

## Tactical Briefs #10, October 1998

### Shotgun Home Defense Ammunition

For home defense, a shotgun is superior to a handgun in terms of being able to stop a violent intruder as quickly as possible. A reliable, well-made, pump-action shotgun can usually be purchased for less than the cost of a handgun of comparable quality. Also, inexpensive birdshot ammunition, typically used for training applications, is about three-fourths the cost, round for round, of comparable handgun ammunition.

Most people typically choose a shotgun for home defense for one of three general reasons: 1) to minimize wall penetration to reduce the danger to innocent third parties in case of a missed shot, 2) to maximize wound trauma to stop a vicious assailant as quickly as possible, or 3) because a shotgun does not require as much skill as a handgun to put lead on target.

If you're considering a shotgun for home defense or already have one, we suggest you give some serious thought to attending a one or two day "defensive shotgun" training course from a reputable shooting school. (We have a few schools listed on our Links page.) It's one thing to be armed with a well-equipped, high-tech shotgun and premium personal defense ammunition, but if you're not a skilled shotgun operator, you're the weakest link in your last-ditch home defense weapon system.

#### Shotgun Pellet Wound Ballistics

A shotgun pellet produces wound trauma by crushing the tissue it comes into direct contact with as it penetrates. In order to produce wound trauma that will be effective in quickly stopping an attacker, the pellets must penetrate his body deeply enough to be able to pass through a vital cardiovascular structure and cause rapid fatal hemorrhage to quickly deprive the brain of oxygenated blood needed to maintain consciousness.

Shotgun pellets are classified into two general categories: 1) birdshot, of which individual pellets are typically less than .20 caliber in diameter, and 2) buckshot, which varies in diameter from .24 caliber to .36 caliber.

Table 1 and Table 2 list nominal size and weight information about lead birdshot and buckshot, respectively.

**Table 1. Lead Birdshot**

Shot Number	Pellet Diameter (Inches)	Average Pellet Weight (Grains)	Approximate # of Pellets per Ounce
12	.05	.18	2385
11	.06	.25	1750
9	.08	.75	585
8 1/2	.085	.88	485
8	.09	1.07	410
7 1/2	.095	1.25	350
6	.11	1.95	225
5	.12	2.58	170
4	.13	3.24	135
2	.15	4.86	90
BB	.18	8.75	50

**Table 2. Lead Buckshot**

Shot Number	Pellet Diameter (Inches)	Average Pellet Weight (Grains)
4	.24	20.6
3	.25	23.4
2	.27	29.4
1	.30	40.0
0	.32	48.3
00	.33	53.8
000	.36	68.0

Birdshot, because of its small size, does not have the mass and sectional density to penetrate deeply enough to reliably reach and damage critical blood distribution organs. Although birdshot can destroy a great volume of tissue at close range, the permanent crush cavity is usually less than 6 inches deep, and this is not deep enough to reliably include the heart or great blood vessels of the abdomen. A gruesome, shallow wound in the torso does not guarantee a quick stop, especially if the bad guy is chemically intoxicated or psychotic. If the tissue crushed by the pellets does not include a vital cardiovascular structure

there's no reason for it to be an effective wound.

Many people load their shotguns with birdshot, usually #6 shot or smaller, to minimize interior wall penetration. Number 6 lead birdshot, when propelled at 1300 fps, has a maximum penetration depth potential of about 5 inches in standard ordnance gelatin. Not all of the pellets penetrate this deeply however; most of the shot will penetrate about 4 inches.

### **Federal Personal Defense Shotshell**

Federal Cartridge Company offers reduced recoil Personal Defense Shotshells in 12 gauge and 20 gauge. Both are loaded with #2 lead birdshot. According to Federal's 1998 catalog, the shotshells propel their pellet payloads at a velocity of 1140 fps.

(Note: We tested terminal performance of the 12 gauge Federal Personal Defense Shotshell, and published our results in Tactical Briefs, January 1999. [Click here to read our product review.](#))

### **12 Gauge Shotshell Ammunition**

For personal defense and law enforcement applications, the International Wound Ballistics Association advocates number 1 buckshot as being superior to all other buckshot sizes.

Number 1 buck is the smallest diameter shot that reliably and consistently penetrates more than 12 inches of standard ordnance gelatin when fired at typical shotgun engagement distances. A standard 2 3/4-inch 12 gauge shotshell contains 16 pellets of #1 buck. The total combined cross sectional area of the 16 pellets is 1.13 square inches. Compared to the total combined cross sectional area of the nine pellets in a standard #00 (double-aught) buck shotshell (0.77 square inches), the #1 buck shotshell has the capacity to produce over 30 percent more potentially effective wound trauma.

In all shotshell loads, number 1 buckshot produces more potentially effective wound trauma than either #00 or #000 buck. In addition, number 1 buck is less likely to over-penetrate and exit an attacker's body.

For home defense applications a standard velocity 2 3/4-inch #1 buck shotshell (16 pellet payload) from Federal, Remington or Winchester is your best choice. We feel the Federal Classic 2 3/4-inch #1 buck load (F127) is slightly better than the same loads offered by Remington and Winchester. The Federal shotshell uses *both* a plastic shot cup and granulated plastic shot buffer to minimize post-ignition pellet deformation, whereas the Remington and Winchester loads do not.

Second best choice is Winchester's 2 3/4-inch Magnum #1 buck shotshell, which is loaded with 20 pieces of copper-plated, buffered, hardened lead #1 buckshot. For those of you who are concerned about a tight shot pattern, this shotshell will probably give you the best patterning results in number 1 buck. This load may not be a good choice for those who are recoil sensitive.

Third choice is any standard or reduced recoil 2 3/4-inch #00 lead buckshot load from Winchester, Remington or Federal.

If you choose a reduced recoil load or any load containing hardened Magnum #00 buckshot you increase the risk of over-penetration because these innovations assist in maintaining pellet shape integrity. Round pellets have better sectional density for deeper penetration than deformed pellets.

Fourth choice is any 2 3/4-inch Magnum shotshell that is loaded with hardened, plated and buffered #4 buckshot. The Magnum cartridge has the lowest velocity, and the lower velocity will help to minimize pellet deformation on impact. The hardened buckshot and buffering granules also help to minimize pellet deformation too. These three innovations help to maximize pellet penetration. Number 4 hardened buckshot is a marginal performer. Some of the hardened buckshot will penetrate at least 12 inches deep and some will not.

### **20 Gauge Shotshell Ammunition Recommendations**

We're unaware of any ammunition company who offers a 20 gauge shotshell that is loaded with #1 buckshot. The largest shot size commercially available that we know of is number 2 buck.

From a strict wound ballistics standpoint, we feel the Federal Classic 3-inch 20 gauge Magnum number 2 buckshot cartridge is the best choice. It contains 18 pellets of number 2 buckshot in a plastic shotcup with granulated plastic shot buffer.

However, the Federal Classic load might produce too much recoil for some people. Given this consideration, Remington's Premier Buckshot 2 3/4-inch 20 gauge number 3 buckshot cartridge is the next best choice. This load contains 20 pieces of nickel-plated, hardened lead shot that is buffered to reduce pellet deformation from post ignition acceleration and terminal impact. The Remington buckshot load will probably produce the tightest shot patterns in 20 gauge shotguns.

Third place is Winchester's 3-inch 20 gauge Magnum number 3 buckshot cartridge, which contains 24 pieces of buffered, copper-plated, hardened lead shot.

### **Shotgun Slugs, Flechettes and Exotic Ammunition for Home Defense?**

Unless you live on acreage and anticipate engaging bad guys at distances beyond 25 yards, [shotgun slugs](#) are not a good choice for home defense, because of their enormous capability to over-penetrate a human body and common building materials.

Some shotgun cartridges are loaded with flechettes. These are small, steel, pointed dart-like projectiles with aft stabilization fins, and are commonly referred to as "nails with tails." The low cross sectional area of a single flechette, combined with the small amount of flechettes that can be loaded into a shotshell, makes them an inferior choice for home defense when compared to buckshot.

Also, according to Second Chance Body Armor Company, flechettes are not effective against soft body armor, if this is a particular mission requirement for your ammunition. Steel shot also is ineffective against soft body armor.

There are other various exotic shotshells that are best classified as gimmicks. These include rubber buckshot, bean bags, steel washers, rock salt, "Dragon's Breath," bird bombs, ceramic slugs, "bolo" projectiles and so on. The efficacy of these loads is questionable at best, and we advise you to avoid them altogether for this simple reason.

### Summary

With the right load, a shotgun can be very effective in quickly stopping the deadly violence being perpetrated by a criminal who's invaded your home.

If you're worried that a missed shot might penetrate through a wall and harm others, load your shotgun so that the first one or two cartridges to be fired is number 6 or smaller birdshot, followed by standard lead #1 buckshot (12 gauge) or #3 buckshot (20 gauge). If your first shot misses, the birdshot is less likely to endanger innocent lives outside the room. If your first shot fails to stop the attacker, you can immediately follow-up with more potent ammunition.

With birdshot you are wise to keep in mind that your gunfire has the potential to NOT PRODUCE an effective wound. Do not expect birdshot to have any decisive effect.

Number 1 buckshot has the potential to produce more effective wound trauma than either #00 or #000 buck, without the accompanying risk of over-penetration. The IWBA believes, with very good reason, that number 1 buckshot is the shotshell load of choice for quickly stopping deadly criminal violence.

### End Notes

The term "Magnum" when applied to shotshells means "more shot." Magnum shotshells usually propel their pellets at a lower velocity than a standard shotshell.

Shotgun barrel length does not affect our shotshell recommendations.

### References

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## **.357 SIG -- A Solution in Search of a Problem?**

Several readers have contacted us to ask for our opinion of the .357 SIG cartridge, and its effectiveness for personal defense use, particularly when loaded with a 125-grain JHP bullet. Our usual response is that it demonstrates adequate performance, meaning that the bullets are capable of penetrating deeply enough to potentially inflict an effective wound. But it doesn't seem to perform any better than current 9mm, .40 S&W or .45 ACP bullets in terms of penetration and expansion.

We feel .357 SIG appeals to people who are preoccupied with velocity and kinetic energy more than with producing effective wound trauma.

The velocity of the .357 SIG 125-grain JHP bullet doesn't appear to make it superior in penetrating automotive sheet metal, windshield glass or other hard barrier materials than existing 9mm, .40 S&W and .45 ACP JHP bullets. In fact, .357 SIG demonstrates virtually identical performance characteristics as the other cartridges when fired through hard barrier materials.

To ensure JHP bullets wouldn't over-expand and fragment when propelled at .357 SIG velocities, most bullet manufacturers couldn't simply take existing 9mm 124-grain JHP bullets, install them in .357 SIG cases and pronounce the result as ".357 SIG 125-grain JHP," because this would be a step backwards.

Existing 9mm 124-grain bullets, designed for nominal 9mm velocities, would over-expand, fragment and under-penetrate. Essentially, they'd be re-inventing the 9mm 115-grain JHP +P+ cartridge. Therefore, the ammo companies had to design sturdier JHP bullets specifically for the .357 SIG; ones that wouldn't over-expand and fragment in bare gelatin.

They succeeded in designing such bullets, but the bullets appear to be so resistant to over-expansion that they under-expand when passing through clothing. As a result, in shootings involving clothed people (the most common scenario), the .357 SIG 125-grain JHP bullet will more than likely over-penetrate and exit the body.

In a strict wound ballistics sense, over-penetration is better than under-penetration because the bullet will at least have the potential to intersect and bore through vital cardiovascular structures. But over-penetration is also a waste of wounding potential.

In comparison, many 9mm 147-grain subsonic JHP bullets demonstrate better penetration and expansion performance than .357 SIG 125-grain JHPs.

Perhaps in the future the ammo companies will be able to develop better 125-grain bullets for the .357 SIG. But until this happens we feel .357 SIG is a solution to a non-problem.

Feel the need for speed? You'd be better armed with a standard velocity (1100-1150 fps) .40 S&W 165-grain JHP.

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