Appendix E

Zeroing

Zeroing a weapon is not a training exercise, nor is it a combat skills event. Zeroing is a maintenance procedure to place the weapon in operation based on the Soldier's skills and capabilities, the tactical scenario, aiming device, and ammunition. Zeroing achieves the desired relationship between the line of sight and the trajectory of the round at a known distance. The zeroing process ensures the Soldier, weapon, aiming device, and ammunition perform as expected at a specific range to target with the least amount of induced errors.

Soldiers must zero their aiming device to their weapon correctly to achieve a high level of accuracy and precision aiming. The Soldier must achieve a consistent grouping of a series of shots, then align the grouping's mean point of impact to the appropriate point of aim. Soldiers use the process described in this appendix with their weapon and equipment's technical manuals to complete the zeroing task.

BATTLESIGHT ZERO

E-1. The term battlesight zero means the combination of sight settings and trajectory that greatly reduces or eliminates the need for precise range estimation, further eliminating sight adjustment, holdover or hold-under for the most likely engagements. The battlesight zero is the default sight setting for a weapon, the ammunition, and the aiming device combination.

E-2. An appropriate battlesight zero allows the firer to accurately engage targets out to a set distance without an adjusted, aiming point. For aiming devices that are not designed to be adjusted in combat, or do not have a bullet drop compensator, the selection of the appropriate battlesight zero distance is critical.

ZEROING PROCESS

E-3. A specific process should be followed when zeroing. The process is time-efficient and produces the most accurate zero possible. The zero process includes a 10-meter laser borelight and zero and field zero (battlesight zero).

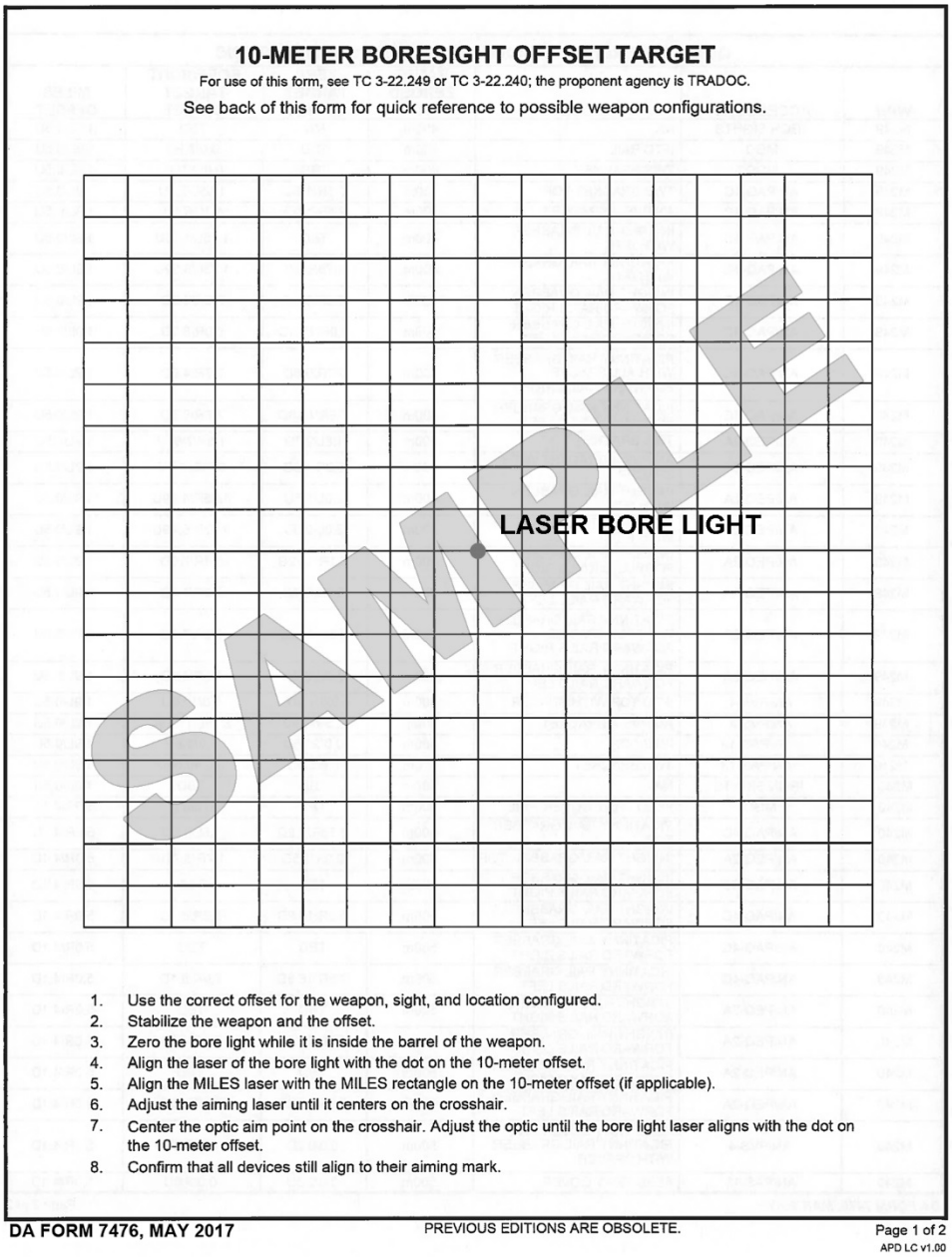
Note. Although wind and gravity have the greatest effect on the projectile's trajectory, air density and elevation must be taken into consideration, also.

TEN METER LASER BORELIGHT AND ZERO

E-4. The borelight is an eye-safe laser that boresights optics, iron sights, and aiming lasers. Using the borelight saves range time and requires less rounds for the zeroing process. Borelighting is done with a borelight, which is centered in the bore of the weapon, and with an offset target placed 10 meters from the muzzle of the weapon. (See DA Form 7476, *10-Meter Boresight Offset Target* in figure E-1, page E-2 and figure E-2, page E-3.)

E-5. The gunner indexes or places the elevation knob on a range of 400 meters. The gunner centers the rear peep sight by rotating it clockwise (right) as far as it will go. The gunner then rotates the windage knob toward the muzzle until the sight is all the way to the right, and while counting the clicks, rotates the windage knob until it stops on the left side. The gunner divides the clicks by two. If the click is an uneven number, the gunner rounds it up. To center the sight, the gunner rotates the windage knob toward the center (right) while counting the appropriate number of clicks. The gunner adjusts the sliding scale at the rear of the sight

to center the large index line under the zeroed windage mark on the sight. Two threads should be showing on the front sight post. If more or less threads are showing, the gunner turns in the weapon for maintenance.



10-METER BORESIGHT OFFSET TARGET

For use of this form, see TC 3-22.249 or TC 3-22.240; the proponent agency is TRADOC.

See back of this form for quick reference to possible weapon configurations.

LASER BORE LIGHT

SAMPLE

1. Use the correct offset for the weapon, sight, and location configured.
2. Stabilize the weapon and the offset.
3. Zero the bore light while it is inside the barrel of the weapon.
4. Align the laser of the bore light with the dot on the 10-meter offset.
5. Align the MILES laser with the MILES rectangle on the 10-meter offset (if applicable).
6. Adjust the aiming laser until it centers on the crosshair.
7. Center the optic aim point on the crosshair. Adjust the optic until the bore light laser aligns with the dot on the 10-meter offset.
8. Confirm that all devices still align to their aiming mark.

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Figure E-1. Example completed DA Form 7476 front

QUICK REFERENCE - POSSIBLE WEAPON CONFIGURATIONS						
WPN	ACCESSORY	MOUNT	RANGE ZEROED TO	ZERO TARGET OFFSET	BORESIGHT TARGET OFFSET	MILES OFFSET
M249	IRON SIGHTS	NA	400m	NA	TBD	1.9L/0.5U
M249	MGO	IFTC RAIL	400m	TBD	0.0/7.9U	1.9L/0.5U
M249	MGO	TWS BRACKET	400m	TBD	0.0/2.15U	1.9L/0.5U
M249	AN/PAQ-4C	TWS BRACKET TOP	400m	0.5R/1.5U	1.85L/7.7U	1.9L/0.5U
M249	AN/PAQ-4C	AN/PVS-4 BRACKET	400m	2.5R/1.5D	4.1L/6.1U	1.9L/0.5U
M249	AN/PAQ-4C	INSIGHT RAIL GRABBER WITH IFTC	400m	TBD	1.75L/4.69U	1.9L/0.5U
M249	AN/PAQ-4C	PICATINNY RAIL GRABBER WITH IFTC	400m	1.75R/0.0	1.75L/5.39U	1.9L/0.5U
M249	AN/PAQ-4C	INSIGHT RAIL GRABBER FORWARD RAILS RIGHT	400m	5.9R/9.6D	5.9R/4.0D	1.9L/0.5U
M249	AN/PAQ-4C	INSIGHT RAIL GRABBER FORWARD RAILS LEFT	400m	6.0R/13.3D	6.0R/8.3D	1.9L/0.5U
M249	AN/PAQ-4C	PICATINNY RAIL GRABBER WITH ALL SPACER FORWARD RAILS RIGHT	400m	7.7R/9.6D	7.7R/4.0D	1.9L/0.5U
M249	AN/PAQ-4C	PICATINNY RAIL GRABBER FORWARD RAILS LEFT	400m	7.6R/13.3D	7.6R/8.3D	1.9L/0.5U
M249	AN/PEQ-2A	TWS BRACKET TOP	400m	1.8L/2.7D	1.8R/7.95U	1.9L/0.5U
M249	AN/PEQ-2A	AN/PVS-4 BRACKET WITH SPACER	400m	5.0R/4.0D	0.45L/6.5U	1.9L/0.5U
M249	AN/PEQ-2A	INSIGHT RAIL GRABBER WITH IFTC	400m	2.0L/1.5U	1.95R/4.79U	1.9L/0.5U
M249	AN/PEQ-2A	PICATINNY RAIL GRABBER WITH IFTC	400m	2.0L/0.5D	1.95R/6.49U	1.9L/0.5U
M249	AN/PEQ-2A	INSIGHT RAIL GRABBER FORWARD RAILS RIGHT	400m	6.1R/13.2D	6.1R/7.6D	1.9L/0.5U
M249	AN/PEQ-2A	INSIGHT RAIL GRABBER FORWARD RAILS LEFT	400m	6.0R/9.4D	6.0R/4.4D	1.9L/0.5U
M249	AN/PEQ-2A	PICATINNY RAIL GRABBER WITH ALL SPACER FORWARD RAILS RIGHT	400m	7.8R/13.2D	7.8R/7.6D	1.9L/0.5U
M249	AN/PEQ-2A	PICATINNY RAIL GRABBER FORWARD RAILS LEFT	400m	7.6R/9.4D	7.6R/4.4D	1.9L/0.5U
M249	AN/PVS-4	IFTC TOP WITH SPACER	400m	0.0/4.3D	0.0/10.0U	1.9L/0.5U
M249	AN/PVS-4	AN/PVS-4 BRACKET	400m	2.5R/4.9D	2.25L/11.25U	1.9L/0.5U
M249	AN/PAS-13	IFTC TOP	400m	0.0/2.75D	0.0/8.6U	1.9L/0.5U
M249	AN/PAS-13	TWS BRACKET	400m	0.0/5.5D	0.0/10.05U	1.9L/0.5U
M240	IRON SIGHTS	NA	500m	TBD	TBD	1.9L/0.5U
M240	MGO	FEED TRAY COVER RAIL	500m	NA	0.0/0.0	5.0R/4.1D
M240	AN/PAQ-4C	PICATINNY RAIL GRABBER TOP	500m	1.75R/2.2D	1.5L/3.5U	5.0R/4.1D
M240	AN/PEQ-2A	INSIGHT RAIL GRABBER TOP	500m	2.0R/1.5D	1.7R/3.71U	5.0R/4.1D
M240	AN/PAQ-4C	INSIGHT RAIL GRABBER FORWARD RAILS RIGHT	500m	TBD	TBD	5.0R/4.1D
M240	AN/PAQ-4C	INSIGHT RAIL GRABBER FORWARD RAILS LEFT	500m	6.2R/16.8D	6.2R/8.1D	5.0R/4.1D
M240	AN/PAQ-4C	PICATINNY RAIL GRABBER FORWARD RAILS RIGHT	500m	TBD	TBD	5.0R/4.1D
M240	AN/PAQ-4C	PICATINNY RAIL GRABBER FORWARD RAILS LEFT	500m	7.9R/16.8D	7.9R/8.1D	5.0R/4.1D
M240	AN/PEQ-2A	INSIGHT RAIL GRABBER FORWARD RAILS RIGHT	500m	TBD	TBD	5.0R/4.1D
M240	AN/PEQ-2A	INSIGHT RAIL GRABBER FORWARD RAILS LEFT	500m	6.2R/12.8D	6.2R/4.1D	5.0R/4.1D
M240	AN/PEQ-2A	PICATINNY RAIL GRABBER FORWARD RAILS RIGHT	500m	TBD	TBD	5.0R/4.1D
M240	AN/PEQ-2A	PICATINNY RAIL GRABBER FORWARD RAILS LEFT	500m	7.9R/12.8D	7.9R/4.1D	5.0R/4.1D
M240	AN/PVS-4	FEED TRAY COVER RAIL PICATINNY RAIL GRABBER WITH SPACER	500m	0.0/6.2D	0.0/6.0U	5.0R/4.1D
M240	AN/PAS-13	FEED TRAY COVER	500m	0.0/2.3U	0.0/8.0U	5.0R/4.1D

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Figure E-2. Quick reference card from back of DA Form 7476

FIELD ZERO 300 TO 700 METERS

E-6. The most important step in the zeroing process is zero confirmation from 300 meters to 700 meters. An automatic rifleman must know how to zero the M249 at a distance. They should select a target whose range is known (a known-distance target), to be between 300 and 700 meters. As the range increases, so does the difficulty of determining the exact center of the beaten zone relative to the target. Therefore, on the transition range, using a 300 rather than a 700-meter target simplifies adjustment of fire.

E-7. The automatic rifleman turns the elevation knob (closest to the buttstock) on the rear sight to the desired range setting to adjust for elevation. Range settings are graduated increments from 300 to 1000 meters. Even-numbered settings are on the left side of the scale wheel and are numbered 4, 6, 8, 10, which represent 400, 600, 800, and 1000 meters, respectively. Odd-numbered settings on the right side of the scale wheel, marked with the number 3 and three index lines represent 300, 500, 700, and 900 meters, respectively. Rotation of the elevation knob toward the muzzle (counterclockwise) increases the range while rotation toward the buttstock (clockwise) decreases the range. The gunner can turn the peep sight nine, 180-degree turns from top to bottom. To make the peep sight easier to grasp, the gunner turns the elevation knob to its highest point (1000 meters). The gunner makes the appropriate adjustment for the peep sight and then returns the sight to the desired range. Whenever readjusting the range, the gunner never changes the point of aim, since the point of aim is the center of the target.

E-8. The gunner indexes or places the elevation knob on the desired range to zero the automatic machine gun iron sights. The gunner centers the rear peep sight by rotating it clockwise (right) as far as it will go. The gunner then rotates the windage knob toward the muzzle until the sight is all the way to the right, and while counting the clicks, rotates the windage knob until it stops on the left side. The gunner divides the clicks by two. If the click is an uneven number, the gunner rounds it up. The gunner rotates the windage knob toward the center (right) while counting the appropriate number of clicks to center the sight. The gunner adjusts the sliding scale at the rear of the sight to center the large index line under the zeroed windage mark on the sight. Two threads should be showing on the front sight post. If more or less than two threads are showing, the gunner turns in the weapon for maintenance.

E-9. Leaders can confirm Soldiers on any range where Soldiers can see the impacts of their rounds. Groups should be fired and aiming devices should be adjusted. At a minimum, the confirmation should be done at ranges between 300 and 700 meters. If rounds are available, groups can be fired at various ranges to show the firers where their impact will hit.

E-10. When confirming zero at ranges past 100 meters, Soldiers must consider and act upon the effects of the wind, if necessary. If a zero is confirmed at 400 meters on a windy day, and then the weapon is fired at a later date in different wind conditions or no wind at all, the impact will change. (See figure E-3.)

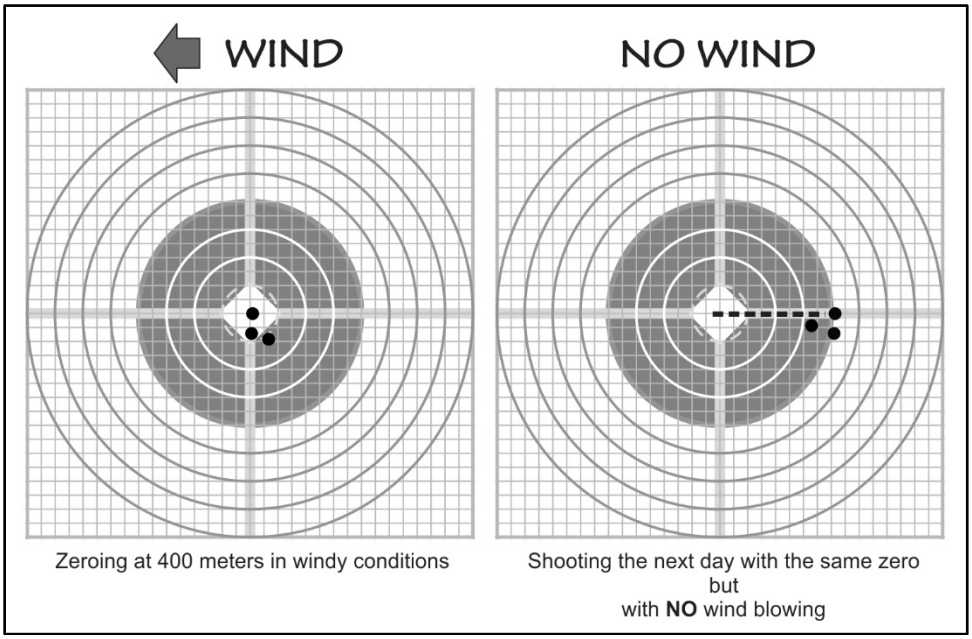

Figure E-3. Wind effects on zero at 400 meters

DOWNRANGE FEEDBACK

E-11. Leaders must include feedback in all live-fire training. Soldiers must have precise knowledge of a bullet strike; feedback is not adequate when Soldiers cannot identify bullets from previous firings. To provide accurate feedback, trainers ensure that Soldiers triangulate and clearly mark previous shot groups on a zeroing target or receive a hard copy from the tower on an automated range.

> ***Note***. A common misconception is that wearing combat gear will cause the zero to change. Adding combat gear to the Soldier's body does not cause the sights or the reticle to move. The straight line between the center of the rear sight aperture and the tip of the front sight post either intersects with the trajectory at the desired point, or it does not. Soldiers should be aware of their own performance, to include a tendency to pull their bursts in a certain direction, across various positions, and with or without combat gear. A shift in point of impact in one shooting position may not correspond to a shift in the point of impact from a different shooting position.

E-12. A good zero is necessary to engage targets accurately. Whenever the Soldier deploys or does training in a new location, they should confirm the zero on their automatic rifle if possible, as elevation, barometric pressure, and other factors affect the trajectory of a round. There are multitudes of factors that can affect a zero, and the only sure way to know where the rounds are going is to fire the automatic rifle to confirm.

E-13. The zero on each assigned automatic rifle WILL NOT transfer to another automatic rifle. For example, if the windage zero on the Soldier’s iron sights is three minutes (3 mils) left of center, putting that same setting on another automatic rifle does not make the rifle zeroed. Rifles from different manufacturers means that there is a difference among all the weapons; thus, the zero does not transfer among the rifles.

E-14. Leaders recommend that Soldiers set up their equipment and dry practice in position with their gear on before coming to the range.

E-15. Standard in Training Commission (known as STRAC) Department of the Army Pamphlet (DA PAM) 350-38 allocates ammunition to conduct zeroing procedures using three-round burst grouping. Figure E-3 shows a similar three shot with one shot on the right edge of the group. If all the shots were taken into account in the three-shot group, the firer would probably adjust their zero from the right edge of the four-cm circle. The marking and analysis of shot groups is part of the grouping and zeroing process (see figure E-4).

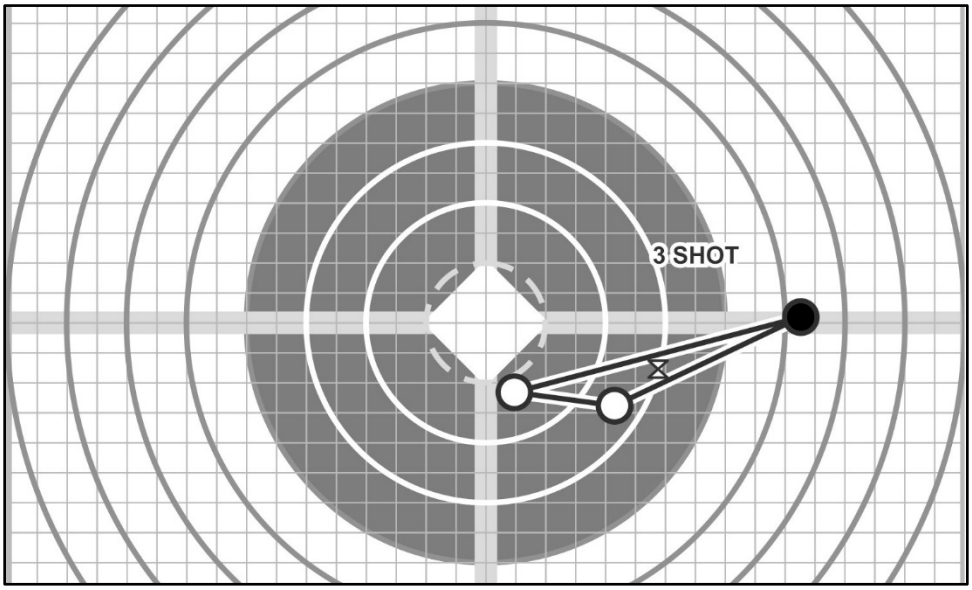

Figure E-4. Grouping

MARKING THE SHOT GROUP

E-16. Leaders should mark shot groups using different colored markers so the firer can track their progress, if possible. Figure E-4 shows a technique for marking shot groups on a zero target. The technique allows the firer and coach to track their progress throughout the grouping and zeroing phase.

E-17. All sight adjustments are from the center of the group, called the mean point of impact, and not from the location of a single shot. When using a three-round group, a single shot that is outside of the rest of the group should not be counted in the group for sight adjustment purposes.

Note. Figure E-5 depicts the color variations in shades of gray.

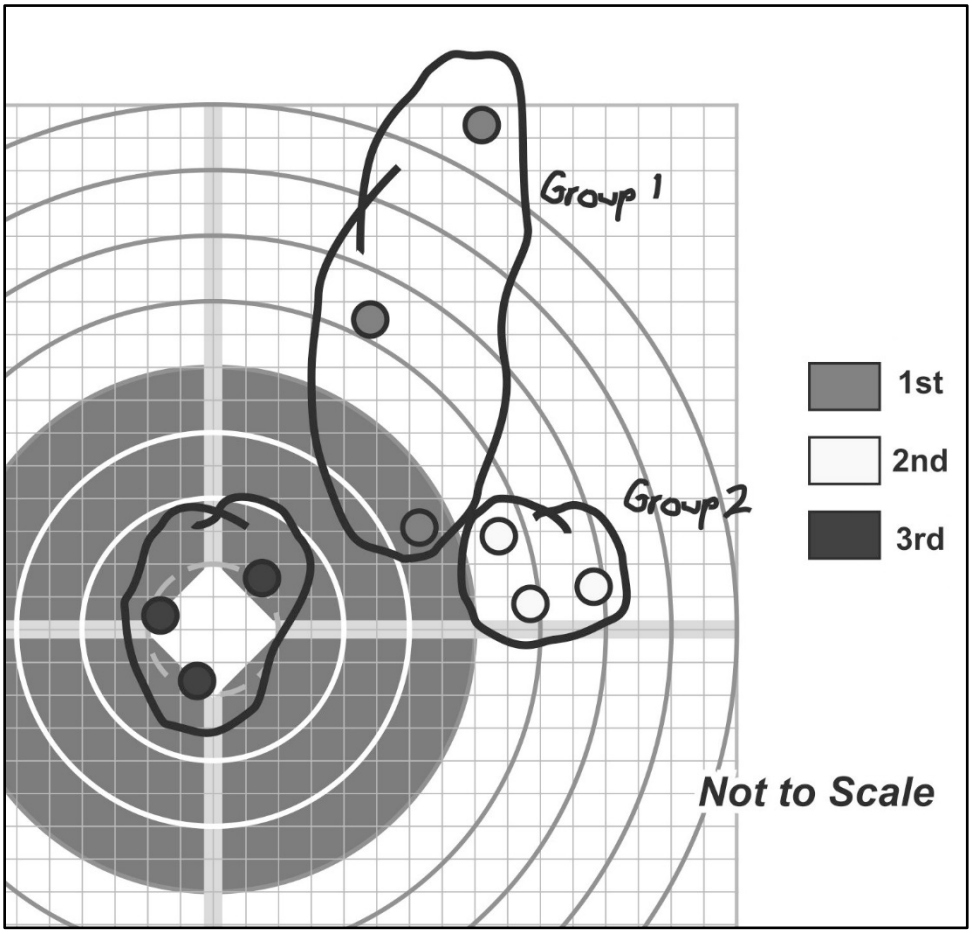

Figure E-5. Marking shot groups

E-18. The firer shoots and marks their first shot group with a colored marker. The Soldier places a line with that marker next to the 1 on the right side of the zero target to note the color of the first group. Soldiers fire and mark groups consistently until the groups are in the same location. Each sight adjustment is annotated in the same color as the group that was just fired.

COACHING

E-19. Coaching is the process of having another Soldier observe the firer during the firing process to look for shooting errors that the firer themselves may not consciously know they are making.

TYPES OF COACHES

E-20. Firing an automatic rifle properly requires the consistent and proper application of the elements of employment. Firing is about doing the right thing the same way at every burst. The small-arms trainer is the validation point for any questions during employment training. In most cases, once the group completes training, it is the firer's responsibility to realize and correct their own firing errors, but this process can be made easier through the use of a coach.

E-21. Two types of coaches exist, the experienced coach and the peer coach. Although each should execute coaching the same way, experienced coaches have a more thorough understanding of employment and should have more knowledge and practice in firing than the Soldiers they are coaching. Knowledge and skill does not necessarily come with rank; therefore, Soldiers serving as experienced coaches should be carefully selected for their demonstrated firing ability and their ability to convey information to firers of varying experience levels.

EXPERIENCED COACHES

E-22. Experienced coaches are in shorter supply throughout the Army and are outnumbered by less skilled firers, in general. Usually, the lack of experienced coaches leads to one experienced coach watching multiple firers dependent upon the table or period of employment being fired. The experienced coach may find it helpful to make notes of errors they observe in the shooters and discuss them with the group after firing. It is often difficult for the coach to remember the errors that they observe in each and every firer.

PEER COACHES

E-23. Using a peer coach, although generally not as effective as using an experienced coach, is a very useful technique. The advantage of using a peer coach is two-fold: A peer coach may use their limited knowledge of employment to observe the firer when an experienced coach is not available or is occupied with another firer. The peer coach can either talk the firer through the shooting errors that they have observed or bring any observed shooting errors to the attention of the experienced coach. Another advantage peer coaching is that the peer coach themselves, through the act of coaching, may observe mistakes the firer makes and learn from them before making the mistakes themselves. Many people grasp instruction more deeply when they are coaching others than when they are simply told to do something.

Note. Peer coaches can be limited by their level of training.

E-24. The coach can observe most of the important aspects of the elements of employment except for aiming. The coach and the firer must have an open dialog and relaxed learning environment to determine the unobservable errors of shooting. The firer cannot hesitate to ask the coach questions and the coach must not become a stressor during firing. The coach must have the ability to safely move around the firer to properly observe. There is no one ideal coaching position. The following section discusses the elements of shooting and how best the coach can observe them.

STABILIZE

E-25. For the coach to observe how stable the shooter is, they may have to move to different sides of the shooter. To observe the shooter's nonfiring elbow, the coach needs to be on the shooter's nonfiring side. To observe the cant of the weapon (the sights on the weapon should be pointing towards 12 o'clock position, not 11 or 1 o'clock positions), the coach needs to watch the relationship of the front sight to the barrel from behind the shooter. The coach should look for all the other aspects of good positions as outlined in chapter 6 of this publication. The coach should observe the total amount of weapon movement on recoil, also. A good, stable position has minimal movement under recoil.

AIMING

E-26. Determining the aspects of the firer's aiming (sight picture, sight alignment, point of focus) requires dialogue between the firer and the coach. Often, a shooter does not realize their aiming errors until they discover them on their own. Without the use of a sighting device, the coach must rely on drawings, discussions, or the use of an M15A1 aiming card (DVC-T-07-26) to determine where the firer is aiming on the target, their focus point during firing (which should be the front sight), and where their front sight was at the moment of firing in relation to the rear sight aperture and the point of aim on the target. Soldiers should use the technique in which the firer call their bursts. The technique involves calling the point on the target where the sights were located at the moment of firing and matching the point called with the impact locations on the target. Calling the burst helps the firer learn to focus on the front sight during the entire firing process.

E-27. When using optics, the shooter can tell the coach where they were holding, which is important with the MGO. Coaches must insure firers use the 400-meter aim point when zeroing at 10 meters.

CONTROL

E-28. The ideal position for the coach to observe trigger squeeze is from the firer's nonfiring side because they have a better view of the speed of pull, finger position on the trigger, and release or pressure on the

trigger after firing. The coach can look from behind the shooter to observe the barrel for lateral movement caused by slapping the trigger during firing.

COACHING FACTORS

E-29. All firing happens at the weapon; therefore, the coach should focus solely on the shooter during firing and not on what is happening downrange. The coach has no way to observe the bullet's impact on the target and to know what errors the firer made. The coach must watch the shooter during firing to determine errors and use the impacts to confirm their assumptions. For a coach to properly observe all aspects of firing they must be able to observe the shooter, safely, from both sides and the back. There is no prescribed coaching position. Coaching requires a relaxed atmosphere with open communication between the firer and the coach.

SHOT GROUP ANALYSIS

E-30. Shot group analysis involves the firer correlating the impacts on paper with the mental image of how the bursts looked when fired. The coach cannot merely look at the holes in the paper to make an accurate analysis of the shot group. The coach must observe the firer than to try and analyze the target. All firing takes place at the weapon, and the holes in the paper are an indicator only of where the firer pointed the barrel when they fired the automatic rifle. When coaches are analyzing groups, they must question the firer about the group to make a determination of what caused the placement of the shots. (See figure E-6 and figure E-7, page E-10.)

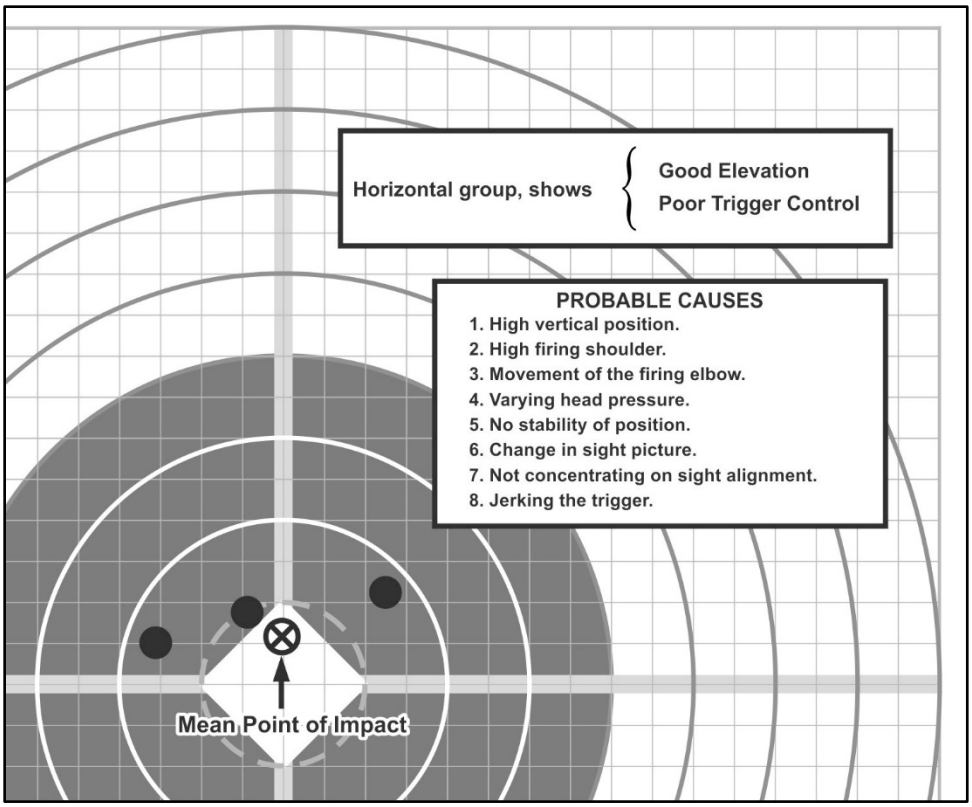

Figure E-6. Horizontal diagnostic shots

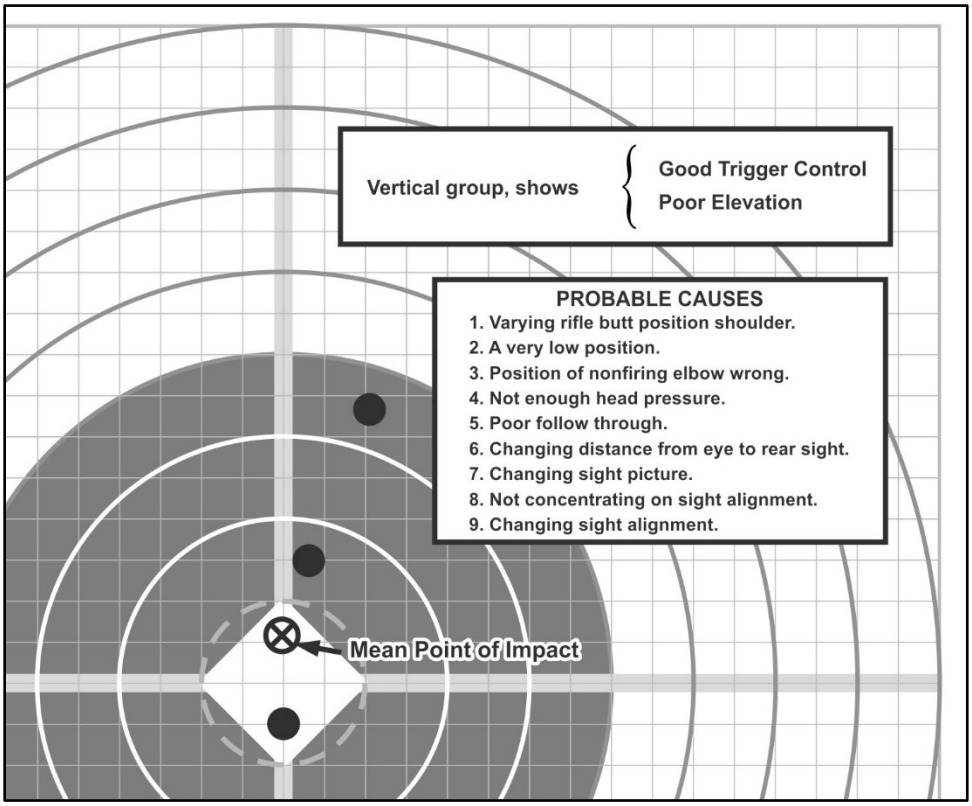

Figure E-7. Vertical diagnostic shots

E-31. Novice shooters may benefit from not marking their own shot group. When marking a shot group, an inexperienced or stressed Soldier may unintentionally make mental corrections. The mental corrections along with the mechanical corrections to their weapon causes further issues during follow-on shot groups. The experienced Soldier, knowing the zero process is aligning the sights to the location of the impact of the rounds, is less likely to make adjustments to their sight placement and the mechanical changes to the weapon. Having a coach or the employment instructor inform the Soldier of mechanical changes needed to the aiming device is an effective way to accomplish this method.

E-32. Observing the shooter must be accomplished before analyzing the target can become effective. Bullets strung vertically do not necessarily mean a breathing issue, nor do bullets strung horizontally indicate an absolute trigger squeeze problem. Coaches must learn to identify shooter errors during firing and use the bullet's impacts on the target to confirm their observations. Several firing errors can cause certain misplacements of impacts. The coach must realize that bullets go only where the firer points the barrel. The coach must determine the cause of the barrel to be pointed in those directions.

E-33. The key to proper coaching is becoming a shooting detective. The coach needs to observe the shooter, question the shooter, look at the evidence downrange, question the shooter again, make assumptions based upon the evidence available, and then act upon their assumptions. The coach and shooter must have a free and open dialog with each other in a relaxed atmosphere. Remember if a Soldier learns to shoot poorly, they will be capable only of shooting poorly.

DISPLACEMENT OF SHOTS WITHIN A GROUP (FLYERS)

E-34. The weapon's capability to shoot groups varies dependent on the number of rounds fired through the barrel over its lifetime. The average expected group size is 4 centimeters at 10 meters; some guns may shoot slightly larger than this. If a shooter is firing groups larger than a normal group size, the next step should be to have a known skilled shooter attempt to fire and group with the shooter's weapon. If a proven, skilled shooter can fire groups of the normal size, then the issue is most likely with the original shooter. If the skilled shooter cannot fire within the accepted group size, there may be something wrong with the gun or barrel.

E-35. When looking at groups that are one or two shots away from the group body (one shot away for a three-round group), the coach must look objectively at the overall consistency of group placement. A bad shot or group might not indicate a poor grasp of the elements; every shooter has a bad shot now and again, and some shooters may even have a bad group now and again. Coaches need to use their experience to determine whether or not the firer had a bad shot, a bad group, or doesn't have a clear grasp of the elements and take the necessary steps to get the shooter to the end-state. The coach may have the firer shoot again and ignore the bad group or bad shot, hoping that the new group matches up with the previous shot groups, or the coach may need to pull the shooter off the line and cover the basic elements. Contrary to popular belief, mandating that a firer shoot over and over again in one sitting, until the firer gets it right is not a highly effective technique.

BULLETS DISPERSED LATERALLY ON TARGET

E-36. Bullets displaced laterally could be caused by a lateral movement of the barrel due to an unnatural placement of the trigger finger on the trigger. The following may be reasons that the bullets are displacing laterally:

- The shooter may be misaligning the sights to the left and right slightly.
- The shooter may have the sights aligned properly but may have trouble keeping the target itself perfectly centered on the tip of the front sight.
- The shooter may be closing their eyes at the moment of firing or may be flinching.

BULLETS DISPERSED VERTICALLY ON TARGET

E-37. Bullets displaced in a vertical manner could be caused by the following:

- The shooter may be watching the target instead of the front sight; thereby, misaligning the front sight in the rear sight aperture vertically. Happens more frequently from less stable positions (kneeling, unsupported positions) due to the natural movement of the weapon.
- Shooter may have trouble seeing the target and trouble keeping the tip of the front sight centered vertically on the target. The coach may consider using a larger target or a nonstandard aiming point such as a five-inch circle. Many shooters find it easier to find the center of a circle than a man-shaped target.
- The shooter may not have good support, which causes them to readjust their position at every shot and settle with the sights slightly misaligned.
- The shooter may be flinching or closing their eyes at the moment of firing.
- The shooter may be breathing while firing the rifle. (Breathing is not normally the case, most shooters instinctively hold their breath just before the moment of firing.)

LARGE GROUPS

E-38. The shooter looking at the target instead of the front sight is the most common cause of large groups. Looking at the target instead of the front sight causes the shooter to place the front sight in the center of the target without regard for its location in the rear sight aperture. A small misalignment of the sights results in a large misplacement of shots downrange. Most shooters do not fire when their properly aligned sights are pointed all over the target, so a large group is most likely not a point of aim issue.

GOOD GROUPS THAT CHANGE POSITION ON THE TARGET

E-39. When the shooter has good groups but they are located at different positions on the target, there can be a number of reasons. Two reasons are listed below:

- The shooter may be aligning the sights properly during shooting but picking up a different point of aim on the target each time.
- The shooter may be settling into a position with the front sight on target but the sights are misaligned. The shooter maintains the incorrect sight picture throughout the group but aligns the sights in a different manner during the next group. The coach tells the firer to focus on the front sight and to check the natural point of aim before each group.

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Appendix F

Qualification

Appendix F assists trainers with preparing and conducting machine gun marksmanship training. Marksmanship begins with proficiency achievement in nonfiring individual skills and ends with collective proficiency achievement in firing under demanding conditions.

OBJECTIVES

F-1. The objective of machine gun marksmanship training is to produce gunners who can fire an accurate initial burst, adjust fire, and develop speed. Each of these functions are described in the paragraphs below.

FIRE AN ACCURATE INITIAL BURST

F-2. Obtaining an accurate initial burst of fire on the target is essential to good marksmanship. The gunner estimates the range to the target, sets the sights, and applies marksmanship skills while engaging targets to achieve an accurate initial burst of fire.

ADJUST FIRE

F-3. The assistant gunner must observe the strike of the rounds when the initial burst is fired. If the gunner misses the target, then they manipulate the T&E mechanism until they hit the target. The assistant gunner must be proficient in observing the strike of rounds and in observing and using tracers. The assistant gunner's proficiency helps the gunner relay the machine gun back on target.

DEVELOP SPEED

F-4. Speed is essential to good marksmanship also. Practicing dry-fire and live-fire exercises increases the gunner's speed. Speed develops through extensive training that combines other skills when delivering fire. However, speed is less important than accuracy.

BASIC MACHINE GUN TARGET

F-5. The 10-meter firing exercise (figure F-1, page F-2) uses the basic machine gun target (FSN 6920-078-5128 and NSN 6920-00-078-5123). The following explanation of the target, including the size of the aiming pasters and scoring spaces, aids in zeroing the machine guns and facilitates control during the 10-meter firing exercises. The target has four sections lettered A, B, C, and D. Each section has four point targets numbered 1, 2, 3, and 4; and two sets of area targets numbered 5 through 6 and 7 through 8. Each space is 4 cm wide and 5 cm high. The black aiming paster within the numbered scoring spaces is 1 cm square. The target is used to score two gunners. One gunner uses sections A and B and the other C and D.

POINT TARGETS

F-6. Point targets on the basic machine gun target are pasters 1 through 4 of sections A, B, C, and D. Firing at point targets exposes the gunner to zeroing techniques and controlled burst fire techniques. Targets 1 through 4 can be used for qualification, also.

AREA TARGETS

F-7. Area targets on the basic machine gun target consist of pasters 5 through 6, and 7 through 8 of sections A, B, C, and D. Target groups 5 through 6 provide the gunner with targets in-depth and allows them to use a series of aiming points to disburse fire across the target by using the T&E mechanism. Target group 7 through

8 provides the gunner with linear targets with depth. The 7 through 8 series of targets uses a series of aiming points to disburse fire across the target and in-depth by using the T&E mechanism.

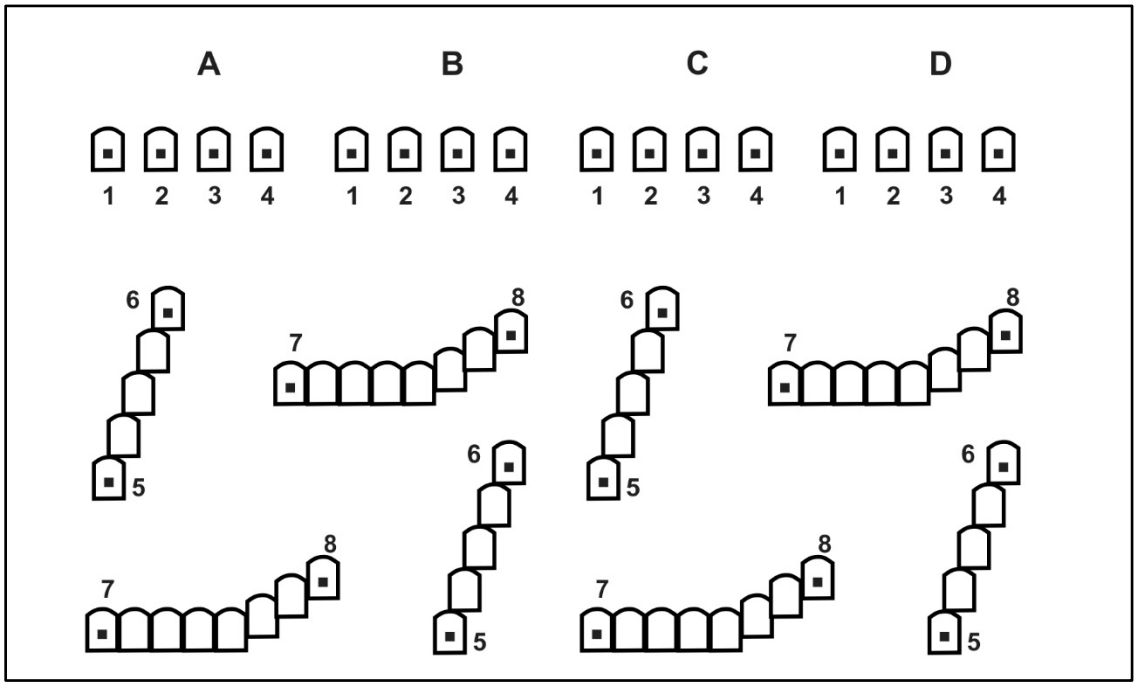


Figure F-1. Basic machine gun target

BASIC GUNNERY, M249 ONLY, AUTOMATIC RIFLE ROLE

F-8. The automatic rifle produces the most casualties for the squad. Although the weapon has changed, its role has not. The automatic rifleman supports the Infantry squad in the offense and defense. The current automatic rifle, the M249 automatic rifle, is nearly as accurate as a standard rifle, but provides a volume of fire as heavy as that of a standard machine gun. Section II discusses general training techniques and employment principles for using the M249 automatic rifle as an automatic weapon.

TEN-METER FIRE

F-9. Automatic riflemen learn to apply the marksmanship skills of automatic rifle marksmanship in live-fire exercises during 10-meter fires. Table F-1 familiarizes the Soldier with the weapon's characteristics, noise, and recoil. Each automatic rifleman learns to zero their M249 automatic rifle, conduct controlled burst fire at point targets, and use traverse and search techniques of fire on area targets. The 10-meter firing table is conducted on a 10-meter or multipurpose range using the basic, machine gun target. One automatic rifleman can use sections A and B while another uses sections C and D of the same, basic, machine gun target. The exercises are fired with the bipod from the prone position and the fighting position (if supported by the range). The 10-meter firing exercises are for practice and record qualification. All 10-meter firing exercises are recorded and scored so the automatic rifleman can assess their performance. The 10-meter firing is conducted in accordance with Firing Table I (table F-1). The paragraphs below describe the seven tasks for the 10-meter firing exercises.

Table F-1. Firing Table I, M249 basic (10-meter) fire, automatic rifle role.

TASK	TIME	ROUNDS		TARGET	TYPE FIRE
		QTY	TYPE		
1	No Limit	12	Ball/tracer	Pasters A1 and A2	3 single-round shot groups
2[a]	No Limit	6	4:1	Pasters A3 and A4	Fixed, 3-round burst each paster
3[a]	No Limit	15	4:1	Pasters A5 through A6	Fixed, 3-round burst each paster
4	No Limit	24	4:1	Pasters A7 through A8	Fixed, 3-round burst each paster
5[b]	20	12	4:1	Pasters B1 through B4	Fixed, 3-round burst each paster
6[ab]	40	24	4:1	Pasters B7 through B8	Fixed, 3-round burst each paster
7[b]	40	15	4:1	Pasters B5 through B6	Fixed, 3-round burst each paster

Notes. The gunner fires pasters on sections A and B and the assistant gunner fires on sections C and D.

[a]Protective mask and gloves required at a minimum.

[b]Qualification task.

TASK 1: ZERO

F-10. The automatic rifleman fires single shots to determine the weapon's zero for 10 meters. The task reinforces the dry-fire experience. The task lets the automatic rifleman practice loading while at the same time obtaining the tightest, most accurate shot group.

TASK 2: CONTROLLED BURST FIRE

F-11. Using point targets, the automatic rifleman fires a 3-round burst. The task exposes automatic riflemen to automatic fire and the action of the weapon. The task introduces trigger control, also.

TASK 3: CBRN TRAVERSE AND SEARCH FIRE

F-12. Task 3 requires the automatic rifleman to—

- Wear a protective mask and gloves.
- Change their body position to engage area targets in-depth.
- Fire a controlled burst.
- Use a series of aiming points to disburse fire across the target.

TASK 4: TRAVERSE AND SEARCH FIRE

F-13. Task 4 requires the automatic rifleman to—

- Change position to engage area targets with width and depth.
- Fire a controlled burst.
- To use a series of aiming points to disburse fire across the target.

TASK 5: TRAVERSE AND SEARCH FIRE

F-14. Task 5 allows the automatic rifleman to fire a controlled burst at a series of point targets while being timed.

TASK 6: CBRN TRAVERSE AND SEARCH FIRE

F-15. Task 6 requires the automatic rifleman to engage area targets with width and depth while—

- Being timed.
- Changing position.
- Wearing a protective mask and gloves.

TASK 7: TRAVERSE AND SEARCH FIRE

F-16. Task 7 requires the automatic rifleman to change position to engage area targets in-depth while being timed.

TEN-METER CONDUCT OF FIRE

F-17. The trainer teaches the automatic riflemen the objectives of firing from the bipod-supported prone and fighting positions, on fire commands used on the basic range, on the basic machine gun marksmanship target, and on analyzing and scoring the target. The unit is organized in firing orders based on range constraints. Each firing order has an automatic rifleman and a coach. The coach helps the automatic rifleman during prefire checks and zeroing. The automatic rifleman relays signals to the tower operator, checks the automatic rifleman's position, and coaches them. During qualification, all coaches are absent. The automatic riflemen fire the seven tasks as follows:

TASK 1: ZERO

- The automatic rifleman prepares the rear sight for zeroing and checks the front sight.
- The automatic rifleman assumes a good position.
- The tower operator instructs the automatic rifleman to prepare a single round.
- The tower operator commands the following and the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN LOADS AND MOVES SAFETY TO FIRE.
  - FRONT (focuses on target or target area).
  - PASTER A1 (locates target) AND A2.
  - THREE HUNDRED (adjusts sights and acquires sight picture).
  - FIXED, ONE ROUND (method of fire).
  - COMMENCE FIRING (on command, fires when ready).

Note. Throughout all firing exercises, the automatic rifleman performs the appropriate tasks during each element of the fire command. Instead of stating the method of fire, the tower operator states the number of rounds. This is for control. Omitting the rate specifies rapid fire, which is undesirable for the tasks.

- The automatic rifleman loads one round, obtains the proper sight picture, and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command to commence firing.
- The automatic rifleman engages paster A1 with three single shots when they are ready.
- The automatic rifleman moves downrange to observe, mark, and triangulate the shot group. The sight adjustments, using the rear peep sight and windage knob, are made at this time if the shot group is tight enough. If not, the automatic rifleman should fire another three rounds to ensure tight shot groups and consistently place those groups in the same location.
- The rifleman repeats steps 2 through 8 except that this time the automatic rifleman fires at paster A2.

Note. If the automatic rifleman zeros the weapon using 9 rounds, they use the remaining 3 to confirm their zero. If the rifleman are unable to zero with 12 rounds, they are removed from the firing line for remedial training.

TASK 2: CONTROLLED BURST FIRE

- The tower operator instructs the automatic rifleman to prepare a 6-round belt.
- When the fire command is given, the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTER A3 THROUGH A4
  - THREE HUNDRED
  - FIXED, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command to fire.
- The automatic rifleman fires the first burst of three rounds at paster A3.
- Steps 2 through 6 are repeated, but the automatic rifleman fires at paster A4.

TASK 3: CBRN TRAVERSE AND SEARCH FIRE

- The tower operator instructs the automatic rifleman to prepare a 15-round belt.
- The tower operator gives the order to mask by stating GAS. Once the Soldiers are masked and have their gloves on, the tower operator gives the fire command.
- When the fire command is given, the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTERS A5 THROUGH A6
  - THREE HUNDRED
  - TRAVERSE AND SEARCH, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command to fire.
- Using the traverse and search technique, the automatic rifleman engages pasters A5 through A6, firing a three-round burst for each paster. Once complete, the trainer orders all clear.
- The automatic rifleman restores their mask to the carrier, removes their gloves, and moves downrange to observe and analyze their targets.

TASK 4: TRAVERSE AND SEARCH FIRE

- The tower operator instructs the automatic rifleman to prepare a 24-round belt.
- The automatic rifleman and coach repeat each element from the trainer as follows:
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTERS A7 THROUGH A8
  - THREE HUNDRED

- TRAVERSE AND SEARCH, THREE-ROUND BURST
- AT MY COMMAND

- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The automatic rifleman engages pasters A7 through A8, firing a three-round burst at each paster using the traverse and search technique.
- The automatic rifleman may move downrange to observe and analyze their targets.

TASK 5: TRAVERSE AND SEARCH FIRE

- The tower operator instructs the automatic rifleman to prepare a 12-round belt.
- When the fire command is given, the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTERS B1 THROUGH B4
  - THREE HUNDRED
  - FIXED, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command to fire.
- The automatic rifleman engages pasters 1 through 4 in 20 seconds, firing a three-round burst at each paster.
- The automatic rifleman may move downrange to observe and analyze the targets.

TASK 6: CBRN TRAVERSE AND SEARCH FIRE

- The tower operator instructs the coach to prepare a 24-round belt.
- The tower operator gives the order to mask by stating Gas. Once the Soldiers are masked and have their gloves on, the tower operator gives the fire command.
- When the fire command is given, the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTERS B7 THROUGH B8
  - THREE HUNDRED
  - TRAVERSE AND SEARCH, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command to fire.
- Using the traverse and search technique, the automatic rifleman engages pasters B7 through B8 in 40 seconds, firing a three-round burst at each paster. Once complete, the Soldiers are given the all clear order.
- The automatic rifleman restores their mask to the carrier, removes their gloves, and moves downrange to observe and analyze their targets.

TASK 7: TRAVERSE AND SEARCH FIRE

- The tower operator instructs the automatic rifleman and coach to prepare a 15-round belt.
- When the fire command is given, the automatic rifleman and coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - PASTERS B5 THROUGH B6
  - THREE HUNDRED
  - TRAVERSE AND SEARCH, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman acquires the proper sight picture and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- Using the traverse and search technique, the automatic rifleman engages pasters B5 through B6 in 40 seconds, firing a three-round burst at each paster.
- The automatic rifleman may move downrange to observe and analyze the target, and the coach scores it.

TEN-METER QUALIFICATION FIRE

F-18. The first phase of qualification has firing tasks 2 through 4 of Firing Table I for practice, and tasks 5 through 7 of Firing Table I for record. Before firing, all Soldiers must be familiar with the tasks, the time allowed, the ammunition allowances, the procedures to follow in the event of a stoppage, and the penalties imposed.

TIME AND AMMUNITION

F-19. Each automatic rifleman finishes zeroing before record fire. The trainer gives them individual fire commands for each task. The automatic rifleman fires task 5 in 20 seconds; task 6 in 40 seconds; and task 7 in 40 seconds.

STOPPAGES

F-20. The automatic rifleman must apply immediate action if a stoppage occurs. If the stoppage is reduced, they continue to fire the course.

- If a stoppage occurs that cannot be reduced by immediate action, the automatic rifleman raises their hand and awaits assistance.
- Once the stoppage is reduced, the automatic rifleman completes firing beginning with the next task.
- If a stoppage is caused by an error on the part of the automatic rifleman, additional time is disallowed. The automatic rifleman receives the score they earned before the stoppage occurred.
- If the M249 automatic rifle must be replaced, then the automatic rifleman must zero the new weapon. The automatic rifleman may refire the exercise.
- Automatic riflemen who cannot fire a task or cannot complete firing in the time allowed (because of malfunctions) can finish the exercise in an alibi run after all other automatic riflemen complete firing. They fire only those tasks they failed to engage because of the malfunction.

PENALTIES

F-21. Five points are deducted from the score of any automatic rifleman who fails to stop firing at the command or signal to cease fire. If an automatic rifleman fires at the wrong target or exercise, they lose the points for those rounds. An automatic rifleman whose target was fired upon by another automatic rifleman is permitted to refire the exercise.

SCORES

F-22. Two automatic riflemen use a basic machine gun target for practice and qualification in table I. One automatic rifleman uses sections A for practice and B for qualification while the second uses sections C for practice and D for qualification. When scoring the 10-meter target, the trainer (not the automatic rifleman) counts the hits in sections B and D. One point is given for each round that impacts within the scoring space. The maximum point value is 3 points for each target. Rounds inside or touching the line on the target are considered a hit. When firing B/D1 through B/D4, the automatic rifleman engages 4 point targets with a maximum possible score of 12 points. When firing B/D5 through B/D6, the automatic rifleman engages 5 targets with a maximum possible score of 15 points. When firing pasters B/D7 through B/D8, the automatic rifleman engages eight targets for a maximum score of 24 points. During qualification firing, riflemen must achieve at least 35 points on Firing Table I. DA Form 7304, *Scorecard for M249AR,* (downloadable at http://apd.army.mil) is used to record scores.

POSITION

F-23. Based on the mission-essential task list, the commander selects either the bipod-supported prone position or bipod-supported fighting position for qualification.

TRANSITION FIRE

F-24. Transition firing provides the automatic rifleman with the experience necessary to progress from 10-meter firing to field firing at various types of targets at longer ranges. The automatic rifleman experiences and learns the characteristics of fire, field zeroing, and range determination. They use the adjusted, aiming point method of fire adjustment. The automatic rifleman conducts transition firing on a machine gun transition range or the multipurpose range complex. The transition exercises are fired with the bipod from the prone or fighting position. Each automatic rifleman fires the transition table twice, once for practice and once for qualification. Transition firing is fired and scored for both practice and qualification to provide feedback to the automatic rifleman. Firing Table II has eight tasks (table F-2).

Table F-2. Firing Table II, M249 transition fire, limited visibility, automatic rifle role

FIRING TABLE II—M249 TRANSITION FIRE Limited Visibility, Automatic Rifle Role						
TASK	*TIME*	*ROUNDS*		*TARGET*	*RANGE (M)*	*TYPE FIRE*
		QTY	*TYPE*			
1	No Limit	12	4:1	Single E	300	Fixed, 3-round burst (field zero)
2	5 sec	6	4:1	Single E	200	Fixed, 3-round burst
3	10 sec	6	4:1	Double E	400	Fixed, 3-round burst
4*	10 sec	6	4:1	Single E	100	Fixed, 3-round burst
5*	15 sec	6	4:1	Single E	300	Fixed, 3-round burst
6*	20 sec	12	4:1	Single E Single E	100 300	Fixed, 3-round burst
7	20 sec	12	4:1 4:1	Single E Double E	200 400	Fixed, 3-round burst
8	20 sec	18	4:1 4:1 4:1	Single E Single E Double E	100 200 400	Fixed, 3-round burst

Notes. The unit commander determines the position.
Boresighting requires 12 rounds and seating the device requires 6 rounds.

*Qualification task.

RANGE FACILITIES

F-25. The transition range has several firing lanes. Each lane is 10-meters wide at the firing line and 100-meters wide at a range of 800 meters. Ideally, each lane has a fighting position with an adjacent prone firing position.

TARGETS

F-26. Two target configurations are used for the automatic rifle, single and double E-type silhouettes. The double represents an enemy automatic weapon, a priority target for the automatic rifleman (figure F-2). The targets are set at the ranges that an automatic rifleman is most likely to engage. All targets must be clearly visible from the firing positions. Electric targets are desirable.

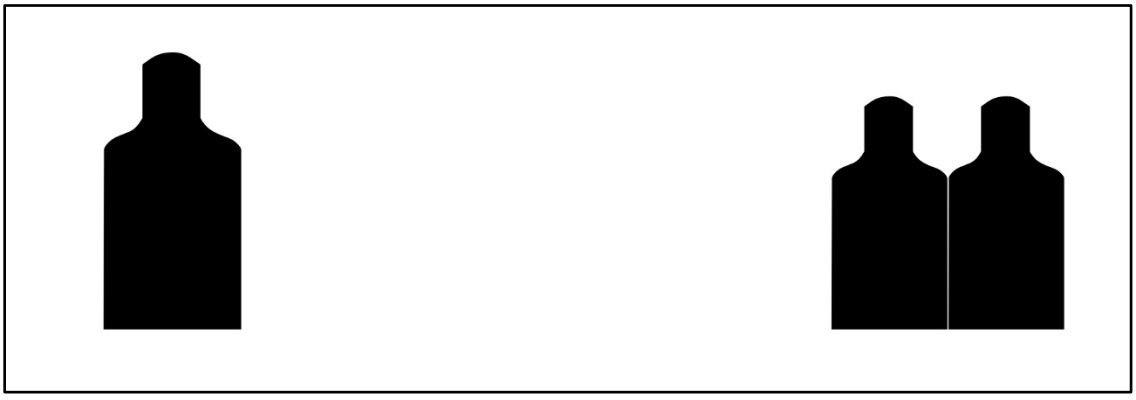


Figure F-2. Single E-type and double E-type silhouette targets

STOPPAGES

F-27. Same as Firing Table I qualification fire.

PENALTIES

F-28. Same as Firing Table I qualification fire.

SCORES

F-29. Each target hit is worth 5 points, whether the firer hits the target on the first or second burst. There are 11 targets, so the maximum score is 55 points. The automatic rifleman must hit at least 7 (7 times 5 equals 35 points) targets out of the 11 to qualify. Trainers use DA Form 7304, which is the scorecard for the M249 automatic rifle, to record scores. Task 1 in the qualification firing table, field zero, is unscored.

FIRING POSITION

F-30. Based on their mission-essential task list, the commander selects either the bipod-supported prone position or the bipod-supported foxhole firing position for qualification.

TRANSITION CONDUCT OF FIRE

F-31. The unit is organized in firing orders based on range constraints. Each firing order has an automatic rifleman and a coach. The coach helps the automatic rifleman during prefire checks and zeroing. The coach also relays signals to the tower operator, checks the automatic rifleman's position, and coaches them except during qualification. The rifleman uses the bipod-supported prone and fighting positions. The automatic rifleman fires the eight tasks in the manner described in the following paragraphs:

TASK 1: FIELD ZERO, SINGLE E-TYPE SILHOUETTE

F-32. The zero target may be located from 300 to 700 meters from the firing line, but the best range is 300 meters.

- The automatic rifleman prepares the rear sight for field zeroing and checks the front sight post.
- The automatic rifleman sets the range to the zero target on the elevation knob.
- The automatic rifleman assumes a good position.
- The tower operator instructs the automatic rifleman to prepare a 12-round belt.
- On hearing the fire command, the automatic rifleman and coach repeat each element as it is given.
  - AUTOMATIC RIFLEMAN
  - FRONT
  - TARGETS: TROOPS IN THE OPEN
  - THREE HUNDRED
  - FIXED, THREE-ROUND BURST
  - COMMENCE FIRING
- The automatic rifleman loads one 12-round belt of ammunition, obtains the proper sight picture, and gives an Up to the coach.
- The coach relays the Ready signal to the tower operator.
- The tower operator gives the command, commence firing.
- The automatic rifleman fires a three-round burst at the target when ready.
- The automatic rifleman observes the beaten zone. If the rounds miss the target, they adjust for windage and elevation.
- The automatic rifleman repeats Steps 8 through 9 with the remaining rounds until rounds start hitting the target. They record their zero.

TASK 2: 200-METER, SINGLE E-TYPE SILHOUETTE

- The tower operator instructs the automatic rifleman to load one 66-round belt.
- The fire command is given once for tasks 2 through 8. The automatic rifleman and the coach repeat each element as it is given—
  - AUTOMATIC RIFLEMAN
  - FRONT
  - TARGET: TROOPS IN THE OPEN
  - ONE HUNDRED TO FOUR HUNDRED METERS
  - FIXED, THREE-ROUND BURST
  - AT MY COMMAND
- The automatic rifleman gives an Up to the coach.
- The coach gives the Ready signal to the tower operator.
- The tower operator commands fire
- The automatic rifleman scans the sector.
- A 200-meter, single E-type target is exposed for 5 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a three-round burst.
- If they fail to hit the target, they fire another three-round burst at the target using the adjusted, aiming point method of fire adjustment.

TASK 3: 400-METER, DOUBLE E-TYPE SILHOUETTE

- The automatic rifleman continues to scan the sector.
- A 400-meter, double E-type target is exposed for 10 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a three-round burst.
- If they fail to hit the target, they fire another three-round burst at the target using the adjusted, aiming point method of fire adjustment.

TASK 4: 100-METER, SINGLE E-TYPE SILHOUETTE

- The tower operator orders, GAS and the automatic rifleman and coach put on their masks and gloves.
- The automatic rifleman continues to scan the sector.
- A 100-meter, single E-type target is exposed for 10 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a three-round burst.
- If they fail to hit the target, they fire another three-round burst at the target using the adjusted, aiming point method of fire adjustment.

TASK 5: 300-METER, SINGLE E-TYPE SILHOUETTE

- The automatic rifleman continues to scan the sector while still wearing a protective mask and gloves.
- A 300-meter, single E-type target is exposed for 15 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a three-round burst.

- If they fail to hit the target, they fire another three-round burst at the target using the adjusted, aiming point method of fire adjustment.

TASK 6: 100-AND 300-METER, SINGLE E-TYPE SILHOUETTES

- The automatic rifleman continues to scan the sector while wearing a protective mask and gloves.
- A 100-meter and a 300-meter, single E-type target are exposed for 20 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a three-round burst at each target.
- If they fail to hit the target, they fire another three-round burst at each target using the adjusted, aiming point method of fire adjustment.
- The tower operator orders All Clear. The automatic rifleman and coach restore their masks to their carriers and remove their gloves.

TASK 7: 200-METER SINGLE AND 400-METER DOUBLE E-TYPE SILHOUETTES

- The automatic rifleman continues to scan the sector.
- The 200-meter, single E-type and the 400-meter, double E-type targets are exposed for 20 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains correct sight alignment and sight picture, and fires a three-round burst at each target.
- If they fail to hit the target, they fire another three-round burst at each target using the adjusted, aiming point method of fire adjustment.

TASK 8: 100- AND 200-METER SINGLE AND 400-METER DOUBLE E-TYPE SILHOUETTES

- The automatic rifleman continues to scan the sector.
- The 100-meter and 200-meter single E-type and 400-meter double E-type targets are exposed for 25 seconds.
- The automatic rifleman determines the range, places the proper setting on the rear sight, assumes the proper position, obtains correct sight alignment and sight picture, and fires a three-round burst at each target.
- If they to hit the target, they fire another three-round burst at each target using the adjusted, aiming point method of fire adjustment.

TRANSITION FIRE, LIMITED VISIBILITY

F-33. Night or limited visibility fire requires the Soldier to use the TWS. They mount the sight, boresight the weapon at 10 meters (10-meter range), and zero the nightsight to the weapon at 25 meters (same transition or multipurpose machine gun range used in Firing Table II). Then they use the nightsight to detect and engage a series of targets at various ranges. The commander can use this training to assess the unit's mission-essential task list. Firing Tables II and III are so similar in their tasks and conduct of fire that the commander can opt to fire only Table II, but with the targets and ranges from Table III. This saves the commander from having to fire Table III at all.

TIME AND AMMUNITION

F-34. Firing Table III provides ammunition requirements. No time requirements apply.

STOPPAGES

F-35. Same as Firing Table I.

PENALTIES

F-36. No penalties are used.

SCORING

F-37. Rather than entering points, no points are used; commanders can use this training for assessment. DA Form 7304, which is the scorecard for the M249 automatic rifle, can be used to record the number of hits. The form is downloadable from http:// www.apd.army.mil.

CONDITIONS

F-38. Firing Table III (table F-3) is for engaging targets out to 400 meters under ideal moonlight or during daylight conditions. If visibility is limited because of a lack of ambient light, commanders may use field expedient means to identify targets.

Table F-3. Firing Table III, M249 transition fire, limited visibility, automatic rifle role

FIRING TABLE III—M249 TRANSITION FIRE Limited Visibility, Prone or Fighting Position, Bipod Supported Practice and Instructional, Automatic Rifle Role						
TASK	*TIME*	*ROUNDS*		*TARGET*	*RANGE (M)*	*TYPE FIRE*
		QTY	*TYPE*			
1	No Limit	12	4:1	Single E	25	Fixed, 3-round burst (zero)
2	No Limit	6	4:1	Single E	200	Fixed, 3-round burst
3	No Limit	6	4:1	Double E	400	Fixed, 3-round burst
4	No Limit	6	4:1	Single E	100	Fixed, 3-round burst
5	No Limit	6	4:1	Single E	300	Fixed, 3-round burst
6	No Limit	6	4:1	Single E	100	Fixed, 3-round burst
Notes. The unit commander determines the position. Boresighting requires 12 rounds and seating the device requires 6 rounds.						

TARGETS

F-39. Single E-type silhouette targets or double E-type silhouette targets are used.

FIRING POSITION

F-40. The commander selects the bipod-supported foxhole firing position.

QUALIFICATION STANDARDS

F-41. Qualification with the M249 automatic rifle requires the Soldier to achieve the minimum standards for 10-meter day and transition day firing tables.

FIRING TABLE I W/CBRN

F-42. One point is allowed for each round that impacts in the scoring space (maximum of 3 for each space) for Firing Table I. The maximum possible score for Firing Table I is 51 points. A minimum of 35 points is required.

FIRING TABLE II W/CBRN

F-43. For Firing Table II, 5 points are allowed for each target hit whether the target is hit on the first or second burst. The maximum score for Table Firing II is 55 points; at least 35 points must be scored on this table to qualify.

TOTAL

F-44. The minimum total score is 70; the maximum total score is 106 (see table F-4). Figure F-3 (page F-15), which illustrates a completed DA Form 7304, shows the ratings.

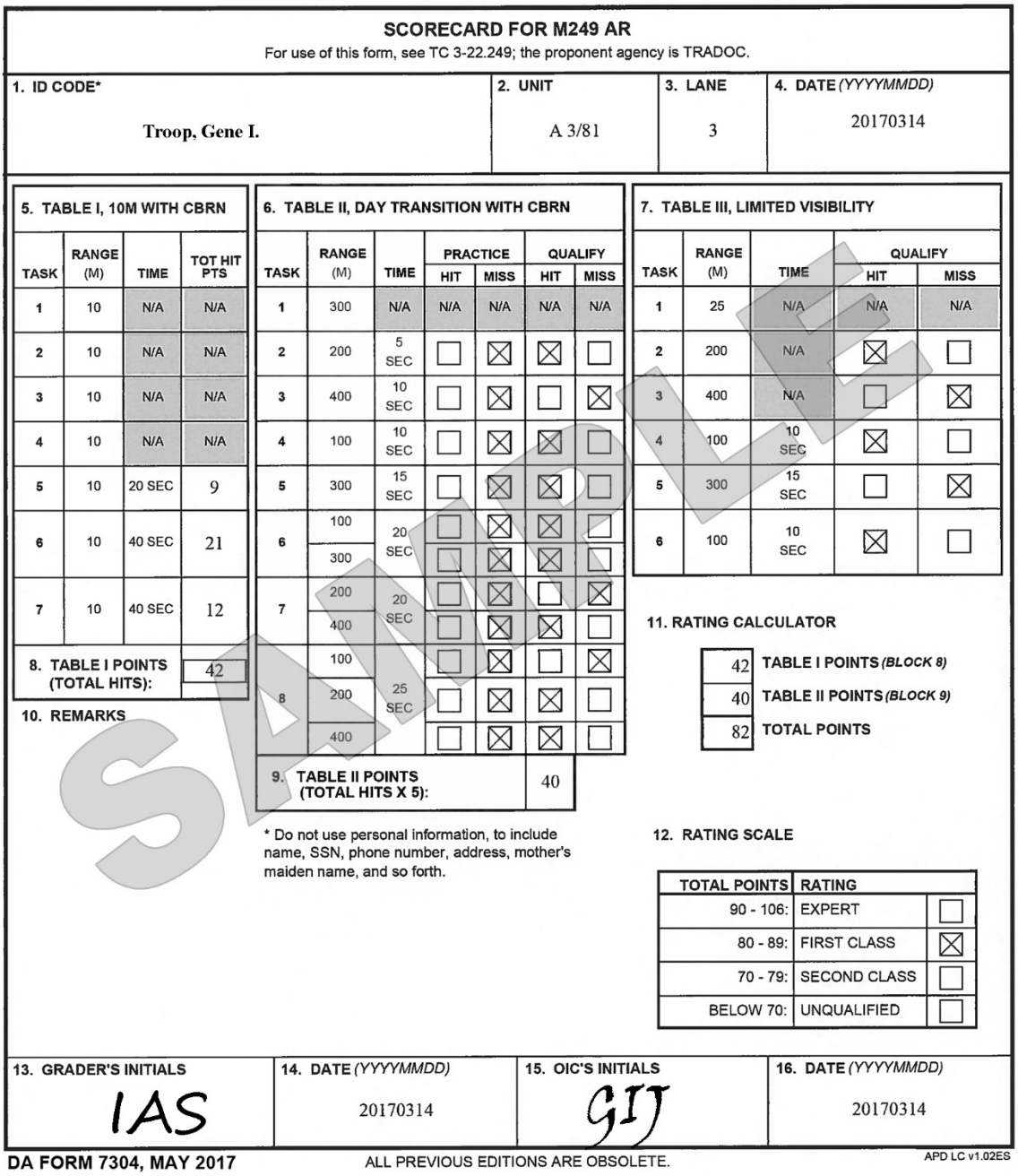
Table F-4. M249 automatic rifleman ratings.

RATING	*MINIMUM*	*MAXIMUM*
Expert	90	106
Automatic Rifleman 1st Class	80	89
Automatic Rifleman 2d Class	70	7
Unqualified	0	69

SCORECARD

F-45. The trainer uses DA Form 7304 to record the automatic rifleman's performance on the M249 automatic rifle qualification range. DA Form 7304 is available for downloading from http:// www.apd.army.mil. DA Pam 350-38 provides STRAC ammunition requirements. (Blocks 1 through 4, and 13 through 16 are administration data):

- Block 5–Table I, 10 Meter. Task 5 has four target spaces; the firer may impact up to three rounds per target, so the firer can earn 12 points (4 x 3). Task 6 has eight. The firer may impact up to three rounds per target space, so he can earn 24 points (8 x 3) for Task 6. Task 7 has 5 target spaces. The firer may impact up to three rounds per target, so he can earn 15 points (5 x3). For a maximum of 51 points for Table I.
- Block 6–Table II, Day Transition. Mark each qualifying hit with an X, whether the firer hits the target on the first or second burst.
- Block 7–Table III, Limited Visibility. Mark each qualifying hit with an X whether the firer hits the target on the first or second burst.
- Block 8–Table I Points. Enter the sum of the points earned in Tasks 5, 6, and 7.
- Block 9–Table II Points. Enter total qualifying hits multiplied by 5.
- Block 11–Enter the total from each table, and then add them to obtain TOTAL POINTS.
- Block 12–Using the TOTAL POINTS in Block 12, determine the firer's RATING.



SCORECARD FOR M249 AR

For use of this form, see TC 3-22.249; the proponent agency is TRADOC.

1. ID CODE*	2. UNIT	3. LANE	4. DATE (YYYYMMDD)
Troop, Gene I.	A 3/81	3	20170314

5. TABLE I, 10M WITH CBRN

TASK	RANGE (M)	TIME	TOT HIT PTS
1	10	N/A	N/A
2	10	N/A	N/A
3	10	N/A	N/A
4	10	N/A	N/A
5	10	20 SEC	9
6	10	40 SEC	21
7	10	40 SEC	12
8. TABLE I POINTS (TOTAL HITS):			42

6. TABLE II, DAY TRANSITION WITH CBRN

TASK	RANGE (M)	TIME	PRACTICE HIT	PRACTICE MISS	QUALIFY HIT	QUALIFY MISS
1	300	N/A	N/A	N/A	N/A	N/A
2	200	5 SEC	☐	☒	☒	☐
3	400	10 SEC	☐	☒	☐	☒
4	100	10 SEC	☐	☒	☒	☐
5	300	15 SEC	☐	☒	☒	☐
6	100	20 SEC	☐	☒	☒	☐
	300		☐	☒	☒	☐
7	200	20 SEC	☐	☒	☐	☒
	400		☐	☒	☒	☐
8	100	25 SEC	☐	☒	☐	☒
	200		☐	☒	☒	☐
	400		☐	☒	☒	☐
9. TABLE II POINTS (TOTAL HITS X 5):						40

7. TABLE III, LIMITED VISIBILITY

TASK	RANGE (M)	TIME	QUALIFY HIT	QUALIFY MISS
1	25	N/A	N/A	N/A
2	200	N/A	☒	☐
3	400	N/A	☐	☒
4	100	10 SEC	☒	☐
5	300	15 SEC	☐	☒
6	100	10 SEC	☒	☐

11. RATING CALCULATOR

42	TABLE I POINTS (BLOCK 8)
40	TABLE II POINTS (BLOCK 9)
82	TOTAL POINTS

10. REMARKS

* Do not use personal information, to include name, SSN, phone number, address, mother's maiden name, and so forth.

12. RATING SCALE

TOTAL POINTS	RATING	
90 - 106:	EXPERT	☐
80 - 89:	FIRST CLASS	☒
70 - 79:	SECOND CLASS	☐
BELOW 70:	UNQUALIFIED	☐

13. GRADER'S INITIALS	14. DATE (YYYYMMDD)	15. OIC'S INITIALS	16. DATE (YYYYMMDD)
IAS	20170314	GIJ	20170314

DA FORM 7304, MAY 2017 ALL PREVIOUS EDITIONS ARE OBSOLETE. APD LC v1.02ES

Figure F-3. Completed DA Form 7304, example.

BASIC GUNNERY, MACHINE GUN ROLE

F-46. In basic marksmanship, the gunner executes live-fire exercises during the day and night. These exercises are conducted with the machine gun mounted on the tripod. Both the gunner and the assistant gunner practice and qualify. Basic gunnery includes 10-meter zero, 10-meter fire, field zero, practice and qualification transition fire, and fire in limited visibility.

TEN-METER FIRE

F-47. Ten-meter fire trains the gunner to apply machine gun marksmanship in live-fire exercises. During ten-meter fire training, the Soldier becomes familiar with the weapon's characteristics, noise, and recoil. The training instills confidence in the Soldier with their weapon. Each gunner learns to zero their machine gun, conduct crew drill, fire controlled bursts at point targets, and use traverse and search techniques on area targets. The Soldier conducts ten-meter fire on a 10-meter or multipurpose range with the basic machine gun target. The gunner fires with the machine gun on the tripod, from both prone and fighting positions. Ten-meter firing exercises allow practice and are a part of record qualification. Therefore, all 10-meter firing exercises are recorded and scored so the gunner has an assessment of their performance. Ten-meter fire is conducted in accordance with Firing Table I (table F-5) below.

Table F-5. Firing Table I, all weapons, basic (10-meter) fire

FIRING TABLE I—ALL WEAPONS, BASIC (10 METER) FIRE Prone or Fighting Position, Tripod, Practice and Qualification, Machine Gun Role					
TASK	*TIME*	*ROUNDS*		*GUNNER TARGETS (PASTERS)*	*TYPE FIRE*
		QTY	*TYPE*		
1	No Limit	12	Ball	A1 and A2	12 single rounds (zero)
2	No Limit	28	Ball	A3 and A4	5- to 7-round burst for each paster
3	No Limit	35	Ball	A5 and A6	5- to 7-round burst for each paster, traverse, and search
4	No Limit	56	Ball	A7 and A8	5- to 7-round burst for each paster
*5	45 sec	56	Ball	B7 and B8	5- to 7-round burst for each paster
*6	30 sec	35	Ball	B5 and B6	5- 7-round burst for each paster
Notes. The gunner fires pasters on sections A and B and the assistant gunner fires on section C and D. *Qualification task					

GUNNER: ZERO, PRACTICE, AND QUALIFICATION

F-48. The Soldiers must perform the following tasks during practice and qualification.

Task 1: Zero, Tripod

F-49. The gunner fires single shots to determine their weapon's zero for 10 meters. The task reinforces the dry-fire experience and allows the gunner to practice loading while providing the tightest, most accurate shot group they can (A1 and A2).

Task 2: Controlled-burst Fire, Tripod

F-50. Task 2 exposes the gunner to automatic fire and the action of the weapon and at the same time introduces trigger control (A3 through A4). Using a point target, the gunner fires a burst of 5 to 7 rounds.

Task 3: Traverse and Search Fire

F-51. Task 3 requires the gunner to make position changes or manipulate the T&E mechanism to engage linear targets with depth, to use controlled burst fire, and to use a series of aiming points to disburse fire across the target (A5 and A6).

Task 4: Traverse and Search Fire

F-52. Task 4 requires the gunner to make body position changes or manipulate the T&E mechanism to engage area targets in-depth, to use controlled burst fire, and to use a series of aiming points to disburse fire across the target while wearing a protective mask and gloves (A7 and A8).

Task 5: Traverse and Search Fire, Qualification

F-53. Task 5 requires the gunner to engage area targets with width and depth while changing position or manipulating the T&E mechanism during timed conditions (B7 and B8).

Task 6: Search and Traverse Fire, Qualification

F-54. Task 6 requires the gunner to make position changes or manipulate the T&E mechanism to engage area targets in-depth during timed conditions (B5 and B6).

Assistant Gunner: Ten-meter Practice and Qualification

F-55. After the gunner finishes firing, they and the assistant gunner swap positions. The assistant gunner then fires the same tasks in the 10-meter practice and qualification tables, but they fire at the pasters on sections C and D.

TEN-METER CONDUCT OF FIRE

F-56. The training instructs the gunners on the objectives of firing from the tripod-supported prone or fighting positions. The gunners learn the fire commands used on the basic range. They learn about the basic machine gun marksmanship target, and how the target is analyzed and scored. The assistant helps the gunner during prefire checks and zeroing. In addition, the assistant gunner relays signals to the tower operator, checks the gunner's position, and provides any other assistance allowed. No assistant gunner is available during qualification fire. The six tasks are fired as follows:

TASK 1: TRIPOD, ZERO

F-57. The gunner should zero their weapon in 9 rounds. The gunner should use the other 3 rounds to confirm the zero. If they cannot zero in 12 rounds, they leave the firing line and attend remedial training.

- The tower operator commands, MACHINE GUN TO BE MOUNTED HERE (weapon squad leaders indicate the firing points on the 10-meter line), FRONT (weapon squad leader points to the 10-meter targets), ACTION.
- At the command action, the machine gun crew places the machine gun into action (tripod mode).
- The gunner prepares the rear sight for zeroing and checks the front sight.
- The gunner assumes a good tripod position.
- The tower operator instructs the gunner to prepare a single round.
- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION — The gunner loads and moves the safety to F.
  - FRONT — The gunner focuses on the target or target area.
  - PASTERS A1 and A2 — The gunner locates the target.
  - FIVE HUNDRED — The gunner adjusts sights and acquires the sight picture.
  - FIXED, ONE ROUND — The gunner is given the method of fire.
  - COMMENCE FIRING — The gunner fires on command from tower operator, but when ready.
- The gunner loads one round, obtains the proper sight picture, and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands, COMMENCE FIRING.
- When ready, the gunner engages paster A1 with three single shots.
- The gunner moves downrange to observe, mark, and triangulate the shot group. They adjust as needed.
- The gunner repeats Steps 3 through 10 until they have zeroed or fired 12 rounds. If the gunner has not zeroed after 12 rounds, the gunner is removed from the firing line for retraining. Once the gunner zeroes, they fire the remaining rounds at paster A2 to confirm the zero.

TASK 2, TRIPOD, CONTROLLED BURST FIRE, TRAVERSE

F-58. The tower operator instructs the gunner to prepare a 28-round belt.

- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION
  - FRONT
  - PASTERS A3 AND A4
  - FIVE HUNDRED
  - FIXED, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner acquires the proper sight picture and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands FIRE.
- The gunner engages pasters A3 and A4, firing a 5- to 7-round bursts at each paster, using traverse.

TASK 3, TRIPOD, CONTROLLED BURST FIRE, TRAVERSE AND SEARCH

F-59. The tower operator instructs the assistant gunner to prepare a 35-round belt.

- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION
  - FRONT
  - PASTERS A5 AND A6
  - FIVE HUNDRED
  - TRAVERSE AND SEARCH, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner acquires the proper sight picture and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands FIRE.
- The gunner engages pasters A5 and A6, firing a 5- to 7-round bursts at each paster, using traverse and search.

TASK 4, TRIPOD, CONTROLLED BURST FIRE, SEARCH AND TRAVERSE

F-60. The tower operator instructs the gunner to prepare a 56-round belt.

- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION
  - FRONT
  - PASTERS A7 AND A8
  - FIVE HUNDRED
  - TRAVERSE AND SEARCH, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner acquires the proper sight picture and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands FIRE.
- The gunner engages pasters A7 and A8, firing a 5- to 7-round burst at each paster, using the search and traverse technique.
- The gunner and assistant gunner move downrange to observe and analyze the targets.

TASK 5, TRIPOD, QUALIFICATION, SEARCH AND TRAVERSE FIRE

F-61. After firing ends, the firing line is cleared and the trainers or safety officers move downrange and score the targets. Someone besides the gunner scores the gunner's target.

- The tower operator instructs the gunner to prepare a 56-round belt.
- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION
  - FRONT
  - PASTERS B7 AND B8
  - FIVE HUNDRED
  - TRAVERSE AND SEARCH, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner acquires the proper sight picture and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands FIRE.
- The gunner engages pasters B7 and B8, firing a 5- to 7-round burst at each paster, using the search and traverse technique. The gunner has 45 seconds to engage as many pasters as they can during the time allowed.

TASK 6, TRIPOD, QUALIFICATION, TRAVERSE AND SEARCH

F-62. On completion of all firing, the firing line is cleared and the trainers or safeties move downrange and score the targets. Someone besides the firer scores the target.

- The tower operator instructs the assistant gunner to prepare a 35-round belt.
- The gunner and assistant gunner repeat each element of the following fire command:
  - FIRE MISSION
  - FRONT
  - PASTERS B5 AND B6
  - FIVE HUNDRED
  - TRAVERSE AND SEARCH, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner acquires the proper sight picture and signals a thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands fire.
- The gunner engages pasters B5 and B6, firing a 5- to 7-round burst at each. The gunner uses traverse and search. The gunner has 30 seconds to engage as many pasters as they can.
- When the gunner and assistant gunner return from downrange, the tower operator commands OUT OF ACTION.
- The machine gun crew then takes the machine gun out of action (tripod mode).

TEN-METER QUALIFICATION FIRE

F-63. The first phase of qualification has the gunner firing tasks 2 through 4 of Firing Table I for practice, and tasks 5 and 6 of Firing Table I for record. Before firing, all Soldiers must be familiar with the tasks, the time allowed, the ammunition allowances, the procedures to follow in the event of a stoppage, and the penalties imposed.

TIME AND AMMUNITION

F-64. Each gunner completes zeroing before record fire. They receive individual fire commands for each task. They must fire task 5 in 45 seconds, and task 6 in 30 seconds.

STOPPAGES

F-65. If a stoppage occurs, the gunner must apply immediate action. If the stoppage is reduced, they continue to fire the course.

- If a stoppage occurs that the gunner cannot reduce by immediate action, then they raise their hand and await assistance.
- Once they reduce the stoppage, the gunner completes firing, beginning with the next task.
- If gunner error causes a stoppage, additional time is disallowed. The gunner receives whatever score they had earned before the stoppage occurred.
- If the machine gun must be replaced, the gunner must zero it and fire the exercise again.
- Gunners who fail to fire a task or fail to do so in the time allowed due to malfunctions have another option: They can finish the exercise in an alibi run after all other gunners complete firing. They need only fire the tasks they failed to hit due to the malfunction.

PENALTIES

F-66. Five points are deducted from the score of any gunner who fails to stop firing at the command or signal to cease fire. If a gunner fires at the wrong target or exercise, they lose the points for those rounds. A gunner whose target was fired upon by another gunner is permitted to refire the exercise.

SCORING

F-67. On the 10-meter target, the trainer counts all scoring pasters in sections B and D (B/D5 to B/D6 and B/D7 to B/D8). The trainer awards 1 point for each round that impacts within the scoring space. The most points they can give the gunner for each paster is 7 points for the M249 or M240. Rounds that touch the line on the paster are considered hits. Someone besides the gunner scores the gunner's target. During qualification fire, the gunner must earn at least 63 points on Firing Table I on any of the weapons.

SECTIONS B/D5 TO B/D6

F-68. When firing B/D5 through B/D6, the gunner engages five scoring pasters with 35 rounds (M249 or M240). They can earn up to 35 points for either the M249 or M240.

SECTIONS B/D7 TO B/D8

F-69. When firing pasters B/D7 through B/D8, the gunner engages eight scoring pasters with 56 rounds (M249 or M240). They can earn up to 56 points for either the M249 or M240.

POSITION

F-70. For practice and qualification, the gunner uses either a tripod-supported prone or tripod supported fighting position.

FIRERS

F-71. The gunner and the assistant gunner both fire Table I.

TRANSITION FIRE

F-72. Transition fire provides the gunner with the experience the need to progress from 10-meter fire to field fire at various types of targets at longer ranges. In a timed scenario, the gunner experiences and learns the characteristics of fire, field zeroing, range determination, and engagement of targets. They use the adjusted, aiming point method of fire adjustment. Transition fire occurs on a machine gun transition range or on the multipurpose range complex. Exercises are fired with the tripod prone or fighting position. However, the commander may direct that trainers conduct transition fire from the bipod prone or fighting position. Each gunner and assistant gunner fires transition fire twice, once for practice and once for qualification. They fire

the field zero (Task 1) only once during the practice phase. Transition fire is scored during both practice and qualification to provide feedback to the gunner. Firing Table II (see table F-6) has eight tasks.

Table F-6. Firing Table II, all weapons, tripod transition fire

FIRING TABLE II—ALL WEAPONS *Tripod Transition Fire, Prone or Fighting Position, Practice and Qualification, Machine Gun Role*						
TASK	*TIME*	*ROUNDS*		*TARGET*	*RANGE*	*TYPE FIRE*
		QTY	*TYPE*			
1	No Limit	28	4:1[b]		500	Fixed, 5- to 7-round burst (field zero)
2[a]	10 sec	14	4:1[b]	Single E	400	Fixed, 5- to 7-round burst
3[a]	15 sec	14	4:1[b]	Double E	500	Fixed, 5- to 7-round burst
4[a]	20 sec	14	4:1[b]	Double E	600	Fixed, 5- to 7-round burst
5[a]	30 sec	14	4:1[b]	Double E	800	Fixed and area, 5- to 7-round burst
6[a]	30 sec	28	4:1[b]	Single E Double E	400 600	Fixed, 5- to 7-round burst
7[a]	45 sec	28	4:1[b]	Double E Double E	700 800	Fixed and area, 5- to 7-round burst
8[a]	45 sec	42	4:1[b]	Single E Double E Double E	400 500 600	Fixed, 5- 7-round burst
Notes. The unit commander determines the firing position. [a]Qualification task. [b]Ball to tracer ratio (mix), that is, four ball rounds are loaded for every one tracer round loaded.						

RANGE FACILITIES

F-73. The transition range has several firing lanes. Each lane is 10 meters wide at the firing line and 100 meters wide at a range of 800 meters. Ideally, each lane has a fighting position with an adjacent prone firing position.

TARGETS

F-74. The E-type silhouette targets are cardboard (NSN 6920-00-795-1806) and plastic (NSN 6920-00-071-4780). Both single and double are needed for qualification. The double E-type silhouette represents an enemy automatic weapon, which for the gunner is a priority target (see figure F-4, page F-22). The targets are at various ranges that the gunner might engage. All targets are plainly visible from the firing positions. Electrical targets are desirable.

STOPPAGE

F-75. Firing Table I criteria are used.

PENALTIES

F-76. Firing Table I criteria are used.

SCORES

F-77. Ten points are given for each target hit, whether hit on the first or second burst. The total possible points are 110. The gunner must hit at least 7 targets (70 points) out of 11 exposures to qualify. Trainers use DA Form 85, *Scorecard for M249 and M240 Machine Guns*, to record scores (see figure F-5, page F-28). The form is available for downloading at http:// www.apd.army.mil.

POSITION

F-78. Transition fire should be fired from the tripod, but the commander may specify that the gunner should fire from the bipod.

FIRERS

F-79. The gunner and the assistant gunner both fire table II.

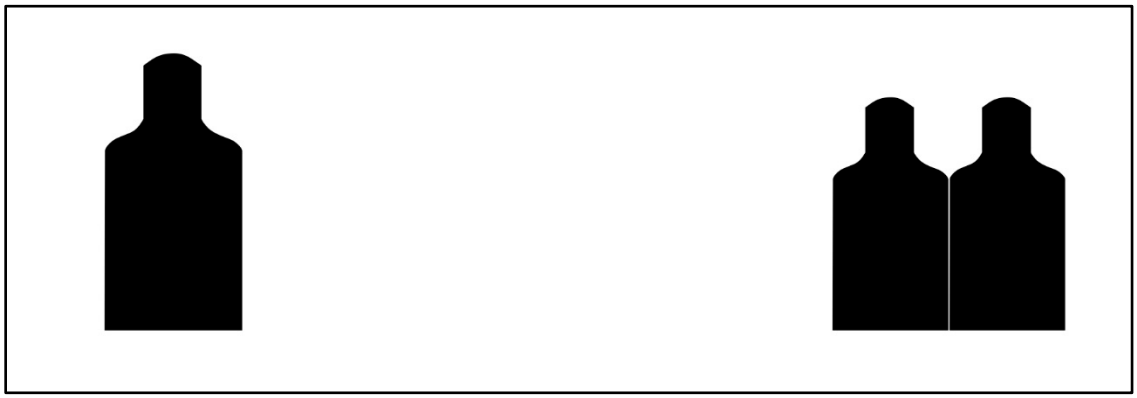


Figure F-4. Single and double E-type silhouette targets

TRANSITION CONDUCT OF FIRE WITH TRIPOD, PRACTICE

F-80. The unit is organized in firing orders based on range constraints. Each firing order has a gunner and an assistant gunner. The assistant gunner helps the gunner during prefire checks and zeroing. The assistant gunner relays signals to the tower operator, checks the gunner's position, and helps with target detection and adjustments during qualification. The gunner uses the bipod-supported prone or fighting position. The gunner fires the eight tasks as follows:

TASK 1: FIELD ZERO, 500-METER, DOUBLE E-TYPE SILHOUETTE

F-81. The tower operator commands MACHINE GUN TO BE MOUNTED HERE (weapon squad leader points to the firing points on the transition line), FRONT (weapon squad leader points to the targets), ACTION.

- At the command ACTION, the machine gun crew places the machine gun into action (tripod mode).
- The gunner prepares the rear sight for field zeroing, and then checks the front sight blade.
- The gunner sets the range to the zero target on the range scale. The preferred range is 500 meters.
- The gunner assumes a good position.
- The tower operator tells the assistant gunner to prepare a 28-round belt.
- The gunner and assistant gunner repeat each element of the fire command exactly as follows:
  - FIRE MISSION
  - FRONT
  - TARGETS, TROOPS IN THE OPEN
  - FIVE HUNDRED
  - FIXED, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner loads one 28-round belt of ammunition, gets the proper sight picture, and signals thumbs up to the assistant gunner.
- The assistant gunner relays the ready signal to the tower operator.
- The tower operator commands fire.
- When ready, the gunner fires a 5- to 7-round burst at the target.

- The gunner observes the beaten zone. If the rounds miss the target, the gunner adjusts windage and elevation.
- After adjusting, the gunner refires and observes the impact with the remaining rounds until the rounds impact on the target. The gunner records the zero.

TASK 2: 400-METER, SINGLE E-TYPE SILHOUETTE

F-82. The tower operator tells the gunner to load one 154-round belt and the gunner takes the actions listed below:

- When the fire command is given, the gunner and assistant gunner repeat each element. For tasks 2 through 8, it is only given once.
  - FIRE MISSION
  - FRONT
  - TARGET, TROOPS IN THE OPEN
  - ONE HUNDRED TO EIGHT HUNDRED METERS
  - FIXED, FIVE- TO SEVEN-ROUND BURST
  - AT MY COMMAND
- The gunner signals thumbs up to the assistant gunner.
- The assistant gunner signals ready to the tower operator.
- The tower operator commands, FIRE.
- The gunner scans the sector.
- A 400-meter, single E-type target is exposed for 10 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a 5- to 7-round burst.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst. To adjust fire, the gunner uses the adjusted, aiming point method.

TASK 3: 500-METER DOUBLE E-TYPE SILHOUETTE

F-83. The gunner and assistant gunner continue to scan the sector as follows:

- A 500-meter, double E-type target is exposed for 15 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a 5- to 7-round burst.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst. To adjust fire, the gunner uses the adjusted, aiming point method.

TASK 4: 600-METER, DOUBLE E-TYPE SILHOUETTE

F-84. The gunner and assistant gunner continue to scan the sector as follows:

- A 600-meter, double E-type target is exposed for 20 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a 5- to 7-round burst.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst. To adjust fire, they use the adjusted, aiming point method.

TASK 5: 800-METER, DOUBLE E-TYPE SILHOUETTE

F-85. The gunner and assistant gunner continue to scan the sector as follows:

- An 800-meter, double E-type target is exposed for 30 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a 5- to 7-round burst.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst using the adjusted, aiming point method of fire adjustment.

TASK 6: 400-METER, SINGLE AND 600-METER, DOUBLE E-TYPE SILHOUETTES

F-86. The gunner and assistant gunner continue to scan the sector as follows:

- A 400-meter single E-type target and a 600-meter double E-type target are exposed for 30 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains the correct sight alignment and sight picture, and fires a 5- to 7-round burst at each target.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst at each target using the adjusted, aiming point method of fire adjustment.

TASK 7: 700- AND 800-METER, DOUBLE E-TYPE SILHOUETTES

F-87. The gunner and assistant gunner continue to scan the sector as follows:

- 700-meter and 800-meter, double, E-type targets are exposed for 45 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains correct sight alignment and sight picture, and fires a 5- to 7-round burst at each target.
- If the gunner fails to hit the target, they fire another 7-round burst at each target using the adjusted, aiming point method of fire adjustment.

TASK 8: 400-METER SINGLE AND 500- AND 600-METER DOUBLE E-TYPE SILHOUETTES

F-88. The gunner and assistant gunner continue to scan the sector as follows:

- The 400-meter, single, E-type silhouettes, and the 500- and 600-meter, double, E-type silhouettes are exposed for 45 seconds.
- The gunner determines the range, places the proper setting on the rear sight, assumes the proper position, obtains correct sight alignment and sight picture, and fires a 5- to 7-round burst at each target.
- If the gunner fails to hit the target, they fire another 5- to 7-round burst at each target using the adjusted, aiming point method of fire adjustment.

TRANSITION CONDUCT OF FIRE WITH TRIPOD, QUALIFICATION

F-89. Gunners fire tasks 2 through 8 to qualify. The conduct of fire, ammunition, and targets are the same as for practice fire.

TRANSITION FIRE, LIMITED VISIBILITY

F-90. Night or limited visibility firing requires the Soldier to apply gunner marksmanship while using night sights. Limited visibility training instills confidence in the machine gunner. Each Soldier learns how to engage targets using a night sight. They learn to mount the sight, boresight the weapon at 10-meters, and zero the vision devices at 10-meters using a 25-meter (M16A2) zero target. Finally, they learn to detect and engage a series of undetermined targets at various ranges with the aided vision device. Night firing exercises can be conducted during daylight with the TWS. The exercises are for instructional, practice, and qualification purposes. One point is given for each target hit, whether hit on the first or second burst. The total possible points are 11. Conduct of fire is identical to that in Firing Table II, except for target ranges and exposure times. Stoppage criteria from Firing Table II is used also. Firing Table III (see table F-7) provides ammunition requirements.

Table F-7. Firing Table III, all weapons, transition fire, limited visibility

FIRING TABLE III—ALL WEAPONS *Transition Fire, Limited Visibility, Machine Gun Role*						
TASK	*TIME*	*ROUNDS*		*TARGET*	*RANGE (M)*	*TYPE FIRE*
		QTY	*TYPE*			
1	No Limit	6	4:1[b]	25-meter zero	10	6 single rounds
2[a]	No Limit	18	4:1[b]	25-meter zero	10	18 single rounds
3[a]	No Limit	28	4:1[b]	Double E	500	28 single rounds
4[a]	10 sec	14	4:1[b]	Single E	200	14 single rounds
5[a]	10 sec	14	4:1[b]	Single E	400	Fixed, 5- to 7-round burst
6[a]	10 sec	14	4:1[b]	Single E	100	Fixed, 5- to 7-round burst
7[a]	15 sec	14	4:1[b]	Single E	300	Fixed, 5- to 7-round burst
8[a]	25 sec	28	4:1[b]	Single E Single E	200 400	Fixed, 5- to 7-round burst Fixed, 5- to 7-round burst
9[a]	25 sec	28	4:1[b]	Single E Single E	100 300	Fixed, 5- to 7-round burst Fixed, 5- to 7-round burst
10[a]	30 sec	42	4:1[b]	Single E Single E Single E	100 200 400	Fixed, 5- to 7-round burst
Notes. The unit commander determines the position. [a]Qualification task. [b]Four ball rounds to one tracer round mix.						

SCORES

F-91. Rather than points, the gunner receives only a hit or a miss when they hit the target on the first or second hit. Gunners must hit 6 out of 11 targets to qualify. The gunner must have qualified on both the 10-meter and transition in order to advance to this step. The scorer can record the number of hits on DA Form 85, which is the scorecard for the M249 and M240 machine guns. The form is available for downloading at http://www.apd.army.mil.

CONDITIONS

F-92. Firing Table III (table F-7) is used for engaging targets out to 400 meters in ideal moonlight or daylight. Commanders may use field-expedient means to identify targets in the absence of ambient light.

TARGETS

F-93. Firers use single and double E-type silhouette targets.

POSITION

F-94. For the limited visibility transition firing table, the firers use the tripod, unless the commander directs that they use the bipod.

FIRERS

F-95. Both the gunner and the assistant gunner fire the limited visibility transition table.

QUALIFICATION STANDARDS

F-96. Qualification with the M249 or M240 machine gun requires the achievement of minimum standards for 10-meter and transition day firing tables.

FIRING TABLE I

F-97. Allow 1 point for each round that impacts within the scoring space up to a maximum of 7 points for each space. The firer must score between 63 and 91 points to qualify.

FIRING TABLE II

F-98. For each hit, place an X in the HIT column; for a miss, place an O in the MISS column. Allow 10 points for each target hit, whether the firer hits it with the first or second burst. The firer must score between 70 and 110 points to qualify.

FIRING TABLE III

F-99. For each hit, place an X in the HIT column; for each miss, place an O in the MISS column. The firer must score between 6 and 11 hits to qualify.

ALL TABLES

F-100. The firer must earn a total (combined) score (all firing tables added together) for each weapon as follows and as shown in table F-8.

Table F-8. Machine gunner ratings

QUALIFICATION	*POINTS*
EXPERT	186 TO 212
GUNNER 1st CLASS	157 TO 185
GUNNER 2d CLASS	139 TO 156
UNQUALIFIED	0 TO 126

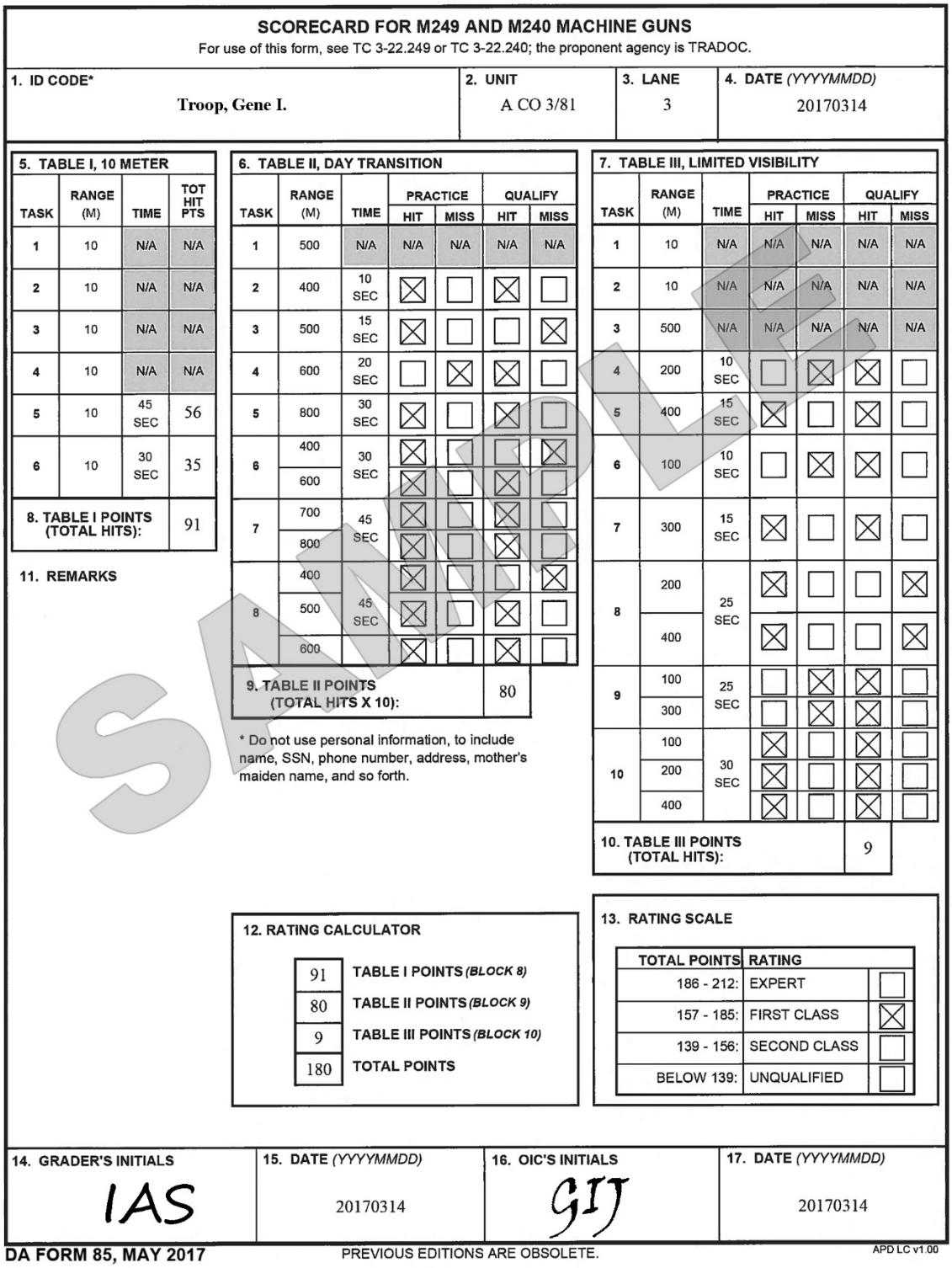
SCORECARD

F-101. The trainer uses DA Form 85, to record the gunner's performance on the qualification range. The form is available for downloading at http:// www.apd.army.mil. Table F-9 shows ammunition requirements by table. DA Pam 350-38 provides the Standard in Training Commission (known as STRAC) ammunition requirements. Figure F-5, page F-28, shows an example of a completed form. Complete this form as follows (blocks 1 through 4, 11, and 14 through 17 are self-explanatory):

- Block 5, Table I, 10 Meter. Task 5 has eight target spaces; Task 6 has five. The firer may impact up to seven rounds per target space, so they can earn 56 points (8 x 7) for task 5 and 35 points (5 x 7) for task 6, for a maximum of 91 points for table I.
- Block 6, Table II, Day Transition. Mark each qualifying hit with an X, whether the firer hits the target on the first or second burst.
- Block 7, Table III, Limited Visibility. Mark each qualifying hit with an X whether the firer hits the target on the first or second burst.
- Block 8, Table I Points. Enter the sum of the points earned in Tasks 5 and 6.
- Block 9, Table II Points. Enter total qualifying hits multiplied by 10.
- Block 10, Table III Points. Enter total qualifying hits (no multiplication factor).
- Block 12. Enter the total from each table, and then add them to obtain the total points.
- Block 13. Using the total points in Block 12, determine the firer's rating.

Table F-9. Ammunition requirements, all weapons, machine gun role

	ROUNDS (ALL WEAPONS)	
FIRING TABLE	***QTY***	***TYPE***
Table I, Practice	131	Ball
Table I, Record	91	X4:1
Table II, Practice	182	X4:1
Table II, Record	154	X4:1
Table III, Practice	52	X4:1
Table III, Record	154	X4:1



SCORECARD FOR M249 AND M240 MACHINE GUNS

For use of this form, see TC 3-22.249 or TC 3-22.240; the proponent agency is TRADOC.

1. ID CODE*	2. UNIT	3. LANE	4. DATE *(YYYYMMDD)*
Troop, Gene I.	A CO 3/81	3	20170314

5. TABLE I, 10 METER

TASK	RANGE (M)	TIME	TOT HIT PTS
1	10	N/A	N/A
2	10	N/A	N/A
3	10	N/A	N/A
4	10	N/A	N/A
5	10	45 SEC	56
6	10	30 SEC	35
8. TABLE I POINTS (TOTAL HITS):			91

6. TABLE II, DAY TRANSITION

TASK	RANGE (M)	TIME	PRACTICE HIT	PRACTICE MISS	QUALIFY HIT	QUALIFY MISS
1	500	N/A	N/A	N/A	N/A	N/A
2	400	10 SEC	X		X	
3	500	15 SEC	X			X
4	600	20 SEC		X	X	
5	800	30 SEC	X		X	
6	400	30 SEC	X			X
	600		X		X	
7	700	45 SEC	X		X	
	800		X		X	
8	400	45 SEC	X			X
	500		X		X	
	600		X		X	
9. TABLE II POINTS (TOTAL HITS X 10):						80

7. TABLE III, LIMITED VISIBILITY

TASK	RANGE (M)	TIME	PRACTICE HIT	PRACTICE MISS	QUALIFY HIT	QUALIFY MISS
1	10	N/A	N/A	N/A	N/A	N/A
2	10	N/A	N/A	N/A	N/A	N/A
3	500	N/A	N/A	N/A	N/A	N/A
4	200	10 SEC		X	X	
5	400	15 SEC	X		X	
6	100	10 SEC		X	X	
7	300	15 SEC	X		X	
8	200	25 SEC	X			X
	400		X			X
9	100	25 SEC		X	X	
	300			X	X	
10	100	30 SEC	X		X	
	200		X		X	
	400		X		X	
10. TABLE III POINTS (TOTAL HITS):						9

11. REMARKS

* Do not use personal information, to include name, SSN, phone number, address, mother's maiden name, and so forth.

12. RATING CALCULATOR

91	TABLE I POINTS *(BLOCK 8)*
80	TABLE II POINTS *(BLOCK 9)*
9	TABLE III POINTS *(BLOCK 10)*
180	TOTAL POINTS

13. RATING SCALE

TOTAL POINTS	RATING	
186 - 212:	EXPERT	
157 - 185:	FIRST CLASS	X
139 - 156:	SECOND CLASS	
BELOW 139:	UNQUALIFIED	

14. GRADER'S INITIALS	15. DATE *(YYYYMMDD)*	16. OIC'S INITIALS	17. DATE *(YYYYMMDD)*
IAS	20170314	GIJ	20170314

DA FORM 85, MAY 2017 PREVIOUS EDITIONS ARE OBSOLETE. APD LC v1.00

Figure F-5. Completed DA Form 85, example