

Test Report

N25 Ballistic Test Facility

The reduction of Gun Recoil and Sound Pressure Levels when using E.R.C. Suppressors Models C3 and C4.

1 Background

Tests were performed on a 7mm Remington Magnum rifle mounted on a special stand against a load cell to allow the measuring of the recoil forces. Overpressures were measured in two positions. Three shot groups were fired without any suppressor and with each of the Type C3 and C4 suppressors.

2. Test Setup

To prevent the possible influence of [sound] reflections from the walls, the ceiling and other structures when these tests are done indoors, the overpressure measurements were performed in the open.



The setup with the weapon clamped in the recoil jig and the two overpressure sensors.



Muzzle overpressure sensor.

Recoil Load cell

“Ear” overpressure sensor.



The overpressure sensor at the muzzle was placed 1 meter away, at 90° to, on the same height as the muzzle. The “ear” overpressure sensor was placed at a position where the ear of a shooter would be if he was looking through the scope, 140mm to the back and 140mm to the side of the back face of the scope.

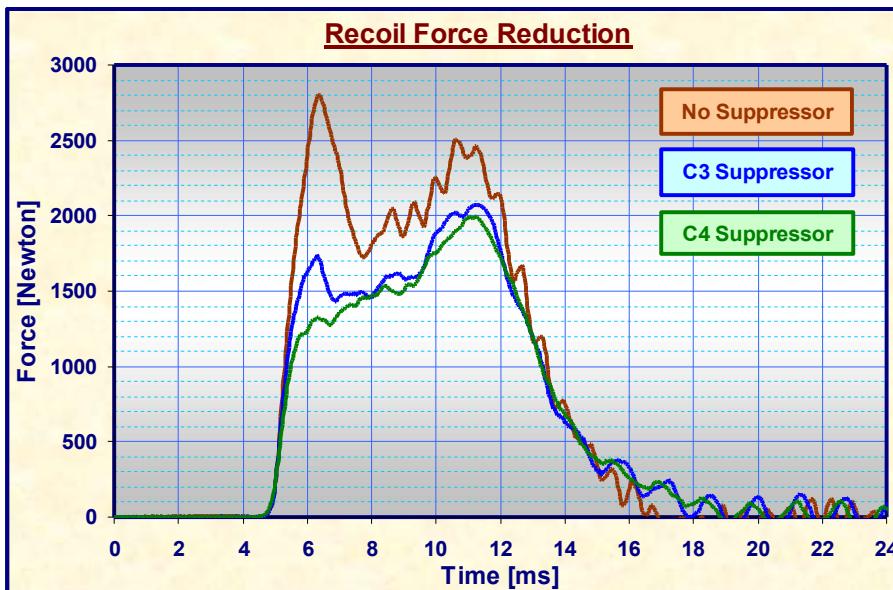
The overpressure data was captured at 156 kHz and a 40 kHz low pass filter was used. The recoil data was captured at 200 kHz and a 180 kHz [hardware] filter was used.

3. Recoil Forces

The suppressors reduced the peak recoil force as shown in the table below.

Test Parameter	No Suppressor	C3 Suppressor	C4 Suppressor
Peak Recoil Force[Newton]:	2800	2076	1995
Peak Recoil Force Reduction [Newton]:	724 [25.8%]	805 [28.7%]	

The reduction of the recoil force realised mainly in the lowering of the sharp peak force in the beginning of the cycle.



The total impulse [area under the curve] is perhaps a parameter that better “represent” the recoil force experienced by the shooter. The suppressors reduced the impulse as shown in the table below.

Test Parameter	No Suppressor	C3 Suppressor	C4 Suppressor
Recoil Impuls [Newton.Sec]:	18.0	15.1	14.3
Recoil Impulse Reduction [Newton.Sec]:	2.9 [16.1%]	3.7 [20.5%]	

3. Blast Overpressures

Looking at the reduction of the recorded peak overpressures the suppressors made major differences in both the positions where it was measured. It should however be noted that sound levels are normally expressed in decibels [dB] which is on logarithmic scale. Large differences in peak overpressures translate to less impressive differences in peak sound pressure levels expressed in dB.

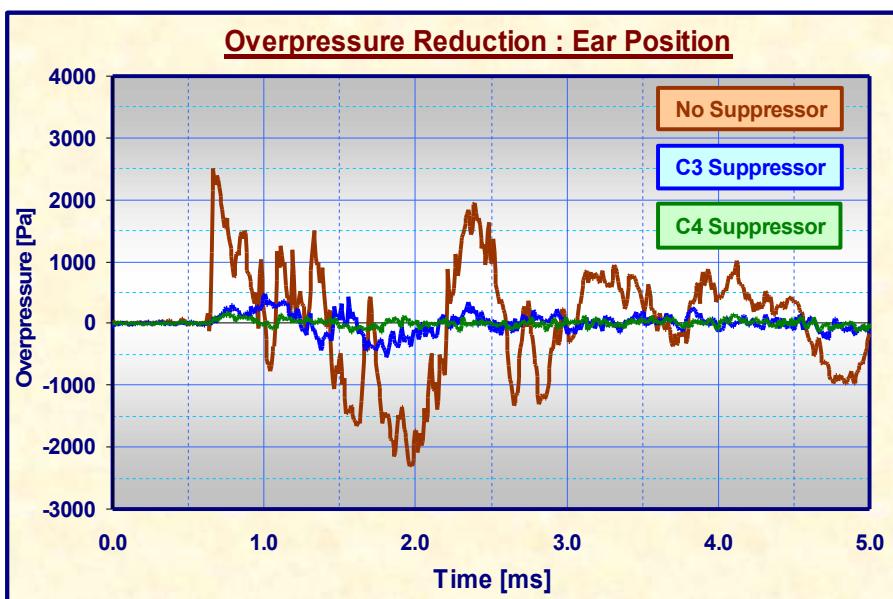
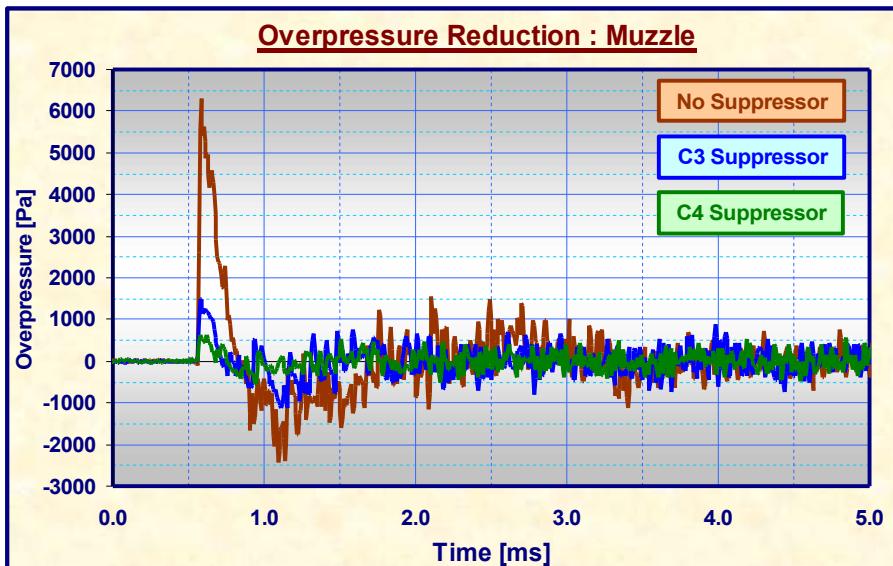
A 2x reduction of the peak overpressure = 6 dB reduction in the sound pressure level

A 10x reduction of the peak overpressure = 20 dB reduction in the sound pressure level

A reduction in peak overpressure of 83 % and 92 % was realised with the C3 and C4 suppressors respectively.

Test Parameter	No Suppressor		C3 Suppressor		C4 Suppressor	
	Ear Position	Muzzle	Ear Position	Muzzle	Ear Position	Muzzle
Peak Overpressure [Pascal]:	2142	7329	349	1279	176	621
Peak Overpressure Reduction [Pascal]:	1793 [83%]	6050 [83%]	1966 [92%]	6708 [92%]		

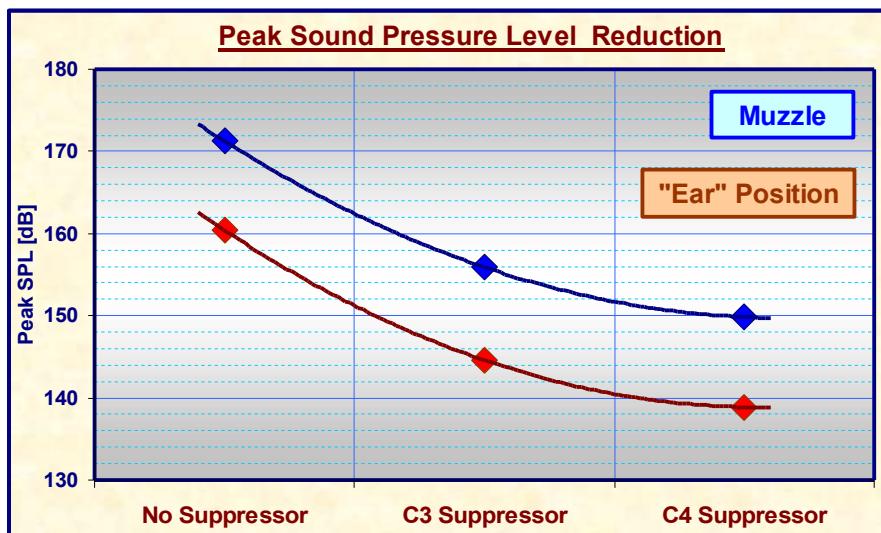
The major reduction in the peak values is clear from the plots below for the overpressure measured at the muzzle and “ear”.



As mentioned before the sound reduction achieved by the suppressors can also be expressed in the reduction in peak sound pressure in decibel [dB].

Test Parameter	No Suppressor		C3 Suppressor		C4 Suppressor	
	Ear Position	Muzzle	Ear Position	Muzzle	Ear Position	Muzzle
Peak Sound Pressure [dB]:	161	171	145	156	139	150
Peak Sound Pressure Reduction [dB]:	16	15	21	21		

The data in the table above can also be presented as follows:



4. Conclusions

The E.R.C. suppressors, Models C3 and C4 reduced:

The Recoil Force by 25.8 % and 28.7 % respectively.

The Recoil Impulse by 16.1 % and 20.5 % respectively.

The Peak Overpressure by 80+ % and 90+ % respectively.

The Peak Sound Pressure Level by 15 dB and 21 dB respectively.

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