

BASIC RIFLE TRAINING



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INTRODUCTION

The general use rifle in the inventory of the FBI is the M16A1-M. (See Figures 1a-1d). The M16 replaced the Remington M760 pump action rifle, caliber .308, which had been the FBI general use rifle for years. The M16 is a gas operated weapon. It is chambered for the .223 Remington cartridge. In military terminology, that cartridge is referred to as the 5.56 mm (millimeter) NATO round (M193). The two, the commercial and the military rounds, are identical and interchangeable in the M16. (Figure 2)

The cartridge is loaded with a 55 grain bullet (caliber .224) to a muzzle velocity of 3250 feet per second (fps). It is loaded with either full metal jacketed, soft pointed or hollow pointed bullets. Although the soft and hollow pointed bullets will normally function in the M16 during semi-automatic firing, they will almost certainly jam the weapon in the full automatic firing phase. Accordingly, as a general rule the full metal jacketed ammunition should be used exclusively. (Figure 3)

The M16 utilizes 20 and 30 round magazines interchangeably. It has a selector by which the shooter can select the desired firing mode. The selector has three positions: SAFE, SEMI and AUTO. On SAFE, the M16 will not fire. On SEMI, the rifle will fire one shot (and only one shot) each time the trigger is pulled. The trigger must be let forward and again pulled for every shot. The rifle will fire as fast as the trigger can be pulled. On AUTO, the M16 will fire, and continue to fire, as long as the trigger is held back and until

the ammunition is expended. There are three versions of the M16 in the FBI inventory. The M16A1 is unmodified and fully capable of both SEMI and AUTO functioning. The M16A1M, on which a block has been installed preventing the selector from being switched to AUTO, is capable only of being fired SEMI-automatically. The third version is the M16A1 Carbine, a shortened version of the M16A1, which is also capable of both SEMI and AUTO functioning. (Figures 4a & 4b) NOTE: In 1985 the M16A1 was redesigned and designated the M16A2. Although no A2's are in the FBI inventory at this time, in the future they will be because the A1 version is no longer manufactured. For discussion of the A2, see Appendix D.

NOTE: ONLY SWAT TRAINED AGENTS AND FIREARMS INSTRUCTORS ARE AUTHORIZED TO UTILIZE AUTOMATIC FIRE. The M16A1M is the only rifle available to the non-SWAT trained agent in the field.

The M16 (both versions) weighs 6.5 pounds empty. With a sling and a fully loaded 20-round magazine, it weighs 7.5 pounds. It has a maximum cyclic rate of fire (AUTO) of 700-800 rounds per minute. Its maximum rate of effective fire (that rate of SEMI firing in which a reasonably proficient shooter can fire accurately) is 45-65 rounds per minute. The sustained rate of fire (that actual rate of fire the rifle can sustain indefinitely without damage to the shooter or the rifle) is 12-15 rounds per minute. The maximum range is 2653 meters (about 2900 yards). The maximum effective range is 500 meters (about 545 yards) - that is the maximum

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range at which a reasonably proficient shooter could expect to hit a man-sized target.

In the FBI, the rifle is zeroed at 200 yards, which is to say, the weapon's sights are adjusted in order that at 200 yards the point of aim and the point of impact coincide. Given a 200 yard zero, the trajectory of the bullet is such that from the muzzle to about 225 yards, the bullet is never more than approximately 1.5 inches above or below the line of sight. (Figure 5) For the shooter, this means that for any target out to a range of about 225 yards, there is no need to hold above or below the desired point of impact. The shooter merely aims at the part of the target to be hit and fires the weapon. Thus, when sighted in at 200 yards, the rifle is said to have a "Point Blank" range of 225 yards. The Point Blank range is that range within which the shooter need make no change in sight picture to hit the target. (See APPENDICES for detailed trajectory information).

DESCRIPTION

The M16 bears several features worth discussing. (See Figure 1 for an illustration of each feature and its location on the rifle). On the right side of the rifle are located the Forward Bolt Assist, Magazine Release, Dust Cover and Windage Adjustment. On the left side are the Selector and the Bolt Release/Bolt Stop. At the back of the receiver is the Operating Handle (also called the T-Handle. Inside the Carrying Handle is located the Rear Sight, while the Front Sight is located within the raised, protective wings on the muzzle

end of the barrel. The Front Sight contains the vertical sight adjustment, called Elevation. The sights and their adjustments will be discussed below in the section on the Rifle Qualification Course, Sighting-In phase. The function of the other features mentioned here is as follows:

- Forward Bolt Assist. Since there is no handle directly on the bolt, this feature was added to the rifle. If the bolt does not fully close, pushing on the Forward Bolt Assist will cam the bolt fully closed. As a matter of habit, the shooter should push on this a couple of times every time the bolt is released. Generally, the bolt will not fail to fully close unless the weapon has been extensively fired without cleaning, dirt or other matter has gotten into the action, or the cartridge is misshapen.
- Magazine Release. Pushing on this button releases the magazine from the magazine well. The magazine should drop free without having to be handled. Right handed shooters should operate the release with the trigger finger. Left handed shooters should operate it with the right thumb.
- Dust Cover. This is intended to enable a shooter to close off the action of the rifle to limit the possibility of dust, dirt or other foreign matter from getting into the action. It will open on the first motion of the bolt either forward or backward. On the range, it should be left open to allow visual inspection of the condition of the weapon.

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- **Selector.** This lever selects the desired firing mode of the rifle. The front of the lever has a pointer that points to the mode selected, either SAFE (horizontal, pointing forward), SEMI (vertical, pointing up) or AUTO (horizontal, pointing backwards). The selector cannot be put on SAFE if the rifle is uncocked.
- **Bolt Release.** When the bolt of the rifle is locked in the open position, pushing on the large serrated end at the top of the Bolt Release will release the bolt, allowing it to travel forward into the closed position. If the bolt is closed and it is desired to lock it in the open position, apply pressure to the small pointed end at the bottom of the Bolt Release while pulling the bolt back with the Operating Handle. Pull the bolt all the way back and then let it forward until it stops. Release the bottom of the Bolt Release and the bolt is locked open.
- **Operating Handle.** (Also called Charging Handle). By grasping this T-shaped handle, the bolt can be pulled back into the open position. If an empty magazine is in the rifle, the bolt will automatically lock in the open position. Without an empty magazine in the rifle, the bolt will not stay back unless the Bolt Release is utilized as described above. When not in use, the Operating Handle should be locked forward out of the way. It does not move when the weapon is fired as the bolt moves within the rifle independently of the Operating Handle.
- **Carrying Handle.** This provides a convenient handle for carrying the rifle, much like a suitcase. However, on the range the weapon should be carried with the muzzle pointing up in the air. The Carrying Handle also contains the rear sight inside the handle and the windage adjustment "wheel" on its right side.

BASICS OF MARKSMANSHIP

Six factors comprise the Basics of Marksmanship: Sight Alignment, Sight Picture, Breathing, Trigger Control, Follow Through and Position. These six factors are applicable to all forms of rifle shooting. Regardless of the rifle being used, the course of fire being pursued, or the conditions under which it is being used, the Basics of Marksmanship must be applied in order to fire effectively and accurately. In order for the shooter to gain proficiency it is necessary to practice extensively in both live firing and dry firing exercises.

SIGHT ALIGNMENT. Sight alignment is the image formed when the front and rear sights are properly aligned with each other. The rear sight on the M16 is an aperture sight. (Figure 6a). The front sight is a small post within the protective wings of the front sight assembly. (Figure 6b). The protective wings are NOT part of the sight picture - their function is only to protect the front sight from being bent or damaged. The proper sight alignment is attained when the top of the front sight is in the center of the aperture of the rear sight. (Figure 6c). To do so, the shooter should position the eye directly behind the rear sight and as close as comfortable.

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bly possible to it. Look through the rear sight and focus the vision on the top of the front sight. The eye will automatically center the top of the sight and will keep the proper sight alignment AS LONG AS the vision remains focused upon the front sight through the rear sight. The shooter must discipline himself to keep the vision focused solely upon the front sight. If focus on the front sight is not maintained, correct sight alignment is lost.

SIGHT PICTURE. Sight picture is the correct sight alignment imposed upon the target. (Figure 7). Remember, correct sight alignment requires the shooter to keep vision focused upon the front sight. The human eye can focus upon only one point in space at a time. It can change focus almost instantaneously, but can be focused on only one point in space at a time. To form a sight picture, the shooter is dealing with three points in space - the rear sight, front sight and target. By focusing upon the front sight, the remaining two points (rear sight and target) can be seen suitably well to align all three. If the vision is focused anywhere other than the front sight at the moment the weapon fires, the sight picture is lost and the shooter can have no idea where the shot went. The aperture sights of the M16 (or similar sights on other weapons) simplify the sight picture problem. Since the shooter has only to look through the rear sight while focusing upon the front sight and thereupon ignore the rear sight, there are only two points in space to align - the front sight and the target. Thus aperture sights are faster and more accurate to use than conventional open sights in which the rear sight, front sight and tar-

get (all three) must be aligned. This also highlights the advantage of a telescopic sight (other than magnification). In a scope, the sights and target are presented on the same optical plane, further simplifying the required visual focus point.

BREATHING. Having attained correct sight alignment and the proper sight picture, the shooter must control breathing. As breathing occurs, the weapon (and the vital sight picture) moves up and down in rhythm with the breathing cycle. In order to fire accurately, the breathing must be controlled for the moment of firing. Conventionally, shooters have been instructed to let half of their breath out and then hold their breath until the shot is fired. Holding one's breath instills a tension in the body through the abdomen and diaphragm that is not conducive to a high level of marksmanship (see the discussion of Position Elements below). Rather, a shooter should employ what is termed the Natural Respiratory Pause. In a normal breathing cycle, the individual breathes in for a second or two, then breathes out for a second or two, and then pauses for several seconds without breathing at all. The shooter should merely extend this pause in order to be still until the weapon fires. To accomplish this, align the sights and breathe normally. Prior to starting the trigger squeeze breathe in deeply through the mouth and breathe out through the mouth. Then, during the natural pause that follows, simply DO NOT breathe while squeezing the trigger. After the weapon fires, resume breathing. The Natural Respiratory Pause can be extended easily for 15-20

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seconds. However, the shot should fire within 8 seconds (and certainly no more than 10) from the start of the respiratory pause. To go longer is to suffer blurred vision and inability to retain clear focus upon the front sight as the oxygen level of the brain is depleted. If the shot is not fired within the optimum interval, start breathing and begin again from the start.

Breathing is thus controlled even in rapid fire. To do so in a rapid fire situation either extend the pause for all the shots or increase the rapidity of the cycle. The latter is done by breathing through the mouth deeply and quickly. Force the air in hard, blow it out hard, shoot; force it in, out and shoot; and repeat for however many shots are being fired.

TRIGGER CONTROL. This factor entails pulling the trigger in such a fashion that the sight picture is not disturbed while the shot is fired. Trigger control is a vital element of basic marksmanship and probably the most difficult to master. Because the trigger pull of a rifle is short and easy, requiring little strength, the untrained shooter is inclined to jerk or snap the trigger in an attempt to make the weapon fire when the sight picture looks perfect. In so doing, the weapon is moved, the sight picture is destroyed, and the shot does not go where the shooter thought it was aimed. Usually, it will strike low and, sometimes, off to one side (which side depends on whether the shooter is right or left handed). This occurs because the weapon is moved and the sight picture is changed at the instant of firing. The shooter is unaware of it be-

cause it is masked by the recoil of the rifle. Dry firing and "ball and dummy" exercises will amply demonstrate to the shooter the effects of jerking or snapping the trigger. The motion imparted to the weapon will be apparent.

Proper trigger control consists of a steady application of pressure to the trigger until the rifle fires. Ideally, the shooter will not know when the trigger will release, (or "break", to use a rifleman's term). Depending upon the stability attained through the respective position being used, the trigger pull can be either continuous or applied in interrupted stages.

Given a solid, steady position (such as that gained by shooting from a sand-bagged rest) the trigger pull is uninterrupted. The weapon is sufficiently stable that the sight picture remains undisturbed throughout the firing process. The shooter need only concentrate on the sight picture, control breathing, and softly but steadily squeeze the trigger until the weapon fires. An "undisturbed sight picture" means that the sights remain aligned on or within the part of the target the shooter wants the bullet to hit. Some motion may be evident, but it remains within the desired target area. Squeezing the trigger itself can best be likened to using an eye-dropper from which only one drop is wanted. Gradually increasing pressure is applied to the bulb of the eye-dropper while watching the end of it. When the one drop forms and falls, no further pressure is added. By the same token does one shoot, watching the sight while adding gradually increasing pressure to the trigger until the shot fires.

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Other positions are not as stable as the sand-bagged rest. The apparent motion of the weapon and sights is more evident. The most extreme example of this is the off-hand position where the shooter must fire while standing erect without external support. When so firing, control of the trigger is paramount to accurate shooting. The shooter must employ an interrupted trigger squeeze. To accomplish this, align the sights, control the breathing and start the trigger pull. As the sight alignment moves out of the area the shooter wishes to hit, the trigger pressure should be held (neither relax it nor apply additional pressure). As the sights move back into the desired target area, add additional pressure in a gradual and gentle manner. Continue in this fashion until the shot is fired. Ideally, the shot will occur as the sights are at the center of the desired target area or as they are moving into the center of it. As the proficiency of the shooter increases, this interrupted technique should be employed for ALL positions. Even in the steadiest of positions there is some motion imparted to the rifle and sights. Proficiency in trigger control will result in smaller groups being fired.

POSITION. Position is the "platform" by which the weapon is held and fired. In FBI basic rifle training, seven positions are taught and utilized. These seven positions are discussed individually below.

Common to all positions are three Position Elements: Bone Support, Muscular Relaxation, and Natural Point of Aim. "Bone support" means that the weight of the weapon should be supported by the skeletal structure of the

body and not by muscular strength alone. For example, in an off-hand position if the shooter holds the rifle in one hand extended at arm's length away from the body, it is supported by muscular strength alone. In a very short time the muscles begin to fatigue and the weapon begins to sink lower and lower. Contrarily, if the weapon sits in the hand and the arm is bent so the elbow is directly under the weight of the weapon, sitting close in to the body, the weight is borne by the bone structure of the arms and can be held indefinitely without duress. (Figure 8).

"Muscular relaxation" means precisely that. Once the position is attained, the shooter should be totally relaxed without any muscular tension or duress in the arms, legs or torso. Given bone support, and muscular relaxation, the weapon should stay lined up on the target without any effort or muscular control on the part of the shooter, assuming a natural point of aim has been established.

"Natural point of aim" is adjusting the position so that as the shooter relaxes completely the weapon is supported fully (bone support) and the sights are aligned upon the target without any muscular control being exerted by the shooter (muscular relaxation). Accomplish this by aiming the rifle, closing the eyes and relaxing completely, then open the eyes and see if the sight picture changed. If the sights have moved, **ADJUST THE POSITION** as necessary to bring the proper alignment into effect. Retest the natural point of aim again. Once the position has been adjusted to the point that the sight pic-

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ture remains unchanged after closing the eyes and completely relaxing, then a natural point of aim has been established. This is important in any position for shooting with the greatest possible degree of accuracy. If a natural point of aim is not attained, then the sights must be held aligned by muscular effort. When the weapon fires and recoils, the effects of the recoil overcome the muscular control of the rifle and it begins to revert to wherever the natural point of aim would be. This occurs BEFORE THE BULLET LEAVES THE BARREL, and causes the shot to be thrown off. Further, in rapid fire, if a natural point of aim is established the rifle tends to stay on target from shot to shot. This enhances recovery and makes possible faster accurate shots. If a natural point of aim is not established, then the weapon recoils away from the point of aim (towards the natural point of aim) and thus reduces the ability to recover and fire rapidly and accurately.

FOLLOW THROUGH. Once the shot is fired, the bullet must travel the length of the barrel and exit the muzzle without disruption of the sight picture or of the rifle's position. Any disruption at this time is masked from the shooter by the recoil and its effect. Nevertheless, it is easily possible for a shooter to cause an inaccurate shot AFTER "breaking" the trigger. This is remedied by "Follow Through". Simply put, to follow through on a shot means the shooter tries to maintain the sight picture, position and grip through the recoil. DO NOT relax away from the weapon or let the trigger forward until the recoil is finished. Most expert shooters will follow through for one or two seconds af-

ter the recoil ends (in slow fire). The process is still employed, but more quickly, in rapid fire. Another aspect of properly following through on a shot is the ability to "call" the shot. The shooter must concentrate on trying to "see" the sight picture through the recoil. At the moment of firing the shooter will have a mental image of where the sights were the instant the rifle fired. The shooter must consciously recall this image or it is quickly lost. By recalling the image of the sight picture the shooter can "call" where the shot struck.

If the rifle is sighted in and the shooter made a good shot (i.e., did not jerk the trigger or make any other mistake), the shot will strike where it is "called." If a shooter is consistently "on call" then the weapon is sighted in and the shooter's techniques are sound. If the techniques are sound and no mistakes are being made, but the shooter is "off call" (hitting other than where the shot is called), then the sights are off. If unable to "call" the shot, then the shooter's techniques are not sound and additional instruction and practice is necessary.

POSITIONS

In the FBI Basic Rifle Training program, seven positions are taught. These positions are utilized in the Rifle Qualification Course described in detail below. Each of these positions incorporates the elements of bone support, muscular relaxation and natural point of aim which have been previously discussed in detail. These positions are applicable to any rifle and not just the M16.

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SUPPORTED PRONE. (See Figure 9). In this position, the rifle is supported by sand bags or some other means. The support should have some "give" to it and not be hard and rigid since the rifle tends to rebound off of a rigid surface. The weapon should rest on the support just in front of the magazine well. The shooter assumes a prone position behind the rifle, insuring the body is almost directly in line behind the weapon. The strong knee should be drawn up and contacting the ground. As a key, the strong knee should be directly behind the stock or only slightly to the side. This keeps the body rolled slightly onto the weak side, raising the shoulder up behind the stock and keeping the chest from lying on the ground where the heartbeat can be transmitted to the rifle. The weak leg should be straight, and both feet laying sideways flat against the ground. The strong hand grips the rifle firmly and holds it firmly into the shoulder. The weak hand does not touch the rifle at any point except, if the shooter desires, the weak hand can be put under the toe of the stock to help fine-tune the sight picture elevation. A common mistake in all the positions is for the shooter to hold the weapon too loosely in the strong hand. Doing so allows the recoil effects and motion of the rifle to vary considerably from shot to shot, which in turn is very detrimental to consistent accuracy. The easiest way of getting consistent recoil effect and motion is to hold the rifle firmly. A firm grip is better duplicated from shot to shot. All the basics of marksmanship apply to this and all other positions. One cautionary note regarding the M16: DO NOT allow the bottom of the pistol

grip to contact the ground. This will cause shots to scatter randomly.

UNSUPPORTED PRONE. (See Figure 10). In the unsupported prone position, the shooter duplicates the basic elements of the supported prone position except the rifle must be supported by the weak hand and arm, rather than a sand bag or other means. The weak hand should be placed under the forearm of the rifle but DOES NOT grip it. As far as is possible for the individual shooter, the weak elbow is under the rifle. By allowing the weak hand to slide farther out the forearm or by pulling it in closer to the receiver, the shooter can adjust the elevation of the rifle. If the weak hand grips the rifle, the shooter will involuntarily try to "catch" the recoil in that hand and jerk the rifle off the target at the instant of firing. This applies to ALL of the positions discussed here. The weak hand should always be a "rest" for the rifle and NOT grip it. As in all of these positions, the strong hand should grip the rifle firmly and hold it firmly into the shoulder. The basic elements of bone support, muscular relaxation and natural point of aim are applied.

OFFHAND. (See Figure 11). This is the single most difficult shooting position. Proficiency in off-hand shooting will lead to proficiency in all positions. The shooter stands bladed to the target (from 45° to standing sideways, turned 90° from the target) commensurate with the individual's physical structure. As nearly as possible, the rifle should lie across the shooter's chest. The strong hand firmly grips the rifle and holds it firmly in the shoulder. The weak hand

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provides a rest, and the weak elbow should be directly under the rifle. The weak arm is bent in order that the weight of the rifle presses the weak elbow down against the shooter's side. With the M16 the bottom of the magazine can be used as a palm rest, sitting in the weak hand. Other options for the shooter are to hold the rifle in the weak hand at the front of the magazine well, or let the fore grip in front of the magazine well rest on the hand or fingertips. The shooter may allow the stock to rest against the arm rather than the shoulder, thereby allowing easier placement of the head and eye behind the sights. The elbow of the strong arm is held high, horizontal to the ground or higher. This prevents the stock from slipping out of the shoulder under recoil. The feet should be no more than shoulder width apart, and the weight evenly distributed or very slightly on the forward foot. The elements of all positions are applied: bone support, muscular relaxation and natural point of aim. To establish the natural point of aim, follow the procedure outlined above, shifting the feet left or right as necessary. Of especial importance are breathing control, trigger control and follow through.

KNEELING. (See Figure 12). To start, the shooter should stand in the same stance as that of the off-hand position. The shooter then kneels on the strong knee, putting the knee on the ground at the same spot where the strong foot was. Ideally, the shooter should sit back on the heel of the strong foot or, if possible, lay the foot on its side and sit back on top of it. The weak side foot must be kept flat on the

ground. The shooter maintains the bladed position of the body relative to the target. The rifle is gripped and shouldered with the strong hand/arm in the same manner as in the offhand position, keeping the elbow high. The weak hand provides a rest for the rifle to lie upon and the weak side elbow is directly under the rifle. The shooter should bend forward enough to place the elbow ahead of the raised knee, firmly resting the triceps of the arm against the knee. A second, though less stable, option is to place the elbow joint behind the knee, planting it firmly in the leg muscle of the upper leg immediately behind the knee. Once established, good bone support for the weight of the rifle is attained. The shooter then relaxes and finds the natural point of aim, rotating the position as necessary.

SITTING. Three versions of the sitting position are taught. The shooter is allowed to use the version in which the greatest stability can be attained. First is the open-legged position. (Figure 13a). In this position the shooter sits bladed to the target. The legs are spread at a comfortable angle, bent so that both feet are flat on the ground. The shooter leans forward and plants the backs of the upper arms (triceps) against the front of the knees. The rifle is then shouldered and the body relaxed, drawing the arms back against the knees locking in the position. Again, the weak hand is merely a rest and the strong hand grips the rifle firmly. An allowable, but less steady, variation is to place the elbows inside the legs just behind the knees, or on top of the legs behind the knees. Shooters unable to bend very far forward can thus shoot from a more erect

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sitting position. Although less stable than the other forms of the sitting position, the open-legged position is very good for shooting down hill. The second form of the position is the cross-ankle position. (Figure 13b). The shooter sits slightly bladed to the target and crosses the weak side ankle on top of the strong side ankle. The legs are extended and only slightly bent. Without shouldering the rifle, the shooter leans straight forward over his lap and plants both elbows either in front of, or inside of, the knees. After planting the elbows, the rifle is shouldered and the position adjusted to establish a natural point of aim. The third variant is the cross-legged position. (Figure 13c). After sitting, the shooter crosses the weak leg over the strong leg. Again bending straight forward without shouldering the weapon, plant the elbows in front of the knees. If unable to get that far forward, plant the elbows on top of the knees, or inside the knees. The latter is a very erect position. Once the elbows are firmly planted, shoulder the rifle and adjust for a natural point of aim.

In all of these sitting variations, common factors apply. The position is adjusted for a natural point of aim by rotating the entire position about the shooter's rear end. The elevation of the rifle can be adjusted by shifting either one of the elbows up or down. A common mistake by shooters trying a sitting position is to lean to the weak side instead of bending straight forward across the lap. By doing this, it is impossible for the other elbow to contact a knee. A second error is to raise the legs and hold them up to avoid bending as far forward. The leg muscles soon begin to fa-

tigue and the resulting tremor is transmitted to the rifle with detrimental effects on accuracy. The legs must be relaxed and allowed to rest. The shooter bends forward to the legs and does not raise the legs up to the elbows.

STANDING BARRICADE. (See Figure 14). This position allows the shooter to utilize a wall or post or other barricade to steady the rifle. The shooter stands behind the barricade in the same stance as used in the off-hand position. Keeping the weak forearm nearly vertical, the forearm is placed against the barricade. The heel of the thumb of the weak hand also contacts the barricade on the side. Thus contact with the barricade is at two points. The rifle is rested on the weak hand, gripped firmly with the strong hand and held in the shoulder. Keep the strong side elbow high. The shooter should not lean into the barricade, but stay erect and balanced behind it. Do not allow any part of the rifle to contact the barricade.

KNEELING BARRICADE. (See Figure 15a). The only difference in the kneeling barricade position as compared with the standing barricade position is that the shooter is kneeling behind the barricade. Placement of the weak hand and forearm is the same. An acceptable variation is to kneel on the weak-side knee. (See Figure 15b). By so doing, the shooter can sit back on the heel of the weak-side foot and use the raised knee of the strong-side leg as a rest for the elbow of the shooting arm. This is a very stable position.

NOTE: In all these positions, the natural point of aim can be checked by

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watching the sight picture while relaxing and breathing normally. If the sights move straight up and down across the target, a natural point of aim is established. If they move diagonally, the position must be adjusted to establish a natural point of aim.

HANDLING THE M16

Handling the M16 is dependent upon the situation. The safe condition of the weapon is with the action open, the magazine removed, the selector on SAFE and the muzzle pointed up. This is the way the rifle should be carried to and from the range, and in all non-shooting situations.

On the range, the rifle is held by the pistol grip in the shooting hand. For a right-handed shooter, the right hand holds the rifle, operates the magazine release and pulls the trigger. The left hand supports the rifle, operates the bolt release and is used to load the magazine into the magazine well. The selector is operated with the right thumb. At all times, the muzzle is kept pointing down range.

A left-handed shooter will hold the rifle in the left hand by the pistol grip and operate the selector with either the left thumb or the left index finger. The right hand supports the weapon and the magazine release is operated with the right thumb. The weapon should be loaded with the right hand. As soon as the magazine is locked into the magazine well the shooter should reach around the front of the magazine well with the right index finger and operate the bolt release.

When the shooter is given the command to load, the magazine is inserted into the magazine well and the bolt is released. The trigger finger is kept off the trigger and the selector kept on SAFE until the position to be used has been established. When firing is finished, remove the magazine and ensure the selector is on SAFE. If the bolt is not open, open it and lock it open. ALWAYS visually inspect the chamber to ensure it is empty.

It is common for the bolt to close accidentally if the weapon is jarred or bounced, even slightly. If this occurs, open the bolt and lock it in the open position.

In the event of a jam or malfunction, first put the selector on SAFE. Then remove the magazine. After removing the magazine, open the bolt and lock it in the open position with the bolt stop. Now clear the jam. Once the jam is cleared the rifle can be reloaded and firing resumed. If a malfunction occurs which prevents the rifle from being used again (for example, a broken extractor) clear the weapon as described then place it out of the way until it can be turned in to the gunsmiths for repair.

RIFLE QUALIFICATION COURSE

The basic Rifle Qualification Course used by the FBI is a 30 round course fired on the standard FBI silhouette target. The number of hits scored in the 4 and 5 areas of the target is counted. The minimum qualifying score is 21 hits out of a total possible of 30. The course has three phases: 1) the initial sighting in phase, 2) the 200 yard phase, and 3) the

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100 yard phase. When fired for score the time limits applied to the 200 and 100 yard phases are absolute and no alibis are allowed, except for malfunctions of the rifle or of the ammunition.

Each shooter is issued one rifle and two magazines. Additionally, each shooter will require at least 65 rounds of ammunition. To load the magazines, the ammunition is put into the magazines one round at a time. The spring-loaded follower in the magazine has an outline of a cartridge on it. The actual rounds should be loaded so that they match the outline in alignment. (Figure 16). Place one round on the top of the magazine between the lips of the magazine. Then press it straight down into the magazine. After the magazine is loaded with the required number of rounds, tap the back of the magazine against the heel of the hand, side of the foot, etc., to insure all the rounds are uniformly seated against the back of the magazine.

SIGHTING-IN PHASE. The shooter is allowed five rounds with which to check the zero of the weapon. Firing is done at 200 yards from a supported prone position. Each shot is marked in order that the shooter can see where the bullet is striking. The shooter fires one shot at a time, and waits for the shot to be marked before firing a subsequent shot. If additional rounds are needed to properly sight-in the rifle, they are allowed.

SIGHTS & SIGHT ADJUSTMENTS. The M16 has two rear sights: 1) the short "battle" sight, and 2) the "long" sight. (Figure 17a). In military usage the rifle is sighted in at 250 meters with the

battle sight. If a shot is necessary at longer range (out to 375 meters) the long sight can be flipped up and the additional elevation necessary is automatically added. In FBI usage the rifle is zeroed at 200 yards using the battle sight. The long sight is not used. The shooter must insure the battle sight is used. If the rear sight is flipped backwards towards the shooter, the battle sight is in use. Also, the long sight has an "L" etched in its base which can only be seen if the long sight is in use, i.e., the rear sight is flipped forward away from the shooter.

The sights on the M16 are fully adjustable for windage and elevation. The windage adjustment is the small adjustment wheel on the right side of the rear sight. (Figure 17b). It is located on the outside of the carrying handle. It is marked with an "R" and an arrow indicating the direction to turn the sight in order to move the point of impact of the bullet to the right. To do so, use the point of a bullet or other pointed object to depress the small detent pin which holds the adjustment wheel in place and then turn it in the direction desired. Each single adjustment will move the strike of the bullet approximately one minute of angle. One minute of angle translates into 1.1-inch of movement at 100 yards, 2.2-inches of movement at 200 yards, etc.

The elevation adjustment is the front sight. (Figure 17c). It turns in the same manner as the rear sight adjustment. A small arrow and the letter "U" indicate the direction to turn the front sight to move the point of impact up. As with the windage adjustment, each single ad-

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justment will move the strike of the bullet approximately one minute of angle.

200 YARD PHASE. The shooter will load two magazines with five rounds each. On the command to commence firing, the shooter will have five minutes to fire five rounds in the supported prone position and five rounds in the unsupported prone position. The selector must be in the SAFE position during the magazine and position changes. **NOTE:** if a 200 yard range is unavailable, fire this phase at 100 yards but count only the hits in the 5 area of the target.

- Total Rounds Fired: 10

100 YARD PHASE. The shooter loads the rifle with one magazine of ten rounds. The second magazine, containing five rounds, is placed on the ground where it can be easily reached from the sitting position. On the command to commence firing, the shooter fires five

rounds off-hand, puts the selector on SAFE, assumes a kneeling position and then fires five rounds kneeling. The shooter, again with the selector on SAFE, establishes a sitting position, changes magazines and then fires the last five rounds in the sitting position. Time for the entire 15 rounds is 90 seconds. The final part of the 100 Yard Phase, the shooter loads with one magazine of five rounds behind a barricade. On command, the shooter fires two rounds in the standing barricade position and three rounds in the kneeling barricade position. It is not necessary to put the selector on SAFE while changing positions. Time allowed for all five rounds is 30 seconds.

- Total Rounds Fired: 20

Combine the score from the 200 Yard Phase with the score from the 100 Yard Phase for the total score. A minimum total score of 21 hits is required for qualification.

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APPENDIX A BALLISTIC TABLE FOR .223 REMINGTON/5.56mm NATO

Range Yards	Remaining Fps	Remaining Ft/Lb	Drop (In)	Elevation	Max Height	10 mph Wind Deflection
0	3250	1290	0	0	-2.4	0
100	2899	1026	1.8	4.2	0.1	0.9
200	2575	809	7.7	5.1	1.1	4.1
300	2272	630	18.9	7.1	4.4	9.6
400	1991	484	36.9	9.8	9.9	18.3
500	1732	366	63.8	13.2	18.6	30.4
600	1500	275	102.6	17.5	31.8	47.0
700	1303	207	157.6	22.9	51.2	68.6
800	1149	161	234.1	29.6	78.9	95.6
900	1043	133	337.9	37.8	116.8	127.7
1000	969	115	472.7	47.5	166.3	164.0

1. REMAINING VELOCITY is listed in feet per second (fps).
2. REMAINING ENERGY is listed in foot/pounds (ft/lb).
3. DROP is listed in inches. It is the distance below the line of the bore the bullet will drop at the indicated range.
4. ELEVATION is the sight correction in minutes of angle (moa) necessary to be zeroed at the indicated range. Additionally, the difference in elevation between two ranges is the correction necessary to change zero from one to the other. For example, if zeroed at 200 yards (elevation 5.1 moa) and you wish to be zeroed at 300 yards (elevation 7.1 moa) the sight correction is $7.1 - 5.1 =$ plus 2.0 moa.
5. MAXIMUM HEIGHT is given in inches. It is the maximum height above the line of sight the bullet will reach, if the rifle is zeroed at the indicated range. For example, if zeroed at 500 yards, the bullet will be 18.6 inches above the line of sight at its highest point in the trajectory.
6. WIND DEFLECTION is given in inches, calculated for a 10 mph wind blowing at right angles to the flight of the bullet.
7. TABLE calculated for Quantico conditions: 25 feet altitude and 70 degrees Fahrenheit. Height of sight for an M16 (used in table) = 2.4 inches.

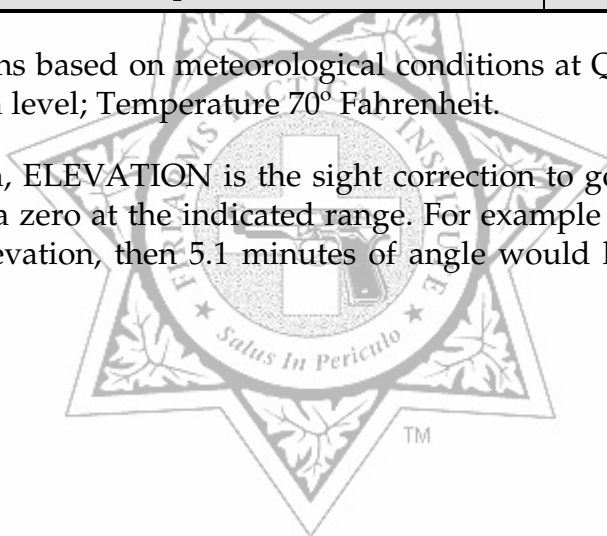
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APPENDIX B TRAJECTORY DATA FOR 200 YARD ZERO

Muzzle Velocity (fps)	3250
Zero Range (yards)	200
Remaining Velocity (fps) @ 200 yds	2575
Remaining Energy (ft/lb) @ 200 yds	809
Time of Flight (seconds)	00.208
Total Drop (inches)	-7.7
Maximum Height Above LOS (inches)	1.1
Elevation (MOA) For Zero @ 200 yds	5.1
Deflection in 10mph Wind (inches)	4.1

NOTE: Calculations based on meteorological conditions at Quantico, Virginia: Altitude 25 feet above sea level; Temperature 70° Fahrenheit.

To further explain, ELEVATION is the sight correction to go from a zero sight setting (line of bore) to a zero at the indicated range. For example here, if the rifle had its sights set with no elevation, then 5.1 minutes of angle would have to be added for a zero at 200 yards.



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APPENDIX C BULLET PATH WITH 200 YARD ZERO ALTITUDE 25 FEET, TEMPERATURE 70 DEGREES F

Range (yards)	Velocity (fps)	Bullet Path Above LOS		10 mph Wind Deflection
		MOA	Inches	
50	3071	-0.6	-0.3	0.2
100	2899	0.9	0.9	0.9
150	2734	0.7	1.0	2.2
200	2575	0.0	0.0	4.1
250	2421	-0.9	-2.3	6.5
300	2272	-2.0	-6.1	9.6
350	2129	-3.3	-11.7	13.5
400	1991	-4.8	-19.1	18.3
450	1858	-6.4	-28.6	23.7
500	1732	-8.2	-40.9	30.4

1. BULLET PATH ABOVE LINE OF SIGHT (LOS) is the distance in either minutes of angle (moa) or inches the bullet is above or below the line of sight with a 200 yard zero. It also provides the necessary correction to change the zero, or hold off the point of aim. The positive figures given for ranges less than 200 yards indicate the bullet is above the line of sight and thus the sights must be adjusted lower, or the point of aim lowered, the indicated amount. The negative figures for ranges greater than 200 yards indicate the bullet is below the line of sight beyond 200 yards. Thus the sights must be adjusted higher, or the aiming point raised, the indicated amount. For example, to hit the target at 500 yards either adjust the sights UP 8.5 moa or aim 42.2 inches ABOVE the desired point of impact at 500 yards. The sights on an M16 are 2.4 inches high, so the bullet is below the line of sight until past 60 yards.
2. WIND DEFLECTION is given in inches, and represents the distance the bullet will be moved by a 10 mph wind at right angles to the flight of the bullet, at the indicated range. For example, at 500 yards a 10 mph wind from the left will move the point of impact of the bullet 30.4 inches to the right. A 20 mph wind will cause a deflection of double the amount (60.8 inches), and a 5 mph wind will cause half as much (15.2 inches). The wind deflection figures can be interpolated for any wind strength.

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APPENDIX D THE M16A2 RIFLE

There are several differences in the design of the M16A2 compared to the M16A1. The A2 has a thicker, heavier barrel more resistant to bending and adding weight to better control muzzle climb in automatic firing. The hand guard is a cylindrical shape with vertical ribbing for a better gripping surface. The A2 is made with a rifling rate of twist of one turn in 7 inches. This faster rate of twist is designed to stabilize all bullets fired in the M16, including the new NATO round with its 63 grain bullet. The flash suppressor on the A2 is designed to direct muzzle flash up and sideways to reduce muzzle climb, unlike the A1 design which dispersed flash 360 degrees around the muzzle. The A2 has a built-in brass deflector on the right side to insure brass is deflected away from the face of a left-handed shooter.

The A2 is available with either one of two automatic firing phases: 1) either an unrestricted capability like that on the A1, in which the weapon will fire as long as the trigger is held back; or 2) a "3-round burst" capability, in which the weapon will fire three shots and no more, even if the trigger is held back. When the trigger is released and pulled again, another three shots are fired. The burst cycle is mechanically controlled. For example, if the shooter releases the trigger after shots one and two are fired, on the next pull only shot three will fire. The trigger must again be released and pulled, at which time three more shots will fire.

The most noticeable differences between the A1 and the A2 are the sights. The A2 has a square front sight post for better sight definition. The rear sight is designed so that when the rifle is sighted in, it can be zeroed at any range from 300 to 800 yards (or meters) by merely turning the rear sight adjustment to the indicated range, or to a position between indicated ranges. The sight is graduated in increments of 100, starting at 300 (the lowest setting, marked 3/8 on the sight) to 800 (a complete revolution of the adjustment around to the 3/8 marking, raising the sight). Secondly, the windage adjustment on the rear sight is adjustable by hand, needing no tools or implements to move.

To sight in the A2, zero the rifle at 300 yards (meters) in the same manner as the A1 - changing elevation on the front sight and windage on the rear - with the sight set at 3/8. Once zeroed, the rifle may be zeroed at other ranges by merely rotating the rear sight adjustment to the proper setting.

The A2 has two rear sight apertures. One aperture is large in diameter for shooting at close ranges (0 to 200 meters). The small aperture is for sighting in and for shooting at ranges from 300 to 800 meters.

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Like the A1, the A2 version is offered in both rifle and carbine configurations. The magazine provided with the A2 has a 30 round capacity. See illustrations D1 through D6.

