

**Law Enforcement Technology
tests and compares weapons
in the .50-caliber line up**



**Putting the big bore
to the test**

By Lindsey Bertomen

The .50-caliber cartridge has been around for almost 90 years and is normally considered a military tool. However, the law enforcement community has begun to recognize the need for the extreme capabilities of the big bore.

For this article, “Law Enforcement Technology” tested several .50-caliber firearms for police use and compared their

features. The testing team discovered that the weapons broke down some of the paradigms of rifle shooting.

Law enforcement's use of the .50 caliber

The .50-caliber weapon system is based on John Browning's 11th machine gun design originally conceived in 1918. General John Joseph Pershing made a public request for an armor piercing machine gun. Browning built the version that the military designated as the M-2 in 1927. During the



Armalite's AR-50 is a bolt-action, single-shot .50-caliber weapon.

weapons include buildings, vehicles and terrain. The .50 caliber is perfect when the shot needs to be made from a safe distance to destroy explosive ordnance or the shot needs to be made to incapacitate a vehicle, vessel or equipment where a smaller bullet or less accurate shot would be impossible.

Why use a .50 caliber

For a police agency preparing to fight the War on Terrorism, the .50-caliber rifle should be one of its first purchases. It is cheap insurance against barricaded targets and the last word in countersniping.

For a police agency preparing to fight the War on Terrorism, the .50-caliber rifle should be one of its first purchases.

Agencies should seriously consider the .50 caliber if any one of these conditions exist:

- (1) There is an airport within an hour's drive.
- (2) Any body of water larger than 1 km square is in the usual response area.
- (3) The urban agency has any buildings or built up areas taller than three to four stories.
- (4) The rural agency has open fields greater than 1 km square.
- (5) The agency patrols in marine, desert or arctic conditions.

Big bore manufacturers

What kind of company builds a .50-caliber weapon? Building a platform for the .50 caliber requires superior knowledge in metallurgy, bolt and receiver design, and recoil reduction. The receiver has to be robust enough to handle higher chamber pressures

Battle of Britain, the United States was the only country with a .50-caliber arm.

The .50-caliber bullet closed the margin of advantage between armor and infantry troops opposing them. The .50 BMG (Browning Machine Gun) cartridge, or 12.7x99mm, could penetrate anything on the battlefield. At the end of World War II, armor improved and the role of the .50 shifted. Although no longer employed as a tank stopper, the .50-caliber is ideal against lightly armored vehicles. The M-2 and its variants, virtually unchanged from their birth in John Browning's workshop, are still standard military issue. The M-2 has been used in every conflict since its inception, including Desert Storm, Mogadishu and Operation Just Cause. Soldiers use the .50-caliber weapon to protect troops, in

motor movements, to destroy light armor, for reconnaissance by fire and in special purpose missions.

The law enforcement application of the .50 caliber is different but based on the same principles, and its use should be considered when the capabilities of normal law enforcement calibers, like the .308, would not do.

A .50 caliber should be used when shearing winds would deflect a lesser bullet or when the big bore needs to overcome the distance of another long-range weapon. It should be deployed when shooting through heavy brush, inclement weather or other materials likely to deflect smaller bullets. The .50 caliber should come out when the target is behind what is normally deemed cover for conventional munitions. Examples of cover for conventional

With the AW50, shown at right, Accuracy International designed a precision shooting platform around a steel receiver and an aluminum chassis.

The EDM Windrunner, below, has a fluted 28-inch barrel with a simple cylindrical muzzle brake.



and longer bolt travel.

Barrett Firearms Mfg. Inc. of Murfreesboro, Tennessee, is probably the best known of big bore manufacturers. Barrett .50-caliber rifles are used in more than 35 countries around the world. The Model M82A1 was first introduced in 1983. When military special purpose forces recognized the obvious value of a shoulder-fired .50 caliber, it began appearing in troop deployments worldwide. The Barrett M82A1 was the coveted weapon for ground troops against special targets during Operation Desert Storm. Currently, Barrett offers four basic models: Model 95, a bolt action, magazine-fed version; Model 82A1, a semi-auto; and Models 99 and 99-1, the full-sized and tactical-sized single-shot versions.

Accuracy International Ltd. of Oak Ridge, Tennessee, manufactures the L96A1, the standard sniping arm of the British Army. Founded in 1978,

Accuracy International is a company that combines the experience of international target competition, extreme military deployment and superior manufacturing techniques to make precision rifles. Accuracy International builds rifles for a specific purpose, using a specific platform for a specific performance. Rifles from Accuracy International are being used in over 50 countries worldwide. Accuracy International builds rifles that deploy by parachute and shoot groups measured with precision calipers.

Armalite Inc. of Geneseo, Illinois, is a name that has been associated with the firearms industry since the post-Korean War era. Armalite's development of the AR-10 led to the adoption of Colt's AR-15 as the basic infantry rifle. The AR designation on this household word is from the Armalite name. Armalite has reorganized several times but maintains the strong background in new designs and products.

Armalite currently makes one .50-caliber model: the AR-50.

EDM Arms of Redlands, California, is a precision firearm manufacturer. Bill Ritchie, the owner, has owned the tool and die company that became EDM Arms since 1979. EDM Arms entered the big bore business in 1990, creating an immediate impression in target competition. EDM Arms stayed on the cutting edge of technology by using electrical discharge machining and CNC (computer numerically controlled) machining. These methods are known in the firearms industry to produce precise fitting parts and consistent accuracy. EDM Arms makes the XM-107 Windrunner, a three-round model that folds into a neat package; the SA-99, a single-shot version similar to the Windrunner; and the Model 50, which does not fold down like the other two models.

Testing the .50 caliber

We tested firearms for accuracy, reliability, ergonomics, durability, maintenance and overall design. Our team knew that most of these factors could not be tested over a few days on the range or just by simply disassembling the weapons. We interviewed shooters who regularly used them. We spoke with soldiers who have used .50-caliber anti-material weapons in deployment. We talked with armorers who regularly repair big bore weapons.

We knew that rating a weapon for accuracy couldn't be done with a single rifle-bullet-optics combination or during a single range session. Smaller caliber rifles are checked for accuracy at distances less than 500 meters. The

.50-caliber rifle can make a shot out to 1 1/2 kilometers. With the rifles we tested, we were skeptical of the manufacturer's minute of angle (MOA) claims and took notes while we pulled the trigger.

There were several items our testing crew noticed were consistent in the .50-caliber rifles we tested. First, rating the reliability of this kind of product is difficult. None of the rifles we tested failed, or even suggested failure. It appeared that the Windrunner had the most user-serviceable components. A shooter could replace most of the parts in the field. However, the AW50 supplied a kit that allowed an armorer to change the barrel. This says volumes about consistency in manufacture. The M82A1 has a reputation of being soldier-proof. The AR-50 has a simple, straightforward design. Each rifle fed, chambered, fired, extracted and ejected as advertised.

All of them scored high in reliability.

All of the rifles had some version of a free-floating barrel. This means that the barrel does not contact the stock and set up a vibration or a whipping effect when the bullet travels down the barrel. This is an important factor in the accuracy equation.

*Each rifle fed,
chambered, fired,
extracted and ejected
as advertised.*

All of the guns we tested had military-standard M1913-style rails to mount a scope. There rails had only minor differences; and all of them were sturdy enough to mount a small automobile on.

We commented several times that using a three- to five-round magazine is sort of a moot point on some of the weapons tested. After firing for extended periods, our shooters were willing to pick up a round on the shooting bench and manually load it into the chamber rather than load it from the magazine. This gave the shooter a little more time for the spots in our vision to clear.

All of the guns we tested had tight-fitting parts and no tool marks in the bolt ways or places one cannot see. All of the rifles showed fine attention to detail. All of the guns we tested easily exceeded the 2-8 MOA standard of accuracy for the anti-material role of the .50 caliber.

We shot some other brands of ammunition but consistently used one bullet in all of the weapons when it came down to testing. This bullet was The Hunting Shack Inc., Steverville, Montana, 750-grain "T-Coat." We



The Windrunner folded neatly into a compact package.

used this bullet because each bullet component manufacturer and most gun manufacturers we contacted recommended this product. The Hunting Shack bullet performed consistently in all of the weapons we tested.

When we talked to several manufacturers of the guns we tested, they recommended we contact Frank Abramson, the owner of ARM USA in Anaheim, California. ARM USA is a stocking dealership that allows its customers to test drive its products at nearby Angeles range. Abramson has spent many hours shooting, repairing and testing big bore rifles. He is a regular at the Angeles range, which had the facilities for us to shoot at extreme distances.

Accuracy International

The Accuracy International AW50 resembles a conventional rifle. Most rifles have a receiver and barrel bedded into a gun stock. On closer examination, we found Accuracy International designed a precision-shooting platform around a steel receiver and aluminum chassis. Most would call the chassis a stock assembly but for the AW50, "chassis" is more appropriate. The action is permanently bonded and bolted to the aluminum chassis. The butt and checkpiece section hinges so that the stock folds, subtracting 25 cm from its overall length when transporting. This is for "travelling in vehicles or for parachute insertions." It also was the way one removed the bolt from

the weapon.

Accuracy International set a standard in the industry. All of the major parts, including the barrels, are interchangeable. Its rifles are built with such consistent precision that the end-user can do what normally takes a gunsmith with specialized training with any other rifle. Translated, this means that an agency with a limited budget will not have to suffer months of downtime waiting for its repair because there is only one in the inventory. The armorer can fix the problem on-site. The AW50 has a six lug bolt with a roll pinned extractor. There are two red dots on the top of the weapon right at the chamber. These are overpressure valves for safety, sort of like freeze plugs in an automobile engine block. There is another valve in the bolt. These valves are designed to protect the shooter

from unsafe chamber conditions. This weapon has an ambidextrous safety with a positive 160-degree throw.

Underneath the butt pad was the strongest and most useful rear support leg we have seen. The support leg is attached to the butt near the thumbhole grip and adjusted for elevation by a knurled screw. This assembly allowed us to make elevation adjustments in fractions of mils.

The AW50 has a tapered precision barrel with a recessed crown, terminating into a muzzle brake reminiscent of an M-60 tank's muzzle end. The bipod is identical to the Parker-Hale type supplied with the smaller .30-caliber version. There are sling-mounting lugs placed in rather strategic locations on the chassis.

The AW50 was easy to index and hold steady on the target. The trigger was crisp with only a moderate amount of travel. These features alone would have given the AW50 a high rating, until we pulled the trigger.

The recoil was punishing on the AW50. Not only was it the biggest bite of the group, the muzzle brake tended to deflect hot gases to

Minute of Angle (MOA)

What is minute of angle? Besides being one of the most misused buzzwords in the industry, a minute of angle is a unit of measurement. Most of us learn in grade school that a circle has 360 degrees. For a precision shooter, measuring his accuracy with a single degree is akin to using a truck scale to weigh yourself. A degree is just not small enough. To make a minute of angle, divide one of those 360 degrees into 60 equal parts — 1/60th of a degree is a minute of angle. Now that we know this, how does one apply it? On a target downrange, a minute of angle is approximately 2.50 cm at 100 meters. At 200 meters, a minute of angle is about 5 cm and so on. If a sporting rifle shoots a minute of angle at 200 meters, gun writers call it a tack driver.

— Lindsey Bertomen

wherever the observer (of the shooter-observer sniper team) was. If the AW50 shooter was in a concealed position before firing, he probably gave himself away from the first shot. The signature from this muzzle brake was immense.

Because the butt pad floats freely from the chassis, the rifle travels rearward in the first part of the cycle before the shooter's face does. We had to add this distance to the scope eyepiece for safety reasons. The AW50 redefined the concept of scope bite. Additionally, this heavy recoil only confirmed another issue that some of the other .50-caliber rifles had: Accuracy International put a bipod designed for a lighter rifle onto a system that weighed in at 30 or more pounds. The AW50 created bipod rattle quickly.

Barrett

The Barrett Model M82A1 is a semi-automatic, short recoil-operated delivery system. It is probably the most recognizable big bore rifle in the world. It is the only semi-automatic rifle we tested.

The M82A1 comes with a quick detachable bipod, M-16 style handgrip and a carry handle. It is the only rifle

tested that came with the option of iron sights.

We were surprised when our testers first cycled the action. We knew that the larger the bullet, the stronger the spring that keeps the bolt closed. The M82A1 was only moderate in this

Its (.50 caliber) use should be considered when the capabilities of normal law enforcement calibers, like the .308, would not do.

respect. Barrett uses a chevron-shaped enclosed muzzle brake system. It was effective in reducing recoil and also lowering the firing signature of the muzzle.

The M82A1 was right about mid-range in shooter comfort. It was light in recoil. It was safe to assume that both the action and the design of the muzzle

brake were responsible for the reduced recoil. The butt pad, action and muzzle are linear with the bore on all Barrett rifles. This kind of cheek indexing took a little getting used to but shooters were easily able to achieve Barrett's accuracy claims. The Barrett M82A1 was the only magazine-fed weapon we fired where "magazine fed" makes any sense. The recoil stroke was short and we were able to reacquire the target quickly and fire the next round. The recoil was similar to a 12-gauge shotgun. When we spoke with soldiers, who deployed with an M82A1, we confirmed the inherent accuracy and follow-up shot capability of the M82A1.

The design of the M82A1 is simple and practical. It has enough ventilated forend forward of the barrel receiver junction to prevent burned fingers. It is purposely similar in "feel" to an M-16. The M82A1 was designed for a high stress shooter environment. The controls are not quite as ergonomic as they are easy to find in the dark. The bipod looks like an M-60 machine gun bipod. It is easily deployed and easily stowed. Takedown and maintenance requires few or no tools.

Armalite

The Armalite AR50 was the least expensive .50 BMG we tested. It had the longest overall length in our lineup. It was the only single shot we tested. The AR-50's appearance can be summed up in one word: utilitarian. It has an extruded forend, grip frame and a removable buttstock. The barrel, a 31-inch chrome moly, 8-groove leviathan, sits high above the forend. The muzzle brake is an enclosed chunky oblong piece with two steel wings near the muzzle.

We got behind the AR-50. We put our cheek on the padded cheekpiece. We tested the single-stage trigger. The safety was at the rear of the action, providing a positive lock up by flipping a large fin at the rear of the bolt. This may require the shooter to reach to disengage it but it also could be visually checked while the shooter is looking at the target.

The AR-50 provided the biggest sur-

.50 caliber comparison

Weapon	AW50	AR-50	M82A1	xM107
Type	Bolt Action Five Round	Bolt Action Single Shot	Recoil Operated Semi-Auto	Bolt Action Five Round
Approximate Weight	13.5 kg	15.6 kg	13.40 kg	15.42 kg
Approximate Weight	13.5 kg	15.6 kg	13.40 kg	15.42 kg
Approximate OAL	1350mm	1511mm	1447.8mm	1473mm
Rating	Most Features	Best Value	Quickest Follow-up Shot	Best Overall
Approximate Price	\$10,925	\$2,615	\$7,300	\$7,250

prise of all. It was pleasant to shoot. The weight of the rifle, coupled with the massive muzzle brake tamed the beast. We found the AR-50 the easiest bolt action to shoot a follow-up shot with. Ironically, the AR-50 is a single shot.

We shot several shot strings with the AR-50. It proved to be moderately accurate. We were, however willing to practice with it more. The muzzle brake did not throw hot gases on the observer. The rifle did not struggle with the bipod during the shot. The trigger was crisp. This rifle is our first choice for extended shooting sessions.

The AR-50 did not have some of the embellishments of the more expensive rifles. It would be a welcome addition to have a rear support leg and some takedown ability.

EDM Arms

The EDM Arms Windrunner was the most accurate of the guns we

tested. The Windrunner had some features that put it in a class of its own. For these reasons, we rated it highly for law enforcement use.

The Windrunner has a fluted 28-inch barrel with a simple cylindrical muzzle brake. The muzzle brake design was the epitome of the KISS principle. In fact, ARM USA even had EDM make this same muzzle brake for the AW50. It is a cylinder with 80 holes drilled at a 30-degree angle. We tried it on the AW50. It worked. The Windrunner barrel screws into the receiver with a ratchet action reminiscent of the Uzi barrel. The stock is collapsible with adjustment locks. The extractor on the Windrunner was unique. It was secured by a spring-loaded ball detent. The extractor was simple and could be replaced without tools.

The Windrunner will fold down small enough to fit into a standard

Pelican case. It can be toted around in its included AR-15 style soft case. We were able to make it operational in less than a minute, without any tools. No other .50 BMG can do this.

We began shooting the Windrunner at the 500-yard mark. EDM claims ? MOA at 1,000 yards with match ammunition. They were not kidding. The crisp, clean Remington-style trigger only enhanced the shooting session.

The fact that the Windrunner buttstock was collapsible precluded having a long and wide cheekpiece. Our shooters preferred more cheek indexing than the Windrunner provided. The Windrunner came with a sturdy bipod that folded neatly along the receiver.

The .50-caliber rifle is not for every department. The capabilities of the big bore bear an enormous responsibility on the user. The bullet will travel farther than any sporting arm. It will penetrate materials normally deemed "bulletproof." It will incapacitate vehicles and structures normally deemed invincible.

On the other hand, the .50-caliber rifle is a tool with unprecedented utility. It could interrupt a terrorist act that would render most departments ineffective. It can deploy at distances that create a margin of protection to the user. It can deter some acts just by its known presence in the police armory. ■

Lindsey Bertomen is a police officer in Turlock, California. He serves on the firearms training staff as an assistant armorer and firearms instructor. He serves in the Army National Guard by assisting in firearm instruction. Bertomen has a criminal justice degree from Roger Williams University.

For more information on these companies, use the Reader Service Card and circle the corresponding number

company	READER SERVICE #
Barrett	25
Accuracy International	26
Armalite	27
EDM Arms	28
The Hunting Stack Inc.	185

