

Muzzle Brakes

By Chuck Hawks

Newton's law says (to paraphrase) that for every action there must be an equal and opposite reaction. Recoil (kick) is the rifle's reaction to the action of the bullet being accelerated down the rifle barrel. Recoil is caused by two factors. The first is the bullet itself, which cannot be interfered with. The second is the expanding powder gasses that are pushing the bullet and must also exit the barrel. Muzzle brakes reduce recoil by diverting part of these gasses to the side so that they do not add to the rearward recoil.

A properly designed muzzle brake can significantly reduce recoil. The actual effectiveness depends to an extent on the cartridge for which the rifle is chambered. Ahlman's claims a 50% recoil reduction when their Recoil Reducer muzzle brake is used on large magnum rifles. Mag-na-port International claims recoil reduction of up to 45% for their Mag-na-brake. Browning, whose BOSS (Ballistic Optimizing Shooting System) is both a muzzle brake and an accuracy tuning device, claims a recoil reduction of up to 30%. Weatherby, who claims that their Accubrake is the most effective on the market, claims recoil reduction of up to 53%.

In their literature, Weatherby compares the effectiveness of the Accubrake to several other makes of muzzle brake. According to Weatherby, who used a .416 Weatherby Magnum rifle for testing, the Recoil Reducer reduced recoil by 39%, the KDF Slimline reduced recoil by 40.6%, and the KDF Regular reduced recoil by 49%. These devices reduced recoil by an average of 42.86%. I find that pretty impressive.

The Recoil Reducer, Magna-brake, Accubrake and BOSS muzzle brakes are screwed onto the end of the barrel. They are essentially a ventilated steel tube bored a little larger than the groove diameter of the barrel. Screwed firmly into place, they add a couple of inches of length to the end of the barrel, and are usually slightly fatter than the normal outside contour of the barrel. There is no loss of bullet velocity or change in the rifle's ballistic performance with these muzzle brakes.

The bullet never touches this type of muzzle brake, simply passing through the muzzle brake tube as it leaves the barrel. Some of the expanding powder gas pushing the bullet also passes through the center of the muzzle brake and exits the barrel in a normal manner. But a considerable percentage of the escaping gas finds its way through the holes drilled into the body of the muzzle brake and is deflected outward and at an angle to the rear. This is how these devices reduce recoil. They do work, it is simple physics.

There is another type of muzzle brake. These are "installed" by porting (drilling or cutting angled holes or slots into) the barrel itself. Such brakes avoid the added length and the slight bulge at the end of the barrel of a screw-on muzzle brake. They are a neater installation and cannot loosen with use. On the other hand, they slightly reduce bullet velocity, tend to collect fouling, make the barrel more difficult to clean, and, most importantly, cannot be removed.

Mag-na-port cuts a total of four slots into the barrel. The first pair of these are 180 degrees apart on opposite sides of the barrel, starting about 1.5" back from the muzzle. The other pair are 50 degrees apart on the upper surface of the barrel and closer to the muzzle. Mag-na-port claims an average recoil reduction of 15% with their porting system. Other porting systems are said to deliver about a 20% reduction in recoil. Clearly, porting systems are less effective than muzzle brakes attached to

the end of the rifle barrel.

If the advantage of muzzle brakes is reduced recoil, the disadvantage is increased muzzle blast. As always, in the real world, there is no free lunch. The increase in muzzle blast with these devices can be literally deafening, even for shooters wearing hearing protection.

The muzzle blast from a powerful muzzle brake equipped rifle is so loud that even with hearing protection the shooter risks suffering some permanent hearing damage after a few shots. Earmuff type hearing protectors typically reduce noise by about 25 dB. A muzzle brake equipped magnum rifle (like a .300 or .338 Magnum) produces a sound pressure level (spl) in the 130-dB range, according to reports I have read. Thus the spl inside the hearing protector is in excess of 100 dB, a potentially damaging level.

For a hunter in the field, shooting without ear protection, the muzzle blast from a muzzle brake is immediately deafening. Nearly complete temporary deafness usually lasts from about a minute to several minutes after firing a powerful magnum rifle equipped with a muzzle brake. Later almost all of the shooter's hearing returns, but a certain amount is permanently lost, and the losses are cumulative.

This is why hunting rifles equipped with muzzle brakes are illegal in some African jurisdictions. They have proven damaging to the unprotected hearing of the scouts and guides accompanying the hunter. In North America an increasing number of big game guides now refuse to let a sport use a rifle equipped with a muzzle brake for the same reason.

For the hunter, a muzzle brake that can be removed is the best option. That way it can be used to save the shooter's shoulder when shooting at the range, and removed to help save the shooter's hearing during the hunt.

Both the Weatherby and Browning devices mentioned above are removable. When the Weatherby Accubrake is unscrewed from the muzzle, a cover ring is screwed on to protect the threads. The Browning BOSS muzzle brake is unscrewed and a solid (no holes) BOSS-CR muzzle weight replaces it. The accuracy tuning function of the BOSS system is thereby retained.

The muzzle brake tested for this article is a BOSS attached to the barrel of a .338 Winchester Magnum caliber Browning BAR Mark II rifle, which weighs approximately 9 pounds with scope and mount. This rifle was fired from a bench rest at an outdoor rifle range with covered, but not enclosed, firing positions. (It rains a lot in Western Oregon.) The rifle was test fired with both the standard (drilled) BOSS muzzle brake and the solid BOSS-CR (conventional recoil) replacement installed. These are the same length and weight, so there is no difference except for the absence of the muzzle brake effect when the BOSS-CR is used. The test load was Remington Express 225 grain Core-Lokt factory loads with a claimed MV of 2780 fps and ME of 3860 ft. lbs.

From the shooter's perspective, there is a noticeable reduction in recoil with the drilled BOSS muzzle brake in place. I am inclined to guess about 30%, as Browning claims. In other words, the approximately 29.7 ft. lbs. of free recoil energy is probably reduced to about 20.8 ft. lbs. This means, for example, that the recoil of a BOSS muzzle brake equipped .338 Mag. rifle feels subjectively about like the recoil of a similar 7mm Magnum rifle without the BOSS device (or with a BOSS-CR).

How a muzzle brake will feel to you, on your rifle, is mostly subjective. The best candidates for a muzzle brake are obviously hard kicking rifles, particularly high velocity magnums that burn a lot of powder. The higher the momentum of the powder gasses being ejected from the muzzle in

relation to the momentum of the bullet, the more effective the muzzle brake can be.

Magnum rifles are generally good candidates for a muzzle brake. For example, Weatherby rifles in the ultra-powerful calibers .378, .416, and .460 Magnum are sold *only* with the Accubrake installed, which speaks volumes in itself.

Other rifles chambered for huge magnum calibers, such as the Remington Ultra Mag line of cartridges, are also prime candidates for a muzzle brake. Any lightweight magnum rifle could probably benefit from the installation of a muzzle brake. This includes most of the rifles chambered for the WSM and Remington SAUM lines of short magnum cartridges. (Several Browning models for WSM calibers can be ordered with BOSS.)

A rifle of adequate weight for its cartridge kicks less than a lightweight model. If a rifle stock fits the shooter well the effect of recoil is minimized. A good recoil pad, such as a Pachmayr Decelerator, softens the effect of recoil; so does a large buttplate. Some rifles, such as the gas operated BAR Mark II used for this test, have a reputation as soft shooting guns and seldom require additional recoil reduction. I prefer the BOSS-CR to the regular BOSS on this rifle, as I find the increase in muzzle blast worse than the recoil.

Muzzle brakes are controversial devices, because they offer real advantages and entail real disadvantages. As a general guide, I would suggest that hunting rifles, especially those that might be used for hunting dangerous game, should never be ported. If a hunting rifle is equipped with a muzzle brake it should be removable, for the reasons cited above.

The best answer to the muzzle brake question is simply to avoid calibers that generate more recoil than you can comfortably tolerate. Then you will never need a muzzle brake. Try this. Instead of a .264 Win. Mag., buy a rifle in .260 Rem. or 6.5x55. Instead of a .270 WSM or a .270 Wby. Mag., buy a .270 Winchester. Instead of a 7mm short magnum, buy a 7mm-08. Instead of a standard length 7mm Magnum, buy a .280 Remington. Instead of a .300 short magnum, buy a .308 Winchester. Instead of a standard length .300 Magnum, buy a .30-06. And so on. See, it's easy. You can hunt the same animals and avoid having to make a choice between being kicked out from under your hat or being deafened.

Please remember that muzzle brakes are exceptionally hard on hearing. Always wear ear protection. Earplugs worn inside of earmuff type hearing protectors are highly recommended when shooting a rifle equipped with a muzzle brake.