PROJECTILE BREAKING THE SOUND BARRIER PAST THE METER

CONFIGURATION	FIRED FROM 100 YD	FIRED FROM 567 YD	FIRED FROM 1,000 YD
Bare muzzle (R1, 2,684)	**152.2**	**151.2**	not run
TBAC CB muzzle brake (R1, 2,684)	**152.9**	**151.8**	not run
Magnus S-RR, std cap (R2, 2,684)	**152.1**	**150.5**	not run
Magnus S-RR, Recoil X (R3, 2,750)	**152.5**	**151.4**	**147.9**
Magnus S-RR, flat cap (R3, 2,750)	**152.2**	**151.0**	not run
338 Ultra (R4, 300 WM)	**153.9**	**149.3**	**149.9**

Values are the average of the recorded runs. At any given firing distance the total spread across every configuration is under 3 dB, whether the rifle was bare, braked or suppressed, and across a 66 fps velocity spread.

PROJECTILE IMPACT ON STEEL

CONFIGURATION	IMPACT, FIRED FROM 567 YD	IMPACT, FIRED FROM 1,000 YD
Bare muzzle (R1, 2,684)	**127.0**	not run
TBAC CB muzzle brake (R1, 2,684)	**127.5**	not run
Magnus S-RR, std cap (R2, 2,684)	**123.7**	not run
Magnus S-RR, Recoil X (R3, 2,750)	**127.0**	**121.9**
Magnus S-RR, flat cap (R3, 2,750)	**138.0***	not run
338 Ultra (R4, 300 WM)	**126.0**	**125.6**

*Flagged. A round passing over the plate rather than striking it was logged separately at 135 dB. The 138.0 reading sits in that same range and is more consistent with a round going over the plate than with an impact. Treat it as unverified until it is reshot.

WHAT THE DATA SAYS

The muzzle device does not change what the target hears.

At the ear, the spread between the loudest and quietest 6.5 configuration is 31.9 dB. At the target it collapses to under 3 dB and it does not trend with the device. At 100 yards, a bare muzzle read 152.2 and a suppressed rifle running a flat end cap read 152.2. What the meter hears is the projectile breaking the sound barrier as it passes, which is a function of the bullet and its velocity. Nothing threaded onto the muzzle changes it.

The brake is the loudest thing on the line.

Same rifle, same load, devices swapped back to back. Rifle 1 averaged 157.0 dB bare and 164.7 dB with the TBAC CB brake, an increase of 7.7 dB. Every 3 dB is a doubling of sound energy. The shooter next to you is paying for your recoil reduction, and the animal at 600 yards is not.

End cap selection looks worth roughly 8 dB, with a caveat.

The standard TBAC cap averaged 140.9 dB and the flat end cap averaged 132.8 dB, both on a Magnus S-RR. Those two readings came off different rifles running 66 fps apart, which is not enough to explain a gap that size, but it is enough to keep this from being a clean comparison. Run both caps on one rifle back to back before this number gets published.

The impact is quieter than the passing round.

Steel impacts read between 121.9 and 127.5 dB, roughly 25 dB below the sound of the round passing the same meter. A target-side meter reading above 135 is almost certainly catching a round going by, not a hit.

140 dB is the ceiling, and most of this is over it.

NIOSH sets 140 dB peak as the impulse exposure limit for unprotected ears. Both Rifle 1 configurations exceed it by 17 to 25 dB. Several suppressed configurations sit at or below it, but that is not permission to shoot bare eared. Plugs and muffs stay on.

OPEN ITEMS FOR THE NEXT SESSION

Confirm the Hunt brake and Recoil Intro brake belong to Rifle 3, and confirm the suppressor on Rifle 4. Run the standard cap and the flat end cap on one rifle back to back. Third at-ear run and third 100 yard run were not logged, and the 1,000 yard line was only run with two configurations. Meter offset from the flight path, meter orientation, temperature and wind were not recorded and need to be before this is published. The 138.0 dB steel reading needs a reshoot.