

CHAPTER 10

Light Cavalry Gunnery Tables

The light cavalry gunnery tables are used to develop and test the proficiency of individual, crew, and section gunnery techniques at the basic, intermediate, and advanced levels. The series of engagements on each table replicate typical battlefield tasks under realistic conditions, against likely target arrays, but within the safety and resource constraints of live-fire gunnery ranges. This chapter discusses the light cavalry gunnery tables for the M2 HB caliber .50 machine gun, the MK 19 40-mm grenade machine gun, and the TOW; this chapter also discusses the qualification requirements for crews and sections, rating procedures, standards, and allowable variations for these tables. Section I is an introduction to the basics of the different tables; it discusses the purposes of the tables, the gunnery phases and variations, the timing procedures, and the standards required for qualification. Section II defines the basic and intermediate tables; Section III defines the advanced tables.

Basic tables include—

Table I	Ten-Meter Firing (M2 HB Caliber .50). Manipulation Exercise (MK 19). Individual Gunnery Practice (TOW).
Table II	Transition Firing (M2 HB Caliber .50). Tripod Exercise (MK 19). Individual Gunnery Qualification (TOW).
Table III	Night Firing (M2 HB Caliber .50). Adjustment of Fire (Stationary) (MK 19). Advanced Gunnery Practice (TOW).
Table IV	Basic Qualification (M2 HB Caliber .50). Basic Crew Qualification (MK 19). Advanced Gunnery Qualification (TOW).

Intermediate tables include—

Table V	Transition to Vehicle (M2 HB Caliber .50). Adjustment of Fire (Moving) (MK 19). Baseline Gunnery Practice (TOW).
Table VI	Not Used (M2 HB Caliber .50 and MK 19) Baseline Gunnery Qualification (TOW).
Table VII	Practice for Qualification (M2 HB Caliber .50 and MK 19). Squad Gunnery Practice (TOW).
Table VIII	Intermediate Crew Qualification (M2 HB Caliber .50 and MK 19). Squad Gunnery Qualification (TOW).

Advanced tables include—

Table IX	Section Training Course (M2 HB Caliber .50 and TOW).
Table X	Section Qualification Course (M2 HB Caliber .50 and TOW).

Note. Because of the maneuvering constraints required by safety standards when firing MK 19 practice ammunition, these section tables cannot be fired on all ranges using the MK 19 weapon system.

Section I. INTRODUCTION

The light cavalry gunnery tables standardize the gunnery program for light cavalry units. These tables are consistent with the gunnery tables for heavier scout weapon systems, thus maintaining a consistent training standard between the light and heavy weapon systems.

Purpose

The following are the specific purposes for each table:

- Table I—This table trains the gunner in the basic skills such as zeroing the weapon and manipulating the weapon system. The M2 HB table uses paster targets. The MK 19 table uses target practice (TP) ammunition, infantry remoted target system (IRETS), and BRDM targets.
- Table II—This table uses timed events (fired from a tripod) to train the gunner to apply all the fundamentals of gunnery, including zeroing, immediate action (if necessary), and burst control against stationary targets. Some tasks are fired under NBC conditions.
- Table III—This table uses timed events to train the gunner to engage stationary targets under NBC conditions. For the MK 19, this table is fired vehicle mounted.
- Table IV—This is the basic qualification table. The gunner acquires and engages stationary and moving targets from a stationary weapon system for record fire.
- Table V—This table trains the gunner to acquire and engage stationary and moving targets, both day and night. It also transitions the M2 HB caliber .50 gunner from tripod firing to vehicle firing.
- Table VI—All HMMWV engagements, except TOW engagements, are fired from a short halt; therefore for consistency, Table VI is used only for the TOW weapon system.
- Table VII—This table trains the gunner to acquire and engage stationary and moving targets, both day and night, and prepares the gunner for Table VIII qualification.
- Table VIII—This is the intermediate qualification table. This table requires the crew to use all the skills trained on the previous tables.
- Table IX—This table transitions the training from individual crews and gunners to sections. Crews are trained to acquire and engage targets with another crew (as a section). If live ammunition is available; it should be used; if live ammunition is not available, use MILES.
- Table X—This table is the qualification exercise for sections; it is the same as Table IX except that it must be fired using live ammunition.

Gunnery Levels

The gunnery tables are used to train crew members progressively in three phases: basic, intermediate, and advanced gunnery.

- Basic gunnery techniques and engagements are trained on Tables I through III and tested on Table IV.
- Intermediate engagements are trained on Tables V and VII and tested on Table VIII.
- Advanced gunnery engagements are trained on Table IX and tested on Table X.

Tables IV, VIII, and X are qualification tables. Tables IV and VIII should be fired successfully (qualified) before advancing to the next higher level of gunnery. (The commander may advance crews at his discretion.) All other tables are recommended for training in sequence.

Gunnery Phases and Variations

There are two phases and two variations of the tables that may be used in a well-rounded light cavalry gunnery program.

PHASES

Day firing (A tables) trains and tests the crew and section in rapid engagement and destruction of targets during daylight.

Night firing (B tables) trains and tests the crew and section in rapid engagement and destruction of targets at night and during other reduced visibility conditions.

Note. Day firing should precede night firing when possible.

VARIATIONS

Device-based (day/night) firing trains gunnery procedures and crew duties without expending live ammunition.

Dry firing is used to develop teamwork before live fire. It is also used to sustain skills when live fire is restricted. All tables except the qualification tables (Tables IV, VIII, and X) may be fired dry.

Notes. If the scenario calls for a moving target and none are available, full-scale stationary targets of the same type may be substituted; however, moving targets are preferred.

At the commander's discretion, Tables III and IV may be fired from vehicle-mounted weapons.

Crew Evaluation

When evaluating Tables II through VII for the M2 HB and MK 19, the evaluator rates crew duties as satisfactory (SAT) or unsatisfactory (UNSAT). The evaluator will circle SAT or UNSAT in the crew duties column on the score sheet. If a firing crew commits more than one crew error, the crew duties for that task are rated UNSAT. This rating will be discussed with the crew during the AAR; however, it will not affect the GO/NO-GO evaluation. Crew errors include the following:

- Firing before receiving the command to fire.
- Incorrect engagement techniques (for example, engaging a *least dangerous* target before a *most dangerous* target).
- Incorrect driving techniques (for example, driver does not maintain course speed).
- Failure to fire from a short halt (MK 19 only).
- Crew does not adhere to the conditions of the firing task (for example, failure to mask during an NBC engagement).

Note. For further information on crew duties and their impact on Table VIII ratings, see page 10-30 (M2 HB) or page 10-51 (MK 19).

For information on crew errors for the TOW tables, see page 10-59.

Credit is not given if the crew uses a weapon that is not capable of destroying the target. However, if the wrong weapon is fired, hits the target, and is capable of destroying the target, credit for killing the target will be awarded.

Ammunition saved may be used on later engagements but may not be carried forward to another table.

Evaluation Procedures

An AAR is conducted after each table (day and night) for each crew. After-action feedback includes a discussion of actions executed during the conduct of the table. An evaluator critiques the entire crew.

The crew evaluator must record exposure times for each task fired (even when computers are used).

TIME

For Tables I through IV, time starts when the evaluator announces "COMMENCE FIRING" and stops when all targets have been engaged or the evaluator announces "CEASE FIRE."

Performance (time) standards for each engagement on Tables V through X are based on an assessment of the simulated threat capability to hit the HMMWV. Exposure time is measured as the total time the firing vehicle is exposed to the threat. Time is determined as outlined; no variations are permitted.

Offensive Engagements

In an offensive engagement (firing vehicle is exposed in the open, on the move, or at a short halt), time starts when the target is fully exposed or the gunner fires the first round.

When the target array consists of more than one target, targets must be presented simultaneously; time begins when all targets for the task are exposed or the gunner fires the first round.

Timing (total engagement time) stops for the engagement when one of the following occurs:

- All targets are killed.
- Total target exposure time expires.

Defensive Engagements

Engagement time starts when the target (all targets) is fully exposed and the firing vehicle is stopped with the weapon system unmasked, or the gunner fires the first round.

Engagement time continues through each engagement, except when the firing vehicle is not exposed to the threat. Stop timing when the firing vehicle starts to move to the defilade position; re-start time when the firing vehicle moves to the firing position and unmask the weapon system.

Note. On ranges where prepared positions are not available, simulated positions should be established using stakes, engineer tape, flashlights, or chemical lights to depict the limits of the defilade and unmasked firing positions. An additional marker must be placed to signify the point on the ground where the firing vehicle becomes exposed.

If the firing vehicle starts the engagement from an unmasked position, time starts when the target(s) is fully exposed. If the firing vehicle fails to move during the engagement, the evaluator may inform the firing crew that the target(s) is up.

Target exposure time continues through each engagement, even if the firing vehicle does not move into the firing position and unmask to engage the target(s). Total exposure time stops for the engagement when one of the following occurs:

- All targets are killed.
- Total allotted target exposure time expires.

Target exposure time for a defensive engagement is figured using the following rule: Add 10 seconds for a day defensive task and 20 seconds for a night defensive task. For example, if target kill time for a particular target is 23 seconds, add 10 seconds for day; target exposure time is 33 seconds. This lets the defending vehicle strike when it is ready, after taking the additional time for day and night exposure for target acquisition.

Note. During NBC engagements, the crew will be told to prepare for NBC conditions before the engagement starts.

ALIBIS

Battalion/squadron commanders are the deciding authority on alibis. All alibi engagements will be refired. Alibis will be given for the following conditions only:

- Range failures.
- Equipment failures that are not the result of crew error.
- Unsafe conditions not related to the firing vehicle or crew.

Section II. BASIC AND INTERMEDIATE GUNNERY TABLES

The basic and intermediate light cavalry gunnery tables are used to train and evaluate a single firing crew. These tables take a single vehicle crew from the basic gunnery engagements on Table I through single vehicle crew qualification on Table VIII. Basic gunnery trains crews to engage targets during good and poor visibility conditions and in NBC environments.

Firing Tables I through IV is not mandatory, but is encouraged. These tables are conducted as the commander deems necessary for sustaining skills or training crews before firing the intermediate tables.

The intermediate gunnery tables are natural extensions of the basic gunnery tables; these tables train vehicle teams to engage stationary and moving, single and multiple targets with all HMMWV weapon systems during daylight and limited visibility, from stationary and moving vehicles. Vehicle teams must qualify on Table VIII A and B before moving to the advanced tables.

Note. The intermediate (marksmanship and engagement) gunnery tables are used to train crews to acquire and engage targets properly through various target or firing vehicle conditions. They are not fired in tactical scenarios and, therefore, are not fired using wingman techniques.

M2 HB Caliber .50 Basic Tables

CLASSIFICATION STANDARDS

One point is given for each round impacting in each space for Table I. For tables II, III and IV, one point is allowed for each target hit with an additional 2-point bonus when the target is hit with the first burst. The maximum score possible for Table I is 119 points; a minimum of 29 points is required. The maximum score for Tables II, III, and IV is 33 points each; a minimum score of 23 points each must be obtained.

DA Form 7007-R (*Machine Gun Scorecard for M2*) is used to record the gunner's performance on Tables I through IV. Maximum total score possible for Tables I through IV is 218 points. Gunners are classified according to their overall points earned:

- Expert 193 to 218.
- First Class 171 to 192.
- Second Class 151 to 170.
- Unskilled 150 and below.

An example of a completed scorecard is shown in Figure 10-1.

Figure 10-1. DA Form 7007-R (Machine Gun Scorecard for M2).

MACHINE GUN SCORECARD FOR M2													See back of this form for instructions.					
For use of this form, see FM 23-85; the proponent agency is TRADOC.																		
NAME: <i>SFC BILLY GREER</i>			SSAN: <i>123-45-6789</i>				UNIT: <i>C 3/4 INF</i>				DATE: <i>6 NOV 90</i> LANE: <i>3</i>							
TABLE I			TABLE II				TABLE III				TABLE IV							
TSK	Range (Meters)	HIT	PTS	RANGE (Meters)	TIME	HIT	PTS	BON	RANGE (Meters)	TIME	HIT	PTS	BON	RANGE (Meters)	TIME	HIT	PTS	BON
1	10	No Score		550	None	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	550	None	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	50	None	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
2	10	No Score		800	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>	800	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>	800	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>
3	10	No Score		400	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>	400	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>	400	20 Sec	<i>X</i>	<i>1</i>	<i>2</i>
4	10	No Score		700	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>	700	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>	700	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>
5	10	<i>X</i>	<i>20</i>	1,000	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>	1,000	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>	1,000	25 Sec	<i>X</i>	<i>1</i>	<i>2</i>
6	10	<i>X</i>	<i>30</i>	400	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>	400	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>	400	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>
		<i>X</i>		700		<i>X</i>	<i>1</i>	<i>2</i>	700		<i>X</i>	<i>1</i>	<i>2</i>	700		<i>X</i>	<i>1</i>	<i>2</i>
7	10	<i>X</i>	<i>45</i>	550	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>	550	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>	550	35 Sec	<i>X</i>	<i>1</i>	<i>2</i>
		<i>X</i>		800		<i>X</i>	<i>1</i>	<i>2</i>	800		<i>X</i>	<i>1</i>	<i>2</i>	800		<i>X</i>	<i>1</i>	<i>2</i>
8				400	45 Sec	<i>X</i>	<i>1</i>	<i>0</i>	400	45 Sec	<i>X</i>	<i>1</i>	<i>2</i>	400	45 Sec	<i>X</i>	<i>1</i>	<i>0</i>
				550		<i>X</i>	<i>1</i>	<i>2</i>	550		<i>X</i>	<i>1</i>	<i>2</i>	550		<i>X</i>	<i>1</i>	<i>2</i>
				1,000		<i>X</i>	<i>1</i>	<i>2</i>	1,000		<i>X</i>	<i>1</i>	<i>2</i>	1,000		<i>X</i>	<i>1</i>	<i>2</i>
TOTAL			<i>95</i>				<i>29</i>					<i>29</i>					<i>31</i>	

TABLES	I	II	III	IV	TOTAL SCORE
	<i>95</i>	<i>29</i>	<i>29</i>	<i>31</i>	<i>184</i>

OIC Signature: <i>CPT Melton A. Young</i>	Grader: <i>SFC Gary Roome</i>	Rating: <i>GUNNER FIRST CLASS</i>
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AUTHORITY 15USC301299g Executive Order 9397 PRINCIPAL PURPOSE(S): Records individual's performance on record fire range. ROUTINE USE(S): Evaluation of individual's proficiency and basis for determination of award of proficiency badge. SSAN is used for positive identification purposes only. MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION: Voluntary, individual not providing information cannot be rated/scored on a pass basis.

DA Form 7007-R, Jun 91 Replaces DA Form 3867-R, Jun 72, which is obsolete.

TABLE I—TEN-METER FIRING

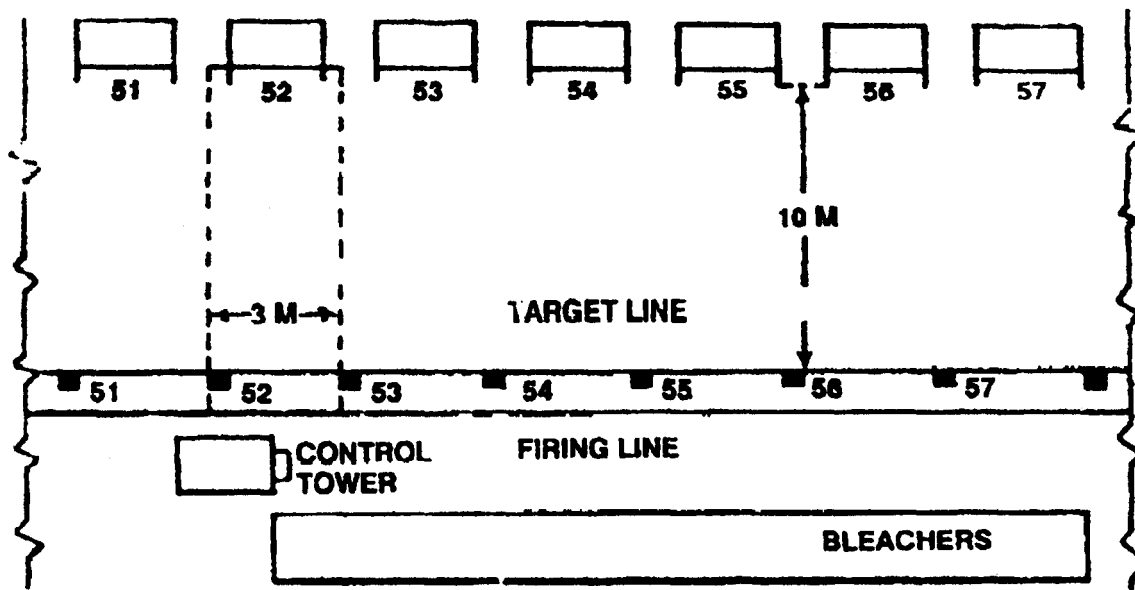
Ten-meter firing exercises allow the gunner to develop skills in the delivery of initial bursts on target, and train the gunner in the basic skills of zeroing, controlling bursts, traversing, and traversing and searching techniques. This table uses paper targets.

Range Layout

The standard 10-meter range can accommodate a unit of 200 to 250 soldiers at a time (concurrent training may be required). This range (see Figure 10-2) may be used to zero the M2 machine guns, and to fire the 10-meter portion of the tables. It is also used to familiarize soldiers with the characteristics, noise, and recoil of the weapon. This range may also be used to practice target observation, adjustment of fire, and traversing and searching; it is also used to develop speed and an accurate burst technique.

The 10-meter range should meet the following requirements:

- The firing line should be long enough to place 20 machine guns with 3 meters between positions; each position should be numbered.
- The target line should be 10 meters in front of the firing line. Paper targets should be pasted onto target cloth stretched over wooden frames. One target should be setup for each position and numbered to correspond with the position.
- The bleachers (to the rear of the firing line) should be set up for instruction of crews.
- The control tower should be located to the immediate rear and center of the firing line.

Figure 10-2. Ten-Meter Range Layout.

Each range should be staffed with the following personnel:

- Officer in charge (OIC).
- Range safety officer (RSO).
- Primary instructor (PI).
- Assistant instructor (AI) for every 10 students.
- Medic.
- Ammunition NCO.
- Tower operator.

Although more equipment may be required by local range regulations, safety regulations, or unit SOPs, the minimum equipment required to operate the range is as follows:

- Public address system.
- Machine gun for each firing lane and a backup for every five lanes.
- Cleaning rod for every AI.
- Scorecard per firer.
- Non-asbestos glove for every two weapons (NSN 8415-01-092-0039).
- Tripod for each lane.
- Pindle for each lane
- Traverse and elevation mechanism for each lane.
- Medical evacuation capability.
- Communication equipment (wire or radio as required by local range regulations or SOP).

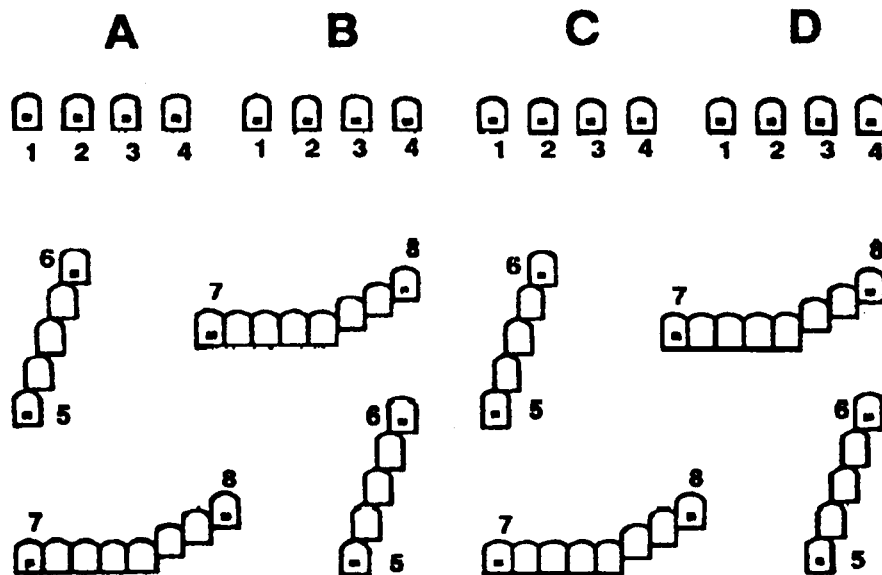
Target Analysis

Table I exercises use the basic machine gun target (FSN 6920-078-5 128) (Figure 10-3). This target consists of 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 5-6 and 7-8. Each space is 4 centimeters wide and 5 centimeters high. The black aiming pasters within the numbered scoring spaces are 1-centimeter square.

Firing at targets 1 through 4 allows the gunner to use the traverse fire technique; target groups 5-6 and 7-8 allow practice in traverse and search techniques.

Target group 5-6 exposes the gunner to traverse and elevation manipulation when using the tripod mount and body position changes to engage targets in depth (elbow position changes). This causes the gunner to use a series of aiming points to disburse fire across the target when using the tripod. Target group 7-8 exposes the gunner to position changes to engage linear targets with depth. It causes him to control the burst length from the weapon, use a series of aiming points, and disburse fire across the target.

Figure 10-3. Basic Machine Gun Target.

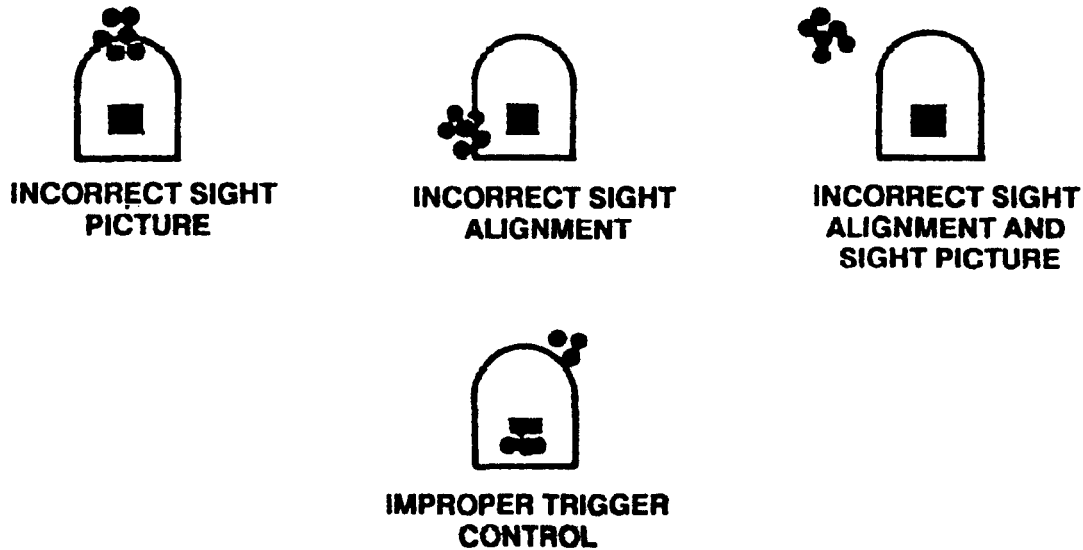


Scoring Procedures

Tasks 1 through 4 are not scored.

Tasks 5 through 7 are scored. When scoring the 10-meter target, one point is given for each round impacting within a scoring space. Rounds touching the boundary of a scoring space are considered hits and counted in one scoring space. (When firing with 28 rounds, the maximum score is 28 points.) The total possible score for Table I is 119 points.

Targets are analyzed and scored to determine the gunner's proficiency and to see if more training is needed in any of the fundamentals of machine gunnery. When firing with a properly zeroed weapon, a target is best analyzed by considering the common errors of gunnery (see Figure 10-4).

Figure 10-4. Common Errors on Machine Gun Target.

Notes. Adjustment does not apply to weapons with fixed rear sights.

Large shot groups are usually caused by incorrect position and grip; small shot groups outside the scoring space are usually caused by incorrect sight alignment, sight picture, or zero.

A minimum of 29 points is required to pass the 10-meter course. Soldiers failing to achieve minimum standards should be retrained and retested in a dry-fire mode until proficiency is demonstrated.

Scores are recorded on DA Form 7007-R.

Before progressing to Table II (*Transition Firing*), soldiers who fail Table I should re-fire the table with close supervision and coaching to ensure they understand the fundamentals of live fire.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point and issued to each assistant gunner as he is assigned a firing point. The total ammunition for this exercise is 236 rounds (117 for practice [Tasks 1 through 4] and 119 for gunner classification [Tasks 5 through 7]):

- Task 1—12 single rounds.
- Task 2—7-round belts (2).
- Task 3—35-round belt.
- Task 4—56-round belt.
- Task 5—28-round belt.
- Task 6— 56-round belt.
- Task 7—35-round belt.

Conduct of Fire

For 10-meter exercises fired on a multipurpose transition range, groups will be broken down to fit firing lanes. The course is designed to fire tripod-mounted machine guns. The basic machine gun target is used for all 10-meter firing and allows four gunners to use it for practice or two gunners for practice and two for gunner classification.

The unit is organized into groups of 10. Each group is assigned a firing order number. One order becomes gunners and the other assistant gunners. The gunners and assistant gunners are then assigned lanes and are required to setup their guns and perform pre-fire checks (in accordance with FM 23-65).

Task 1—Zero M2 HB machine gun.

The gunner will fire 3 rounds, single shot, at Paster A1, then move downrange to observe the shot group and triangulate it. No adjustments will be made at this time.

The gunner will then fire another 3 single rounds at Paster A1 and go downrange to observe that shot group, triangulate it, and make necessary adjustments to his weapon.

The gunner repeats these steps shooting at Paster A2.

Note. The gunner should zero his weapon using 9 rounds, he will use the remaining 3 rounds to confirm his zero. If he is unable to confirm his zero with 12 rounds, remove him from the firing line and administer remedial training.

Task 2 - Engage a target (controlled burst).

The gunner will from the first burst of 5 to 7 rounds at Paster 3, then go downrange to observe, mark the projectile holes, and analyze his burst.

The gunner then fires at Paster 4 of the same section and repeats the procedure.

Tasks 3 and 4 - Engage a target (traverse and search).

Using the traverse and search technique, the gunner will engage Pastors A5-6 firing 5- to 7-round bursts for each paster; then, he will move downrange to observe and analyze his targets.

Note. These tasks are fired from a tripod firing position. If the gunner has difficulty manipulating the weapon, remove him from the firing line and give him remedial training.

Using the traverse and search technique, the gunner will engage Pastors A7-8 firing 5- to 7-round bursts at each paster; then, he will move downrange to observe and analyze his targets.

Task 5—Engage a target (traverse).

Using the traverse technique, the gunner will engage Pastors B 1 through 4 firing a 5- to 7-round burst at each paster; then, he will move downrange to observe and analyze his targets.

Tasks 6 and 7—Engage a target (traverse and search).

Using the traverse and search technique, the gunner will engage Pastors B7-8, firing a 5-to 7-round burst at each paster; then, he will move downrange to observe and analyze his targets.

Using the traverse and search technique, the gunner will engage Pastors B5-6 firing a 5- to 7-round burst at each paster; then, he will move downrange to observe and analyze his targets.

Table I. Ten-Meter Firing.

Task	Conditions/ Target/Situation	Ammo	Standard	GO/NO-GO
1. Zero M2 HB machine gun.	Pasters 1 and 2, 10 meters.	12 single rounds (Ball)	Gunner must engage each target with 6 single rounds. Paster 1 must be engaged first; four of the six rounds fired at Paster 2 must impact on target.	NA
2. Engage a target (controlled-burst).	Pasters 3 and 4, 10 meters.	2 7-round belts (Ball)	Gunner must engage each target using controlled bursts (5- to 7-round bursts), Paster 3 first, then Paster 4; one round must impact on each target.	NA
3. Engage a target (traverse and search).	Pasters 5-6, 10 meters.	35-round belt (Ball)	Gunner must engage targets using traverse and search technique (5- to 7-round bursts); one round must impact on each target.	NA
4. Engage a target (traverse and search).	Pasters 7-8, 10 meters.	56-round belt (Ball)	Gunner must engage targets using traverse and search technique (5- to 7-round bursts); one round must impact on each target.	NA
5. Engage a target (traverse).	Pasters 1 through 4, 10 meters.	28-round belt (Ball)	Gunner must engage targets using traverse technique (5- to 7-round bursts); four rounds must impact on each target.	GO NO-GO
6. Engage a target (traverse and search).	Pasters 7-8, 10 meters.	56-round belt (Ball)	Gunner must engage targets using traverse and search technique (5- to 7-round bursts); one round must impact on each target.	GO NO-GO
7. Engage a target (traverse and search).	Pasters 5-6, 10 meters.	35-round belt (Ball)	Gunner must engage targets using traverse and search technique (5- to 7-round bursts); one round must impact on each target.	GO NO-GO

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Gunnery Points _____ Tasks Scored GO _____

Evaluator's Signature _____

TABLE II—TRANSITION FIRING

Table II (*Transition Firing*) teaches the gunner to incorporate the different techniques of fire learned in preparatory gunnery training and 10-meter firing. On some of these exercises, the gunner's capabilities will be degraded (NBC environment). The gunner will first field zero his weapon.

Note. Instructors should encourage gunners to perform immediate action if a stoppage occurs during fire, unless local policies require gunners to notify range personnel first.

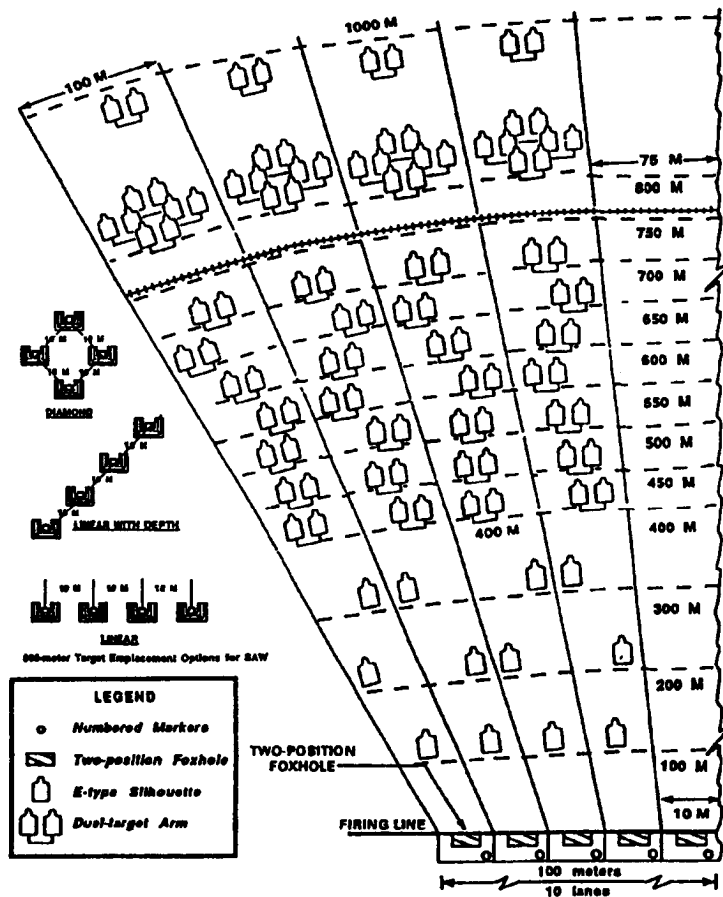
The objective of Table II is to ensure that the gunner—

- Understands the characteristics of fire.
- Field zeros the machine gun.
- Uses range estimation to determine the distance to targets.
- Engages targets at long ranges with the tripod-mounted machine gun.
- Applies the method of adjusted point of aim.

Range Layout

Tables II through IV are fired on a multipurpose machine gun transition range, as depicted in Figure 10-5.

Figure 10-5. Multipurpose Machine Gun Transition Range.



Scoring Procedures

Task 1 is not scored.

Tasks 2 through 8 are scored. One point is given for each target hit and an additional 2-point bonus is given if the target is hit with the first burst. The total possible for this table is 33 points.

Scores are recorded on DA Form 7007-R.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 182 rounds:

- 28-round belt.
- 154-round belt.

Conduct of Fire

The unit is organized for transition firing the same as for 10-meter firing. Field zeroing is the first firing task of transition day-fire course. All vehicle targets will be frontal BRDMs.

Table II will be conducted with a single gunner using a tripod-mounted machine gun.

Task 1— Zero M2 HB machine gun.

The gunner must first center the rear sight in the same manner as the sight setting for the 10-meter firing. He selects the appropriate range mark with his elevation knob.

The gunner will load one 28-round belt of ammunition and fire a 5- to 7-round burst at the 550-meter, double E silhouette.

Note. If the impact of the rounds (beaten zone) is over the target, the gunner has probably fired with an incorrect sight picture (too high on the target). He needs to re-lay the gun on the original aiming point and fire again. If the gunner cannot zero with a proper sight picture, he should have the unit armorer inspect the weapon before continuing the zero procedure.

The gunner will observe the beaten zone and make adjustments to the sights so the rounds will impact on the target.

After adjustments are made, the gunner will re-lay on the center base of the target and fire another 5-to 7-round burst.

The gunner will repeat the steps with the remaining rounds.

Note. If the gunner is unable to zero with 28 rounds, he is removed from the firing line and given remedial training.

Tasks 2 through 8 - Engage single and multiple targets at various ranges.

The gunner will load a 154-round belt of ammunition and fire 5- to 7-round bursts at single and multiple targets (double E silhouettes and vehicle targets) at various ranges.

The gunner will observe the beaten zone and make adjustments, as necessary, to hit the targets.

After the gunner completes firing, he will clear the weapon and the AI will critique the gunner's performance.

Table II. Transition Firing.

Task	Conditions/ Target/Situation	Ammo	Standard	Crew Duties	GO/NO-GO
1. Zero M2 HB machine gun.	Double E silhouette, 550 meters. Stationary tripod firing position.	28-round belt	Gunner must engage target with 5- to 7-round bursts; one round must impact on the target.	NA	NA
2. Engage a single, double E silhouette.	Double E silhouette, 800 meters. Stationary tripod firing position.	14 rounds	Gunner must engage target with 5- to 7-round bursts; one round must impact on the target within 20 seconds.	SAT UNSAT	GO NO-GO
3. Engage a single, double E silhouette.	Double E silhouette, 400 meters. Stationary tripod firing position. NBC environment.	14 rounds	Gunner must engage target with 5- to 7-round bursts; one round must impact on the target within 25 seconds.	SAT UNSAT	GO NO-GO
4. Engage a single, double E silhouette.	Double E silhouette, 700 meters. Stationary tripod firing position. NBC environment.	14 rounds	Gunner must engage target with 5- to 7-round bursts; one round must impact on the target within 30 seconds.	SAT UNSAT	GO NO-GO
5. Engage a single, vehicle target.	Vehicle target, 1,000 meters. Stationary tripod firing position.	14 rounds	Gunner must engage target with 5- to 7-round bursts; one round must impact on the target within 25 seconds.	SAT UNSAT	GO NO-GO
6. Engage multiple targets (double E silhouettes).	2 double E silhouettes, 400 to 700 meters. Stationary tripod firing position.	28 rounds	Gunner must engage targets with 5- to 7-round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
7. Engage multiple targets (double E silhouettes).	2 double E silhouettes, 550 to 800 meters. Stationary tripod firing position. NBC environment.	28 rounds	Gunner must engage targets with 5- to 7-round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
8. Engage multiple targets, (double E silhouette and vehicle targets).	Double E silhouette, 400 meters; 2 frontal BRDMs, 550 to 1,000 meters. Stationary tripod firing position.	42 rounds	Gunner must engage targets with 5- to 7-round bursts; one round must impact on each target within 45 seconds.	SAT UNSAT	GO NO-GO

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Gunnery Points _____ Tasks Scored GO _____

Evaluator's Signature _____

TABLE III—NIGHT FIRING

On the modern battlefield, each soldier must be prepared to accomplish the mission during limited visibility and in degraded mode; therefore, limited visibility and degraded mode gunnery is an important part of our training and preparation for war.

This training is designed to ensure gunners know how to-

- Zero the AN/TVS-5.
- Detect targets using night vision devices.
- Engage targets at different ranges using the AN/TVS-5.

Range Layout

Table III is fired on a multipurpose machine gun transition range (see Figure 10-5 on page 10-13).

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 8 are scored. One point is given for each target hit and an additional 2-point bonus is given if the target is hit on the first burst. The total possible for day fire is 33 points.

Scores are recorded on DA Form 7007-R.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 180 rounds:

- Single rounds (12).
- 7-round belts (2).
- 154-round belt (1).

Conduct of Fire

Organization of a unit for night fire is the same as for day fire. Table III will be conducted with a single gunner using a tripod-mounted machine gun. All vehicle targets will be frontal BRDMs.

Task 1 — Zero AN/TVS-5 to M2 HB.

The gunner must first mount the night vision device and place it into operation. Once the device is mounted, the gunner will fire a 5- to 7-round burst to seat the device, then fire another 5- to 7-round burst to make sure the device is seated.

The gunner must then center the reticle pattern in the field of view. He then places the reticle aiming point on the 50-meter target aiming point and fires three single rounds.

Notes. Each click of the azimuth or elevation adjustment actuator moves the strike of the round 1/2 inch at 50 meters. One click of adjustment moves the reticle one square off the target at 50 meters.

If the impact of the rounds (beaten zone) is over the target, the gunner has probably fired with an incorrect sight picture (too high on the target). He needs to re-lay the gun on the original aiming point, then fire again. If the gunner fails to zero with a proper device sight picture, he should have the unit armorer inspect the device before continuing the zero procedure.

The gunner will observe the beaten zone and make adjustments to the sights so the round will impact on the target.

After adjustments are made, the gunner will fire another round at the target until zero is obtained

Note. If the gunner is unable to zero with 12 rounds, he is removed from the firing line and given remedial training.

Tasks 2 through 8- Engage single and multiple targets at various ranges.

The gunner will load one 154-round belt of ammunition and fire 5- to 7-round bursts at single and multiple targets (double E silhouettes and vehicle targets) at various ranges.

The gunner will observe the beaten zone and make adjustments as necessary to hit the targets.

After the gunner completes firing, he will clear the weapon and the AI will critique the gunner's performance.

Table III. Night Firing.

Task	Conditions/ Target/Situation	Ammo	Standard	Crew Duties	GO/NO-GO
1. Zero AN/TVS-5 to M2 HB.	M16A1/A2 zero target, 50 meters. Stationary tripod firing position.	12 single rounds 2 7-round belts	Gunner must use 2 bursts to seat device, then engage target using single shots; 4 of 6 rounds must impact within a 4-cm circle, in accordance with FM 23-9.	NA	NA
2. Engage single, double E silhouette.	Double E silhouette, 800 meters. Stationary tripod firing position. Using night sight.	14 rounds	Gunner must engage using 5- to 7-round bursts; one round must impact on target within 20 seconds.	SAT UNSAT	GO NO-GO
3. Engage single, double E silhouette.	Double E silhouette, 400 meters. Stationary tripod firing position. Using night sight.	14 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on the target within 20 seconds.	SAT UNSAT	GO NO-GO
4. Engage single, double E silhouette.	Double E silhouette, 700 meters. Stationary tripod firing position. Using night sight.	14 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on target within 25 seconds.	SAT UNSAT	GO NO-GO
5. Engage single vehicle target.	1 frontal BRDM, 1,000 meters. Stationary tripod firing position. Using night sight.	14 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on target within 25 seconds.	SAT UNSAT	GO NO-GO
6. Engage multiple targets (double E silhouettes).	2 double E silhouettes, 400 to 700 meters. Stationary tripod firing position. Using night sight. NBC environment.	28 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
7. Engage multiple targets (double E silhouettes).	2 double E silhouettes, 550 to 800 meters. Stationary tripod firing position. Using night sight.	28 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
8. Engage multiple targets (double E silhouette and vehicle targets).	Double E silhouette, 400 meters. 2 frontal BRDMs, 550 to 1,000 meters. Stationary tripod firing position. Using night sight.	42 rounds	Gunner must engage using 5- to-7-round bursts; one round must impact on each target within 45 seconds.	SAT UNSAT	GO NO-GO

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Gunnery Points _____ Tasks Scored GO _____

Evaluator's Signature _____

TABLE IV—BASIC QUALIFICATION

Table IV (*Basic Qualification*) tests the gunner on the techniques of fire he may use in combat. The gunner must field zero his weapon and incorporate the appropriate techniques for the conditions of each task. The conditions of the tasks may include—

- Limited visibility.
- NBC environment.
- Degraded mode.

Note. Table IV is set up for gunners to engage targets out to 1,000 meters. However, if visibility is limited by other conditions, the commander may alter the ranges for better visibility.

On this table, the gunner will be required to apply all the fundamentals of gunnery learned in preparatory gunnery training and lo-meter firing.

Note. Instructors should encourage gunners to perform immediate action if a stoppage occurs during fire, unless local policies require gunners to notify range personnel first.

The objective of basic qualification is to test the gunners' ability to use different techniques of fire learned and practiced in the preliminary gunnery tables.

Range Layout

Table IV is fired on a multipurpose machine gun transition range (see Figure 10-5 on page 10-13).

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 8 are scored. One point is given for each target hit and an additional 2-point bonus is given if the target is hit on the first burst. The maximum score possible is 33 points (11 targets at 3 points each). A minimum score of 23 points is required for basic qualification.

Scores are recorded on DA Form 7007-R.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 182 rounds:

- 28-round belt.
- 154-round belt.

Note. The ranges for Table IV may be modified to accommodate local range facilities. Commanders are authorized to fire Table IV from FM 23-65 for basic qualification, if ranges cannot be modified.

Conduct of Fire

Organization for transition firing is the same as for night firing. Field zeroing is the first task of the day-fire phase. All vehicle targets will be frontal BRDMs.

Table IV will be conducted with a single gunner using a tripod-mounted machine gun.

Task 1 — Zero M2 HB machine gun. (See page 10-14 for day zero procedures and page 10-16 for night zero procedures.)

Tasks 2 through 8 — Engage single and multiple targets at various ranges. (See page 10-14.)

Table IV. Basic Qualification.

Task	Conditions/ Target/Situation	Ammo	Standard	Crew Duties	GO/NO-GO
1. Zero M2 HB machine gun.	Double E silhouette, 550 meters. Stationary tripod firing position.	28-round belt	Gunner must engage using 5- to 7-round bursts; one round must impact on the target.	NA	NA
2. Engage a single, double E silhouette.	Double E silhouette, 800 meters. Stationary tripod firing position.	14 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on the target within 20 seconds.	SAT UNSAT	GO NO-GO
3. Engage a single, double E silhouette.	Double E silhouette, 400 meters. Stationary tripod firing position.	14 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on the target within 20 seconds.	SAT UNSAT	GO NO-GO
4. Engage a single, double E silhouette.	Double E silhouette, 700 meters. Stationary tripod firing position. NBC environment.	14 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on the target within 25 seconds.	SAT UNSAT	GO NO-GO
5. Engage a single vehicle target.	1 frontal BRDM, 1,000 meters. Stationary tripod firing position. NBC environment.	14 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on the target within 25 seconds.	SAT UNSAT	GO NO-GO
6. Engage multiple vehicle targets.	2 frontal BRDMs, 400 to 700 meters. Stationary tripod firing position.	28 rounds	Gunner must engage using 5- to 7-round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
7. Engage multiple double E silhouettes.	2 double E silhouettes, 550 to 800 meters. Stationary tripod firing position.	28 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on each target within 35 seconds.	SAT UNSAT	GO NO-GO
8. Engage multiple targets (double E silhouette and vehicles).	Double E silhouette 400 meters. 2 frontal BRDMs, 550 to 1,000 meters. Stationary tripod firing position.	42 rounds	Gunner must engage using 5- to 7- round bursts; one round must impact on each target within 45 seconds.	SAT UNSAT	GO NO-GO

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Gunnery Points _____ Tasks Scored GO _____

Qualified/Unqualified _____

Points for Gunner Classification: Table I _____ Table II _____ Table III _____ Table IV _____

Evaluator's Signature _____ Gunner's Classification _____

M2 HB Caliber .50 Intermediate Tables

On area target engagements (infantry squad, motorcycle, and IWG team), full credit is given when five rounds impact in the target area within the time indicated in the task. On point target engagements (lightly armored vehicle targets, such as BRDM and BTR-70), full credit is given when two rounds impact on the target within the time indicated. The target array may be placed on line or in a wedge formation. Targets should not be more than 5 meters apart and will not extend beyond 30 meters in width or 20 meters in depth.

Note. Target area is the ground within a 5-meter radius of a target.

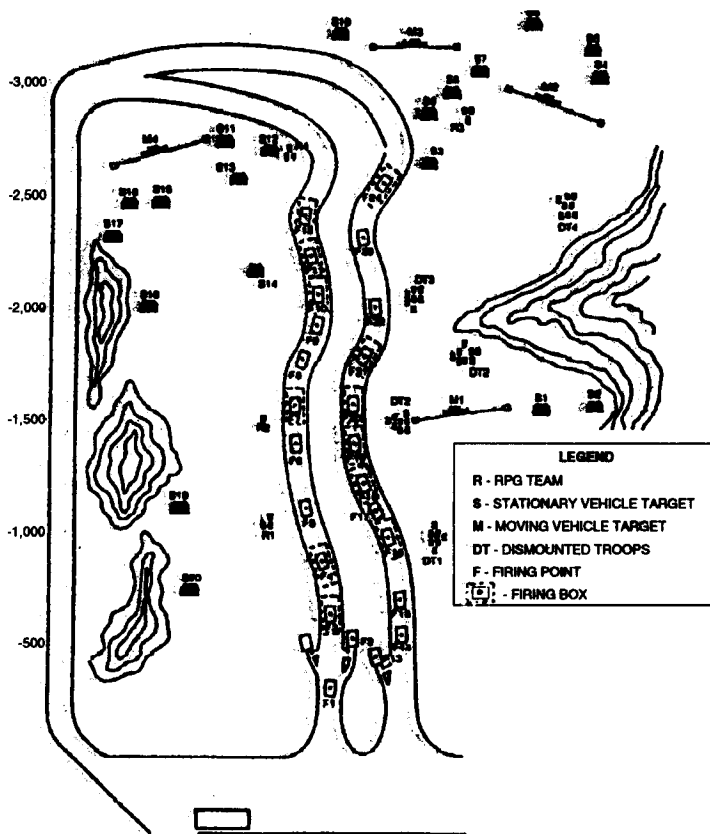
TABLE V—TRANSITION TO VEHICLE

This table transitions the M2 HB gunner from tripod firing to vehicle firing. It also trains the gunner to zero the M2 HB and acquire and engage moving targets from a stationary weapon system in an NBC environment, both day and night.

Range Layout

Tables V through VIII are fired on a multipurpose range complex (MPRC), as depicted in Figure 10-6.

Figure 10-6. Multipurpose Range Complex.



VEHICLE FIRING POINT	TABLE VII (AP) EVENT	TARGET	DISTANCE (METERS)
F1	A-1	M4	1,000-2,500
F2	A-3	M1 DT1	300-500 1,400-1,500
F3	B-9	S20	500-800
F4	A-2	S18	1,400-1,600
F5	A-5	S14 R2	300-500 800-1,000
F6	B-7	M2	1,800-2,500
F7	B-10	DT-5	1,200-1,400
F8	B-11	S8 DT3	300-500 1,200-1,400
F9	B-8	S11 M4	800-1,000 1,000-1,200
F10	A-5	M4 S12	800-1,000 600-800
F11	A-4	S3 S5	600-800 1,200-1,400
F12	B-12	SQ M3	600-800 1,000-1,200

VEHICLE FIRING POINT	TABLE VII EVENT	TARGET	DISTANCE (METERS)
F13	A-1	M1 S2	500-1,500 900-1,300
F14	B-1	S3	1,200-1,400
F15	A-2	S15 R1	900-1,100 400-600
F16	A-3	DT1 DT2	400-600 700-900
F17	B-5A	M2	1,700-1,900
F18	A-4	S17 S18	1,400-1,600 1,400-1,600
F19	B-4	S16 M4	1,300-1,600 1,300-1,600
F20	B-5	M2 M3	1,400-1,600 1,400-1,600
F21	A-5A	S11 M3	1,400-1,600 1,400-1,600
F22	B-5	S7	1,200-1,400
F23	B-2	S6 S8	1,200-1,400 1,200-1,400
F24	B-3	S13 R4	400-600 400-600

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task. The crew must score GO on a total of six of eight graded tasks on Tables VA and VB combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 241 rounds mix and 10 rounds illumination:

- Table VA: 126 rounds mix.
- Table VB:
 - 115 rounds mix.
 - 10 rounds illumination.

Conduct of Fire

Table VA will be fired during daylight; Table VB will be fired at night. Using four and one mix ammunition, the gunner acquires and engages moving targets from a stationary weapon system. Targets will be placed at ranges between 400 meters and 1,000 meters. An additional BRDM target is centered at 600 meters for weapon zero.

Task 1 — Zero M2 HB machine gun.

The gunner must first center the rear sight in the same manner as the sight setting for the 10-meter firing. He selects the appropriate range mark with his elevation knob.

The gunner will load one 15-round belt of ammunition and fire a 5- to 7-round burst at the BRDM target at 600 meters. (See page 10-14 for day zero procedures and page 10-16 for night zero procedures.)

Note. If the gunner is unable to zero, he is removed from the firing line and given remedial training.

Tasks 2 through 5 — Engage single, moving targets. (See page 10-14.)

Allowable Variations

The commander may use MILES and change the sequence of tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Note. For more information on the use of MILES with the M2 HB, see FM 23-65.

Table V A. Transition to Vehicle (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero M2 HB Caliber .50 Machine Gun.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 15	NA	NA	NA	NA
2. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 800 Meters.	Mix 25	2	28	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Stationary).	1 Moving Flank Truck, 400 Meters.	Mix 25	2	26	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 600 Meters. NBC Environment.	Mix 25	2	32	SAT UNSAT	GO NO-GO
5. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 1,000 Meters.	Mix 25	2	28	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 3 Moving Flank BRDM-2s
- 1 Moving Flank Truck

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

Table V B. Transition to Vehicle (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero AN/TVS-5 to M2 HB.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 26	NA	NA	NA	NA
2. Engage a Moving Target (Stationary).	1 Moving Flank Motorcycle, 600 Meters.	Mix 25	5	28	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 1,000 Meters. NBC Environment.	Mix 25	2	34	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 800 Meters.	Mix 25	2	32	SAT UNSAT	GO NO-GO
5. Engage a Moving Target (Stationary).	1 Moving Truck, 400 Meters.	Mix 25	2	28	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 2 Moving Flank BRDM-2s
- 1 Moving Flank Truck
- 1 Moving Flank Motorcycle

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Tasks Scored GO: Table IV A _____ Table IV B _____

Evaluator's Signature _____ Total Tasks Scored GO _____

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TABLE VI—NOT USED

TABLE VII—PRACTICE FOR QUALIFICATION

This table trains the gunner to zero the M2 HB and acquire and engage single and multiple, moving and stationary targets from a moving weapon system, both day and night and in an NBC environment. It also prepares the crew for Table VIII qualification.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the crew must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task. The crew must score GO on six of eight graded tasks on Tables VIIA and VIIB combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 316 rounds mix and 10 rounds illumination:

- Table VIIA: 140 rounds mix.
- Table VIIB:
 - 176 rounds mix.
 - 10 rounds illumination.

Conduct of Fire

Table VIIA will be fired during daylight; Table VIIB will be fired at night. Using four and one mix ammunition, the crew zeros the M2 HB then acquires and engages single and multiple, moving and stationary targets from a moving weapon system. Targets will be placed at ranges between 400 and 1,000 meters. An additional BRDM target will be placed at 600 meters for zero.

Note. All moving engagements are fired from a short halt.

Task 1 — Zero M2 HB machine gun. (See page 10-14 for day zero procedures and page 10-16 for night zero procedures.)

Tasks 2 through 5 — Engage single and multiple, moving and stationary targets from a moving weapon system. (See page 10-14.)

Allowable Variations

The commander may use MILES and change the sequence of tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Note. For more information on the use of MILES with the M2 HB, see FM 23-65.

Table VII A. Practice for Qualification (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero M2 HB Caliber .50 Machine Gun.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 15	NA	NA	NA	NA
2. Engage a Moving Target (Moving).	1 Moving Flank Motorcycle, 400 Meters.	Mix 25	5	28	SAT UNSAT	GO NO-GO
3. Engage Multiple Targets (Moving).	1 Stationary Frontal BRDM-2, 800 Meters. 1 Stationary Frontal Truck, 1,000 Meters. NBC Environment.	Mix 50	2 2	40	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Moving).	1 Moving Flank BRDM-2, 600 Meters.	Mix 25	2	32	SAT UNSAT	GO NO-GO
5. Engage a Moving Target (Moving).	1 Moving Flank Truck, 800 Meters.	Mix 25	2	34	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 1 Stationary Frontal BRDM-2
- 1 Moving Flank BRDM-2
- 1 Moving Flank Motorcycle
- 1 Stationary Frontal Truck
- 1 Moving Flank Truck

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

Table VII B. Practice for Qualification (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero AN/TVS-5 to M2 HB.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 26	NA	NA	NA	NA
2. Engage a Moving Target (Moving).	1 Moving Flank Truck, 800 Meters. NBC Environment.	Mix 25	2	24	SAT UNSAT	GO NO-GO
3. Engage Multiple Targets (Moving).	1 Stationary Frontal BRDM-2, 800 Meters; 1 Stationary Frontal Truck, 800 Meters. NBC Environment.	Mix 50	2 2	40	SAT UNSAT	GO NO-GO
4. Engage Multiple Targets (Moving).	1 Moving Flank Motorcycle, 400 Meters; 1 Stationary Frontal BRDM-2, 600 Meters.	Mix 50	5 2	36	SAT UNSAT	GO NO-GO
5. Engage a Moving Target (Moving).	1 Moving Flank Motorcycle, 400 Meters.	Mix 25	5	28	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 2 Stationary Frontal BRDM-2s
- 2 Moving Flank Motorcycles
- 1 Stationary Frontal Truck
- 1 Moving Flank Truck

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Tasks Scored GO: Table VII A _____ Table VII B _____

Evaluator's Signature _____ Total Tasks Scored GO _____

TABLE VIII-INTERMEDIATE CREW QUALIFICATION

Table VIII is a marksmanship, single vehicle qualification table. This table tests the crew's ability to zero the M2 HB and engage multiple and single, moving and stationary targets from a moving vehicle. These exercises are fired during day and night; some exercises are fired in an NBC environment.

Each crew member should qualify (or transition) on Table VII in the same crew position before firing Table VIII. Each crew must fire Table VIII for qualification.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the crew must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task. The crew receives 100 points for each of the eight graded tasks scored as GO; a 5-point penalty is subtracted for each crew error. There are four possible crew errors for the M2 HB for a possible crew duty penalty of 20 points:

- Firing before receiving the command to fire.
- Incorrect engagement techniques (for example, engaging a *least dangerous* target before a *most dangerous* target).
- Incorrect driving techniques (for example, driver does not maintain course speed).
- Crew does not adhere to the conditions of the firing task (for example, failure to mask during an NBC engagement).

These crew errors do not affect the GO/NO-GO rating of the task. To qualify, the crew must score GO on six of the eight graded tasks on Tables VIII A and B combined. The crew qualification standards are as follows:

- *Distinguished*: Qualified on 8 of 8 tasks on Table VIII A and B combined.
- *Superior*: Qualified on 7 of 8 tasks on Table VIII A and B combined.
- *Qualified*: Qualified on 6 of 8 tasks on Table VIII A and B combined.
- *Unqualified*: Qualified on 5 or fewer tasks on Table VIII A and B combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 280 rounds mix and 10 rounds illumination:

- Table VIIIA: 140 rounds mix.
- Table VIIIB:
 - 140 rounds mix.
 - 10 rounds illumination.

Conduct of Fire

Table VIIIA will be fired during daylight; Table VIIIB will be fired at night. Using four and one mix ammunition, the crew acquires and engages single and multiple, moving and stationary targets. Targets will be placed at ranges between 400 and 1,000 meters. An additional BRDM target will be placed at 600 meters for zero.

Note. All moving engagements are fired from a short halt.

Task 1 — Zero M2 HB machine gun. (See page 10-14 for day zero procedures and page 10-16 for night zero procedures.)

Tasks 2 through 5 — Engage single and multiple, moving and stationary targets from a moving weapon system. (See page 10-14.)

Allowable Variations

The commander may change the sequence of tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table VIII A. Intermediate Crew Qualification (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero M2 HB Caliber .50 Machine Gun.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 26	NA	NA	NA	NA
2. Engage a Moving Target (Moving).	1 Moving Flank Motorcycle, 600 Meters.	Mix 25	5	28	_____	GO NO-GO
3. Engage Multiple Targets (Stationary).	1 Stationary Frontal BRDM-2, 800 Meters. 1 Stationary Frontal Truck, 800 Meters.	Mix 50	2	36	_____	GO NO-GO
			2			
4. Engage a Moving Target (Stationary).	1 Moving Flank BRDM-2, 600 Meters. NBC Environment.	Mix 25	2	30	_____	GO NO-GO
5. Engage a Moving Target (Moving).	1 Moving Flank Truck, 800 Meters.	Mix 25	2	28	_____	GO NO-GO

Tasks Scored GO _____ x 100 = Points _____
 - Crew Duties Penalties _____
 = Total Points _____

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 2 Stationary Frontal BRDM-2s
- 1 Moving Flank BRDM-2
- 1 Moving Flank Motorcycle
- 1 Moving Flank Truck
- 1 Stationary Frontal Truck

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Evaluator's Signature _____

Table VIII B. Intermediate Crew Qualification (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time (Seconds)		
1. Zero AN/TVS-5 to M2 HB Caliber .50 Machine Gun.	1 Stationary Frontal BRDM-2, 600 Meters.	Mix 15	NA	NA	NA	NA
2. Engage a Stationary Target (Moving).	1 Stationary Frontal BRDM-2, 600 Meters. NBC Environment.	Mix 25	2	22	_____	GO NO-GO
3. Engage a Moving Target (Moving).	1 Moving Flank Truck, 800 Meters.	Mix 25	2	18	_____	GO NO-GO
4. Engage Multiple Targets (Moving).	1 Moving Flank Motorcycle, 400 Meters; 1 Stationary Frontal BRDM-2, 600 Meters. NBC Environment.	Mix 50	5 2	22	_____	GO NO-GO
5. Engage a Moving Target (Moving).	1 Moving Flank Motorcycle, 600 Meters.	Mix 25	5	18	_____	GO NO-GO

Tasks Scored GO _____ x 100 = Points _____
 - Crew Duties Penalties _____
 = Total Points _____

Target Requirements

- 1 Stationary Frontal BRDM-2 (for zero)
- 2 Stationary Frontal BRDM-2s
- 2 Moving Flank Motorcycles
- 1 Moving Flank Truck

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tasks Scored GO: Table VIII A and B _____ Qualified/Unqualified _____
 Evaluator's Signature _____

MK 19 40-mm Grenade Basic and Intermediate Tables

On area target engagements (infantry squad, motorcycle, and RPG team), full credit is given when suppression (one round impacts within 5 meters of the target) is achieved within the time standards indicated in the task. On point target engagements (lightly armored vehicle targets, such as BRDM and BTR-70), full credit is given when the gunner scores two hits on the target. Area target arrays may be placed on line or in wedge formations. Area targets should not be more than 5 meters apart and will not extend beyond 30 meters in width or 20 meters in depth.

Note. The MK 19 must be fired from a stationary vehicle (moving vehicles fire from a short halt). Some ranges cannot support the ranges listed on these tables; however, all targets should be placed as close as possible to the range listed in each task.

TABLE I—MANIPULATION EXERCISE

Table I trains the gunner to zero the MK 19, develops coordination skills, and familiarizes the gunner with the weapon system. The gunner practices moving from one target to another in a random fashion, thus developing his skills to manipulate the weapon. These exercises are fired during the day only.

Scoring Procedures

Task 1 is not scored

Tasks 2 through 4 are scored. Time for these engagements starts when the evaluator announces "COMMENCE FIRING." Time stops when all targets have been engaged or the evaluator announces "CEASE FIRE," whichever occurs first.

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task. Before progressing to Table II (*Tripod Exercise*), the gunner should score GO on all graded tasks.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 20 rounds 40-mm TP.

Conduct of Fire

Using 40-mm TP ammunition, the gunner (moving from one target to another) fires the manipulation exercises using the proper techniques. Two stationary BRDM targets and three double E silhouettes are set in three target arrays in front of each weapon system at ranges between 400 meters and 1,100 meters. An additional BRDM target is centered at 400 meters for weapon zero.

Task 1 — Zero MK 19 40-mm grenade machine gun.

Move the leaf sight plate to the midpoint between the two studs.

Move the rear sight slide to the meter mark representing the distance to the target.

Set the windage knob at the zero index line.

Align the sights on the base of the target using the traverse and elevation mechanism.

Fire a single round and spot the impact of the round. If it is on target, fire a short burst to confirm zero.

If the round is not on target, estimate the round (how short or long, right or left).

Adjust the elevation knob to move the sights onto the target. (If the round was short, move the elevation knob clockwise; if the round was long, move the elevation knob counterclockwise.)

Adjust the windage knob to move the impact right or left. (To adjust to the right, turn the windage knob counterclockwise; to adjust to the left, turn the windage knob clockwise.)

Before firing the next round, realign the sights and adjust the gun back on target using the traverse and elevation mechanism.

Notes. If the adjustment was correct, the second round should be on target; fire the rest of the rounds to confirm the zero. If the second round is not on target, repeat all steps. If the impacts are not observed, bold adjustments may be needed.

Once the zero is completed, align the range plate scale at the exact range of the zero, and tighten it.

Tasks 2 through 5 — Engage stationary targets from a tripod-mounted weapon.

The gunner will observe the beaten zone and make adjustments, as necessary, to hit the targets.

After the gunner completes firing, he will clear the weapon and the AI will critique the gunner's performance.

Allowable Variations

None.

Table I. Manipulation Exercise.

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards Hits Time		Crew Duties	GO/NO-GO
1. Zero Mark 19 Grenade Machine Gun (Tripod-Mounted).	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Stationary Target (Tripod-Mounted) (Manipulation Exercise).	1 Stationary Frontal BRDM, 800 Meters.	40-mm TP 6	2	NA	NA	GO NO-GO
3. Engage a Stationary Target (Tripod-Mounted) (Manipulation Exercise) (Traverse and Search).	1 Stationary Frontal BRDM, 800 Meters.	40-mm TP 6	2	NA	NA	GO NO-GO
4. Engage a Stationary Target (Tripod-Mounted) (Manipulation Exercise) (Traverse and Search).	Infantry Squad, 600 Meters.	40-mm TP 4	1	NA	NA	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM (for zero)
- 2 Stationary Frontal BRDMs
- 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Evaluator's Signature _____ Tasks Scored GO _____

TABLE II—TRIPOD EXERCISE

Table II trains the gunner to zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired during the day only.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. Engagement time starts when the target is fully exposed. Engagement time stops when the command "CEASE FIRE," is given.

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 26 rounds 40-mm TP.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages stationary targets from a tripod-mounted weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon zero.

Task 1 — Zero MK 19 40-mm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage stationary targets from a tripod-mounted weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

Table II. Tripod Exercise.

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun (Tripod-Mounted).	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Stationary Target (Tripod-Mounted).	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	2	1 Min	SAT UNSAT	GO NO-GO
3. Engage a Stationary Target (Tripod-Mounted).	1 Stationary Frontal BRDM, 800 Meters. NBC Environment.	40-mm TP 6	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO
4. Engage a Stationary Target (Tripod-Mounted).	1 Stationary Frontal BRDM, 600 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Tripod-Mounted).	Infantry Squad, 600 Meters. NBC Environment.	40-mm TP 6	1	1 Min	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM (for zero)
- 3 Stationary Frontal BRDMs
- 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Evaluator's Signature _____ Tasks Scored GO _____

TABLE III—ADJUSTMENT OF FIRE (STATIONARY)

Table III trains the gunner to zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired vehicle mounted, during the day only.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. Engagement time starts when the target is fully exposed. Engagement time stops when the command "CEASE FIRE" is given.

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 26 rounds 40-mm TP.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages stationary targets from a stationary weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon zero.

Task 1 — Zero MK1940-rnm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage stationary targets from a stationary weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table III. Adjustment of Fire (Stationary).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Stationary Target (Stationary).	Infantry Squad, 800 Meters.	40-mm TP 6	1	1 Min	SAT UNSAT	GO NO-GO
3. Engage a Stationary Target (Stationary).	1 Stationary Frontal Motorcycle, 400 Meters. NBC Environment.	40-mm TP 4	1	1 Min	SAT UNSAT	GO NO-GO
4. Engage a Stationary Target (Stationary).	1 Stationary Frontal Truck, 700 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Stationary).	1 Stationary Frontal Truck, 800 Meters. NBC Environment.	40-mm TP 6	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM (for zero)
- 2 Stationary Frontal Trucks
- 1 Stationary Frontal Motorcycle
- 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

TABLE IV—BASIC CREW QUALIFICATION

Table IV tests the gunner to ensure he can zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired vehicle mounted, during the day and night.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. Engagement time starts when the target is fully exposed. Engagement time stops when the command “CEASE FIRE” is given.

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task.

The crew must score GO on a total of six of the eight graded tasks on Tables IVA and IVB combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 50 rounds 40-mm TP and 12 rounds illumination:

- Table IVA: 26 rounds TP.
- Table IVB:
 - 24 rounds TP.
 - 12 rounds illumination.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages moving and stationary targets from a stationary weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon zero.

Task 1 — Zero MK 19 40-mm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage moving and stationary targets from a stationary weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table IV A. Basic Crew Qualification (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards Hits	Time	Crew Duties	GO/NO-GO
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank Truck, 600 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Defense).	1 Moving Flank Motorcycle, 600 Meters. NBC Environment.	40-mm TP 6	1	1 Min	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Defense).	1 Moving Flank BRDM, 600 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Defense).	Infantry Squad, 400 Meters.	40-mm TP 4	1	1 Min	SAT UNSAT	GO NO-GO

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 1 Moving Flank Truck
 1 Moving Flank BRDM
 1 Moving Flank Motorcycle
 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

Table IV B. Basic Crew Qualification (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 2	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank BRDM, 600 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Defense).	1 Moving Flank Truck, 600 Meters. NBC Environment.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Defense).	1 Moving Flank Truck, 600 Meters.	40-mm TP 6	2	1 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Defense).	Infantry Squad, 400 Meters.	40-mm TP 4	1	1 Min	SAT UNSAT	GO NO-GO

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 2 Moving Flank Trucks
 1 Moving Flank BRDM
 1 Moving Flank Motorcycle
 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tasks Scored GO: Table IV A _____ Table IV B _____
 Evaluator's Signature _____ Total Tasks Scored GO _____

TABLE V—ADJUSTMENT OF FIRE (MOVING)

Table V trains the gunner to zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired during the day and night.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task.

The crew must score GO on six of the eight graded tasks on Tables VA and VB combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 52 rounds 40-mm TP and 10 rounds illumination:

- Table VA: 28 rounds TP.
- Table VB:
 - 24 rounds TP.
 - 10 rounds illumination.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages moving and stationary targets from a stationary weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon mm.

Task 1 — Zero MK1940-mm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage moving and stationary targets from a stationary weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table V A. Adjustment of Fire (Moving) (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank Truck, 1,000 Meters. NBC Environment.	40-mm TP 8	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO
3. Engage a Stationary Target (Offense).	1 Stationary Frontal BRDM, 800 Meters.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Offense).	1 Moving Flank Motorcycle, 400 Meters.	40-mm TP 4	1	1 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Offense).	1 Stationary Frontal Truck, 600 Meters. NBC Environment.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 1 Stationary Frontal Truck
 1 Stationary Frontal BRDM
 1 Moving Flank Truck
 1 Moving Flank Motorcycle

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

Table V B. Adjustment of Fire (Moving) (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 2	NA	NA	NA	NA
2. Engage a Moving Target (Offense).	1 Moving Flank Motorcycle, 400 Meters.	40-mm TP 4	1	45 Sec	SAT UNSAT	GO NO-GO
3. Engage a Stationary Target (Offense).	1 Stationary Frontal Truck, 600 Meters. NBC Environment.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Offense).	1 Moving Flank, BRDM, 600 Meters.	40-mm TP 6	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Defense).	1 Stationary Frontal BRDM, 800 Meters.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO

Target Requirements

- 1 Stationary Frontal BRDM (for zero)
- 1 Stationary Frontal Truck
- 1 Stationary Frontal BRDM
- 1 Moving Flank BRDM
- 1 Moving Flank Motorcycle

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Tasks Scored GO: Table V A _____ Table V B _____

Evaluator's Signature _____ Total Tasks Scored GO _____

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TABLE VI—NOT USED

TABLE VII—PRACTICE FOR QUALIFICATION

Table VII trains the gunner to zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired during the day and night.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task.

The crew must score GO on six of the eight graded tasks on Table VIIA and VIIB combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 52 rounds 40-mm TP and 10 rounds illumination:

- Table VIIA: 26 rounds TP.
- Table VIIB:
 - 26 rounds TF.
 - 10 rounds illumination.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages stationary and moving targets from a stationary weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon zero.

Task 1 — Zero MK1940-rmm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage moving and stationary targets from a moving or stationary weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table VII A. Practice for Qualification (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Moving Target (Offense).	1 Moving Flank Motorcycle, 400 Meters.	40-mm TP 4	1	45 Sec	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Defense).	1 Moving Flank BRDM, 600 Meters.	40-mm TP 6	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Defense).	1 Moving Flank Truck, 800 Meters. NBC Environment.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Offense).	1 Stationary Frontal Truck, 800 Meters.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 1 Moving Flank Truck
 1 Moving Flank BRDM
 1 Moving Flank Motorcycle
 1 Stationary Frontal Truck

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Evaluator's Signature _____ Tasks Scored GO _____

Table VII B. Practice for Qualification (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 2	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank Truck, 600 Meters.	40-mm TP 6	2	1 Min 30 Sec	SAT UNSAT	GO NO-GO
3. Engage a Moving Target (Offense).	1 Moving Flank Truck, 600 Meters.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO
4. Engage a Moving Target (Defense).	1 Moving Flank BRDM, 600 Meters. NBC Environment.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO
5. Engage a Stationary Target (Offense).	1 Stationary Frontal Truck, 800 Meters.	40-mm TP 6	2	2 Min	SAT UNSAT	GO NO-GO

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 1 Moving Flank Truck
 2 Moving Flank BRDMs
 1 Stationary Frontal Truck

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tasks Scored GO: Table VII A _____ Table VII B _____
 Evaluator's Signature _____ Total Tasks Scored GO _____

TABLE VIII—INTERMEDIATE CREW QUALIFICATION

Table VIII tests the gunner to ensure he can zero the MK 19, engage targets with speed and accuracy, and acquire and engage targets under NBC conditions. These exercises are fired during the day and night.

Scoring Procedures

Task 1 is not scored.

Tasks 2 through 5 are scored. (See *Evaluation Procedures* on page 10-4.)

Within the allotted time per exercise, the gunner must obtain the minimum hits per target (as listed in *Hits* column) to score GO on each task. The crew receives 100 points for each of the eight graded tasks scored as GO; a 5-point penalty is subtracted for each crew error. There are five possible crew errors for the MK 19 for a possible crew duty penalty of 25 points:

- Firing before receiving the command to fire.
- Incorrect engagement techniques (for example, engaging a *least dangerous* target before a *most dangerous* target).
- Increase driving technique (for example, driver does not maintain course speed).
- Failure to fire from a short halt (MK 19 only).
- Crew does not adhere to the conditions of the firing task (for example, failure to mask during an NBC engagement).

These crew errors do not affect the GO/NO-GO rating of the task. To qualify, the crew must score GO on six of the eight graded tasks on Tables VIII A and B combined. The crew qualification standards are as follows:

- *Distinguished*: Qualified on 8 of 8 tasks on Table VIII A and B combined.
- *Superior*: Qualified on 7 of 8 tasks on Table VIII A and B combined.
- *Qualified*: Qualified on 6 of 8 tasks on Table VIII A and B combined.
- *Unqualified*: Qualified on 5 or fewer tasks on Table VIII A and B combined.

Ammunition Issue

The ammunition for this exercise will be broken down at the ammunition point. The total ammunition for this exercise is 54 rounds 40-mm TP and 10 rounds illumination:

- Table VIIIA: 28 rounds TP.
- Table VIIIB:
 - 26 rounds TP.
 - 10 rounds illumination.

Conduct of Fire

Using 40-mm TP ammunition, the gunner acquires and engages stationary and moving targets from a stationary weapon system. Target arrays are placed at ranges between 400 meters and 1,100 meters. An additional BRDM target is placed at 400 meters for weapon zero.

Task 1 — Zero MK 19 40-mm grenade machine gun. (See page 10-34.)

Tasks 2 through 5 — Engage moving and stationary targets from a moving or stationary weapon. (See page 10-35.)

Allowable Variations

The commander may change the sequence of the tasks.

If moving motorcycle targets are not available, use an infantry squad (7 IRETS).

Table VIII A. Intermediate Crew Qualification (Day).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank Truck, 800 Meters.	40-mm TP 6	2	2 Min	—	GO NO-GO
3. Engage a Stationary Target (Defense).	1 Stationary Frontal BRDM, 800 Meters. NBC Environment.	40-mm TP 6	2	2 Min	—	GO NO-GO
4. Engage a Stationary Target (Offense).	Infantry Squad, 600 Meters.	40-mm TP 6	1	1 Min	—	GO NO-GO
5. Engage a Stationary Target (Offense).	1 Stationary Frontal, Truck, 800 Meters.	40-mm TP 6	2	2 Min	—	GO NO-GO

Tasks Scored GO _____ x 100 = Points _____
 - Crew Duties Penalties _____
 = Total Points _____

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 1 Stationary Frontal BRDM
 1 Stationary Frontal Truck
 1 Moving Flank Truck
 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Evaluator's Signature _____

Table VIII B. Intermediate Crew Qualification (Night).

Task	Conditions/ Target/Situation	Ammo/ Rds	Standards		Crew Duties	GO/NO-GO
			Hits	Time		
1. Zero Mark 19 Grenade Machine Gun.	1 Stationary Frontal BRDM, 400 Meters.	40-mm TP 4	NA	NA	NA	NA
2. Engage a Moving Target (Defense).	1 Moving Flank BRDM, 800 Meters.	40-mm TP 6	2	2 Min	_____	GO NO-GO
3. Engage a Stationary Target (Offense).	Infantry Squad, 500 Meters. NBC Environment.	40-mm TP 4	1	2 Min	_____	GO NO-GO
4. Engage a Moving Target (Defense).	1 Moving Flank Truck, 700 Meters. NBC Environment.	40-mm TP 6	2	2 Min	_____	GO NO-GO
5. Engage a Moving Target (Offense).	1 Moving Flank Truck, 600 Meters.	40-mm TP 6	2	1 Min 30 Sec	_____	GO NO-GO

Tasks Scored GO _____ x 100 = Points _____
 - Crew Duties Penalties _____
 = Total Points _____

Target Requirements
 1 Stationary Frontal BRDM (for zero)
 2 Moving Flank Trucks
 1 Moving Flank BRDM
 7 IRETS (dismounted infantry)

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Tasks Scored GO: Table VIII A and B _____ Qualified/Unqualified _____

Evaluator's Signature _____

TOW Basic and Intermediate Tables

TABLES I AND II

TOW Gunnery Tables I and II train the basic TOW gunnery skills. Table I (*Individual Gunnery Practice*) prepares the gunner for Table II (*Individual Gunnery Qualification*). These tables should be conducted using the TOW GT. The trainer must construct a planned group of basic skill exercises. (See TM 9-6920-452-10 for a complete list of exercises on the TOW GT.)

When the TOW GT is ready for operation, the planned group has been constructed, and the gunner has been briefed and is in place, the trainer begins the first mission. At the beginning of each mission, the trainer gives the gunner a fire command and tells him to fire when ready. During the mission, the trainer does not coach the gunner in any way. The gunner must make a determination of when to fire and at which target. After each mission, the trainer gives the gunner the results then proceeds to the next mission.

Notes. The trainer has the option of thoroughly debriefing the gunner on his performance at the end of each mission or saving all 10 missions and reviewing them after the table is complete. The trainer must remember that the TOW GT will save a maximum of 20 missions at one time.

Units that do not have the TOW GT may conduct Tables I and II using the M70-series training set, M80 blast simulators, and a target vehicle equipped with an M70 target board.

For each table, the gunner must fire at least two 10-shot events. The trainer will record the results from each mission on DA Form 5107-R. To qualify on a table and progress to the next table, the gunner must receive a minimum of 550 points (tripod-mounted systems) or 600 points (vehicle-mounted systems) for one 10-shot event. If the gunner does not obtain the minimum score on a table, he should refire that table before progressing to the next table.

TABLES III AND IV

Table III (*Advanced Gunnery Practice*) prepares the gunner for Table IV (*Advanced Gunnery Qualification*). The trainer must construct a planned group consisting of a series of missions that train and test the gunner's ability to track and hit targets and perform advanced gunnery skills. (See TM 9-6920-452-10 for a complete list of exercises on the TOW GT.) Only the assigned gunners in each squad are required to verify on Tables III and IV. (Other members of the squad may perform the tables if time permits.)

Along with basic gunnery skills, Tables III and IV train the following advanced gunnery skills:

- Determining if a target can be engaged with the TOW.
- Identifying targets (identify friend, foe, or neutral [IFFN]).
- Prioritizing targets.
- Determining the correct fire control method.
- Engaging targets that are evasive, obscured, hard to track, or at extreme ranges.

Tables III and IV must be conducted using the TOW GT; units that do not have the TOW GT cannot conduct Tables III and IV. The sequence of missions in each 10-shot event should be changed continuously to prevent the gunner from becoming familiar with them.

The trainer constructs the planned group according to TM 9-6920-452-10. Before each mission, the trainer must present the gunner with a fire command that clearly states what the gunner must do. Some missions (determining if a target may be engaged by TOW, engaging evasive or obscured targets, and identifying targets [IFFN]) may not require specific fire commands; the trainer need only give general instructions such as “GUNNER-TARGETS TO YOUR FRONT-FIRE WHEN READY!” Other missions (prioritizing targets—tanks as higher priority than APCs), the trainer gives the command “GUNNER-TARGETS TO YOUR FRONT-ENGAGE TANKS FIRST—FIRE WHEN READY!”

Tables III and IV gunnery is scored in the same manner as Tables I and II, except for target identification (IFFN) missions. If the gunner correctly identifies a target as friendly and does not fire on it, he receives 100 points. If he fires on a friendly target, he receives zero points whether he hits the target or not.

For each table, the gunner must fire at least two 10-shot events. The trainer must not only observe and record the gunner’s tracking performance but brief, observe, and score the particular advanced gunnery task presented in each mission. To progress to the next table, the gunner must achieve a GO on at least 6 of 10 missions and receive a minimum of 550 points (tripod-mounted systems) or 600 points (vehicle-mounted systems) for one 10-shot event. If the gunner fails to meet the minimum qualification standards, he must retrain on Table III before firing Table IV. The trainer will record the gunner’s performance on DA Form 5107-R.

On Table IV, the total tracking score (add scores from all 10 missions) determines the gunner’s classification—expert, first class, second class, or unqualified as follows:

- Expert 750 to 1,000 (Tripod) 800 to 1,000 (Vehicle)
- 1st class 650 to 749 (Tripod) 700 to 799 (Vehicle)
- 2d Class 550 to 649 (Tripod) 600 to 699 (Vehicle)
- Unqualified 0 to 549 (Tripod) 0 to 599 (Vehicle)

The requirements for a mission to be scored as GO vary according to the advanced gunnery task that is presented in each mission. A successful mission is defined as follows:

- The gunner successfully engages (destroys) the correct target as determined by the trainer’s instructions for that particular mission.
 - In a mission to determine if a target can be engaged with a TOW, a hit on any target presented that can be destroyed by TOW is scored as a GO.
 - In scenarios to prioritize targets or determine the method of fire control, the gunner must engage the correct target according to the instructions given to him in the fire command.
- In a scenario to identify targets (IFFN), the gunner must not fire on friendly targets.

Note. Evasive and obscured targets do not require special actions from the gunner to be scored as GO; they are simply targets that are hard to hit. A hit on any target is scored as a GO.

TABLES V AND VI

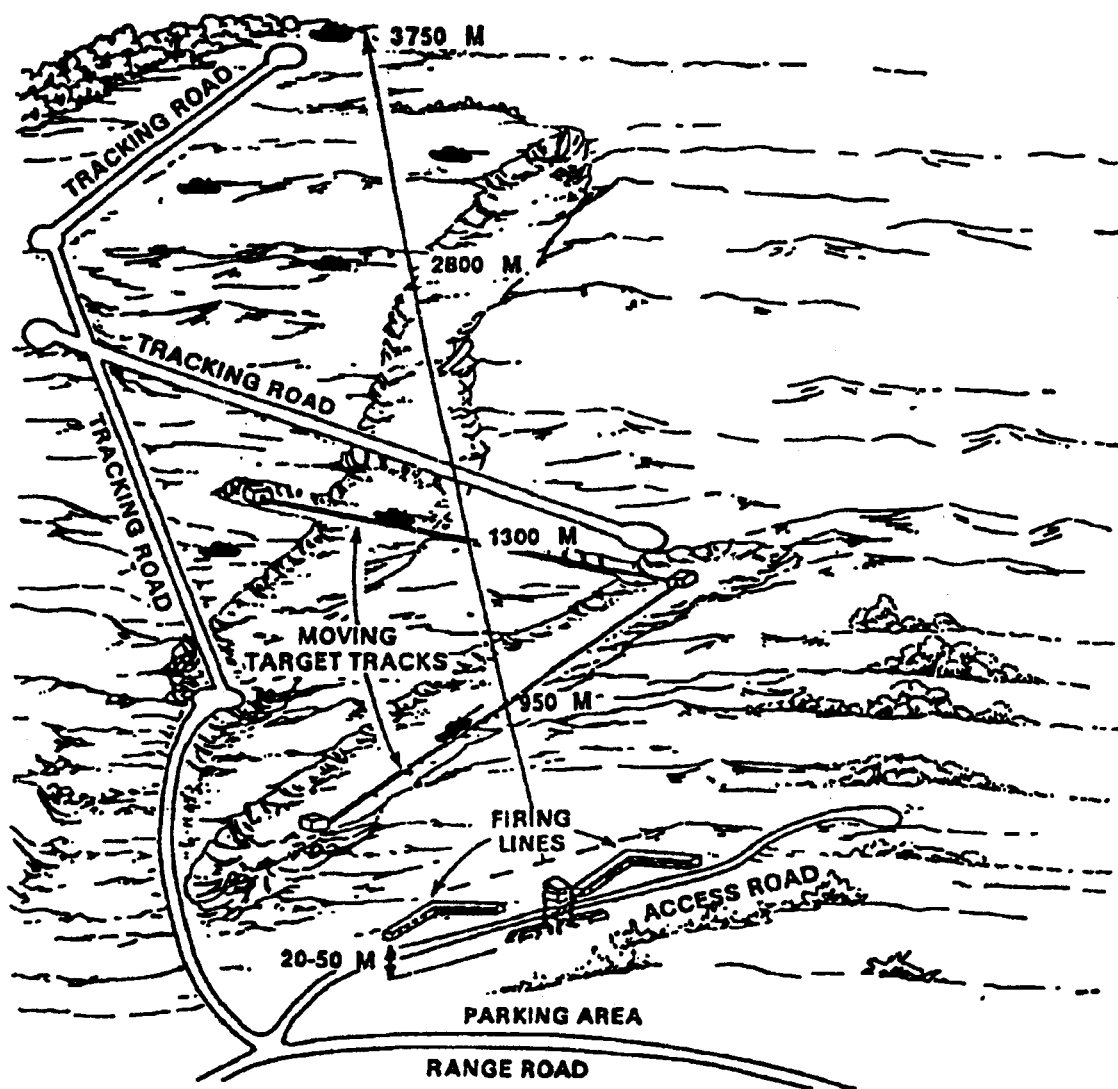
Table V (*Baseline Gunnery Practice*) prepares the gunner for Table VI (*Baseline Gunnery Qualification*). Each table is performed, once during the day and once during the night, under realistic (simulated) battlefield conditions. Some of the engagements will be performed with the crew in MOPP 4.

Tables V and VI allow the crews to troubleshoot the equipment (MILES or TOW FTT) and re-
fresh crews on MILES/TOW FIT gunnery and target engagement techniques to prepare the crews
for the practice and qualification tables that follow.

Range Layout

Tables V through VIII are fired on an antiarmor tracking and live-fire range, as depicted in Figure
10-7.

Figure 10-7. Antiarmor Tracking and Live-Fire Range.



Scoring Procedures

Task 1 is not scored.

Tasks 2 through 6 are scored. To count as a successful engagement, the target must be killed within 30 seconds after exposure. Engagement time begins when the target is exposed (for multiple targets from the same position, time begins each time the vehicle stops in the firing position. Each task counts as 100 points. (For tasks with multiple engagements, divide 100 by the number of targets presented to find the points for each target.) The scores for all engagements are then added.

Each table must be fired both day and night. Total maximum score for either day or night is 500 points for a maximum total of 1,000 points. Squads should achieve a minimum of 700 points on Table V before progressing to Table VI.

Conduct of the Range

Each task consists of one or more target engagements from one firing position. All firings will be from an unmasked position. All reloads will be made from a hide position. The systems and carriers are set up in static positions on a baseline; the systems do not move but engage a series of moving or pop-up targets from the baseline. All stationary targets should be mounted on pop-up mechanisms to facilitate target acquisition and scoring. Moving targets should be presented at speeds from 5 to 40 kph.

Note. If pop-up mechanisms are not available, exposed stationary targets will be placed in an appropriate array. If exposed targets must be used, the exercise should be designed so targets are presented only to the position from which they should be engaged.

The crew must successfully install, troubleshoot, and operate the MILES/TOW FTT equipment in accordance with the appropriate TM. The crew must also successfully acquire, engage, and destroy 6 of 10 targets presented in each table (once during daylight and once at night).

Note. DA Form 5107-R will be used to record the crew's score (day or night).

Tables V/VI. Baseline Gunnery Practice/Qualification.

Task	Conditions/ Target/ Situation	Points Per Target	Task Score
1. Install MILES/ TOW FTT.	NA	NA	NA
2. Engage a Stationary Target.	1 Stationary Flank T72; 1,000 to 1,500 Meters.	_____ _____	_____
3. Engage Multiple Stationary Targets.	1 Stationary Frontal T72, 1 Stationary Flank T72; 1,000 to 1,500 Meters.	_____ _____	_____
4. Engage Multiple Targets.	1 Stationary Frontal T72, 1 Moving Flank T72; 1,600 to 2,000 Meters.	_____ _____	_____
5. Engage Multiple Stationary Targets.	2 Stationary Turret T72s, 800 to 1,500 Meters. NBC Environment.	_____ _____	_____
6. Engage Multiple Targets.	2 Stationary Frontal T72s, 1 Moving Flank T72; 2,100 to 3,750 Meters.	_____ _____ _____	_____

Table _____ Date _____ Squad _____

Section _____ Platoon _____

Day Score _____ Night Score _____

Evaluator's Signature _____ Total Score _____

Note. Tables V and VI must be fired both day and night.

TABLES VII AND VIII

Table VII (*Squad Gunnery Practice*) prepares the squad for Table VIII (*Squad Gunnery Qualification*). These tables train and evaluate the TOW squad on its ability to engage stationary and moving targets in a simulated battlefield scenario. Tables VII and VIII (and all subsequent tables) are moving exercises; the firing vehicle moves from point to point and engages a series of targets.

Note. A range with pop-up or moving targets equipped with MILES LTIDs or the TOW FTT equivalent should be used, if available. If such a range is not available, tactical vehicles equipped with MILES harnesses or the TOW FTT equivalent may be used.

Range Layout

Tables VII and VIII are fired on an antiarmor tracking and live-fire range. (See Figure 10-7 on page 10-56.)

Scoring Procedures

To count as a successful engagement, the target must be killed within the exposure time listed for each task. Each task counts as 100 points. (For tasks with multiple engagements, divide 100 by the number of targets presented to find the points for each target.) Any crew or leader cuts are deducted from this score.

- Crew 5-point penalties.
 - Giving improper fire commands.
 - Firing before receiving command to fire.
 - Incorrect engagement techniques (such as engaging the least dangerous target before the most dangerous target).
- Crew 30-point penalties.
 - Failure to conduct system self-test/boresight before engaging first target.
 - Failure to collimate daysight/nightsight before engaging first target.
 - Failure to assume MOPP 4 and close all doors during NBC engagement.
 - Engaging friendly targets.
 - Failure to go to defilade position while reloading.
- Leader 30-point penalty. Failure to distribute and control section fires properly.

Each table must be fired both day and night. Total maximum score for either day or night is 500 points for a maximum total of 1,000 points. Squads must achieve a minimum of 700 points on Table VII to progress to Table VIII.

The scores for the two events are added together (maximum possible score is 1,000 points) for the total score for each gunnery table.

Conduct of the Range

During move-out scenarios, the senior trainer is normally to the rear of the leader's vehicle, for evaluation and training purposes. An assistant evaluator is normally assigned to each additional vehicle evaluated as part of the same exercise. Scoring for night engagements will be made by both evaluators. Evaluators must monitor crew conversations and fire commands.

The following support requirements are recommended when conducting TOW Gunnery Table VII:

- Evaluators (evaluators will not assist the gunner in finding or identifying targets):
 - One evaluator per squad.
 - One evaluator in the range tower to record scores on engagements.
 Opposing forces: None.
- Support troops: None.
- Vehicles/communications:
 - One PRC 77/68 per squad evaluator.
 - Two PRC 77/68 for the tower evaluator (one primary, one spare).
 - One AN/GRA 39 for tower to record fire commands.
- Maneuver area
 - Multipurpose range complex.
 - A route for the element to move from the assembly area to the first firing position without damaging the underground wiring.
- Firing area:
 - The TOW backblast area (75 meters by 90 degrees) will be clear.
 - Area in which smoke may be used.
 - Training aids, devices, and special equipment:
 - MILES equipment for the TOW squad (extended range TOW) or TOW FIT gear if available.
 - Sufficient LTIDs or TOW FIT receivers to cover the targets.
- Ammunition: Ten ATWESS cartridges per TOW, per iteration.
- References: FM 7-91 and FM 23-34.

Note. Because this table is conducted on an MPRC, marking the firing positions may be necessary. At night, the roads should be marked with luminous tape.

Tables VII/VIII. Squad Gunnery Practice/Qualification.

Task	Conditions/ Target/Situation	Exposure Time		Hits/ Crew Cuts	Points/ Total
1. Engage a Target.	1 Stationary T72, 1,500 to 2,000 Meters. (Baseline).	27 Sec 27 Sec	MILES FTT	_____ _____	_____
2. Engage Multiple Targets.	1 Stationary BMP, 1 Moving T72; 1,200 to 2,500 Meters. (Phase Line 1).	2.5 Min 2.28 Min	MILES FTT	_____	_____
3. Engage Multiple Targets.	1 Stationary BMP, 2 Moving T72s; 3,000 to 3,750 Meters. (Phase Line 1).	4.18 Min 2.28 Min	MILES FTT	_____ _____	_____
4. Engage Multiple Targets.	1 Stationary BMP, 1 Moving T72; 1,500 to 2,000 Meters. (Phase Line 1). NBC Environment.	2.07 Min 2.08 Min	MILES FTT	_____ _____	_____
5. Engage Multiple Targets.	1 Stationary BMP, 1 Moving T72; 2,500 to 3,000 Meters. (Baseline). NBC Environment.	2.55 Min 2.56 Min	MILES FTT	_____ _____	_____

Table _____ Date _____ Squad _____

Section _____ Platoon _____

Day Score _____ Night Score _____

Evaluator's Signature _____ Total Score _____

Note. Tables VII and VIII must be fired both day and night.

Section III. SCOUT SECTION GUNNERY

Tables IX and X are used to train and evaluate the scout section's ability to conduct reconnaissance and limited security missions and to engage stationary and moving targets. Table IX trains section gunnery; Table X evaluates the scout sections.

Units may use device-based gunnery to train before a major gunnery density. Available resources (time, training area, range facilities, and ammunition) will determine the commander's method of training.

An AAR for the entire section will be conducted upon completion of each table. The evaluator will debrief each section on its strengths and weaknesses. Videotaped exercises provide visual feedback (of both positive and negative actions) to the section and should be used whenever possible.

Note. Because of the maneuvering constraints required by safety standards when firing MK 19 practice ammunition, these section tables cannot be fired on all ranges using the MK 19 weapon system.

Tactical Training

The focus of the tactical scenario used for these tables must be on the scout's primary mission of collecting and reporting information. The scout's ability to use his combat resources (direct- and indirect-fire assets) effectively while remaining undetected on the battlefield must be evaluated.

TASK LIST

To maintain tactical emphasis throughout the scout section tables, a standard list of nine combat critical tasks are mandatory in each table. Scenarios for each table will include the nine critical tasks and a minimum of three commander-selected tasks (total of twelve tactical tasks per table). Using the information provided as a guide, the commander designs his own tables, based on resources available and the unit's training needs. (The score sheets in this chapter are examples only.) This flexibility ensures that each unit receives the training required for their scout sections to function effectively.

Required combat critical tasks for Tables IX and X:

- Execute action on contact.
- Report enemy information.
- Call for and adjust indirect fire.
- Conduct tactical movement.
- Control scout section fires.
- Conduct a screen.
- Perform a passage of lines.
- Select firing positions
- Perform a zone reconnaissance.

Based on the METL, the commander may choose from, but is not limited to, the following tasks for the tactical scenario:

- Coordinate with adjacent platoon.
- Perform an area reconnaissance.
- Perform a route reconnaissance.
- Perform reconnaissance by fire.
- Prepare a route reconnaissance overlay.
- Emplace and retrieve a hasty protective minefield.
- Reorganize a squad following enemy contact while in the defense.
- Conduct unmasking procedures.
- Cross a chemically contaminated area.
- Prepare and submit NBC 1 reports.
- React to indirect fire.

Terrain, weather, and distance between engagements dictate course time. Tactical tasks may be conducted at a nearby training area if range areas are not extensive enough to allow tactical maneuvering; however, total integration of gunnery and tactics is preferred to maximize the training effectiveness of these tables.

EVALUATION PROCEDURES

To evaluate the tactical tasks, the evaluator may use the performance checklists provided in Appendix B; commanders may add subtasks to the checklists to reflect more accurately their METL. To evaluate tasks not included in Appendix B, the evaluator may develop performance checklists using ARTEP 17-57-10-MTP.

These evaluation procedures allow sections to train and practice the skills normally performed in combat. Evaluators will use AARs to critique sections upon completion of the tables.

Resources

Live-fire gunnery requires a multilane range facility (such as a multipurpose range complex [MPRC]) which will allow at least two vehicles to maneuver as a section. Local range SOPs will dictate support requirements.

Device-based gunnery requires the use of MILES. Equipping a scout section with MILES is simple; however, inattention to detail and failure to boresight or follow checkout procedures properly will cause a serious training degradation. Including MILES in the precombat inspection will help identify and correct shortcomings. Whenever MILES is used, ensure the mounting and checkout procedures are in accordance with TC 25-6-1.

Both device-based and live-fire gunnery tables require evaluator support. Evaluators will be identified, trained, and scheduled before the conduct of the table. A scoring packet with performance checklists and score sheets, scenarios, operation orders (OPORD), and sequence of events will be provided to the evaluator. Internal evaluation is acceptable; however, external evaluation is preferred.

To assist the commander in identifying resources needed for table execution, the following is a list of recommended equipment.

For live-fire gunnery:

- MPRC or suitable facility allowing two or more vehicles to maneuver as a section.
 - TOW backblast area (75 meters by 90 degrees) will be clear.
 - Area in which smoke may be used.
- Class V consisting of, but not limited to—
 - Caliber .50 four-and-one mix, 40-mm TP, or ATWESS.
 - Artillery simulators.
 - Smoke pots.
 - Red smoke grenades.
 - White smoke grenades.
 - Green smoke grenades.
 - Red star clusters.
 - White or green star clusters.
 - Illumination.

For device-based training:

- Training area 1 kilometer by 2 kilometers or larger.
- MILES equipment for each vehicle consisting of—
 - TM 9-1265-375-10.
 - Laser transmitter.
 - Man-worn helmet and torso harness detector assemblies.
 - Combat vehicle kill indicator.
 - Control console.
 - Battery box assembly.
 - Target-holding mechanisms with MILES target interface devices or OPFOR with VISMOS and MILES.
 - MILES controller guns.

- Class V consisting of, but not limited to—
 - Caliber .50 blank.
 - Hoffman devices.
 - Artillery simulators.
 - Smoke pots.
 - Red smoke grenades.
 - White smoke grenades.
 - Green smoke grenades.
 - Red star clusters.
 - White or green star clusters.
 - Illumination.

Other resources needed for both live-fire gunnery and device-based training:

- Evaluators and support packages consisting of—
 - Score sheets.
 - Performance checklists.
 - Sequence of events.
 - OPORD.
 - Scenario.
 - Dual net radio capability.
 - Night vision devices.
 - Vehicles for evaluators.
 - Medical support as required by local SOP.
 - Any items required by the supporting range facility SOP.

Table IX-Section Training Course

The section training course is used to train and evaluate scout section tactical and gunnery skills in preparation for Table X. It must be designed to evaluate, as a minimum, the nine combat critical tasks, three commander-selected tactical tasks, and the gunnery tasks. At least one NBC engagement will be planned within each table scenario. Day firing should precede night firing whenever possible.

Each crew in the section must have successfully qualified Table VIII within six months of firing Table IX.

Note. Due to crew turbulence, minimum requirement is 75 percent of the vehicle commanders and gunners in the section must have qualified in their respective positions within the last six months.

Each vehicle crew member must have passed the gunnery skills test (appropriate tasks for his specific weapon) in the position he will occupy in accordance with Appendix A.

SCORING PROCEDURES

All tasks are scored (see *Evaluation Procedures* on page 10-4).

Each table uses a 1,000-point scoring system (maximum points for tactics and gunnery combined is 1,000). The breakdown of scoring is as follows:

Tactics are worth 60 percent (600 points).

Note. Commanders may use the following formula to determine total tactical points; or, at the commander's option based on METL importance, point values may be assigned for each task. Total cumulative tactical points must not exceed 600.

To determine the number of tactical points awarded—

- Divide the number of tactical tasks passed by the number of tactical tasks (day and night combined) possible to establish a percentage:
Tasks Passed ÷ Tasks Possible = Percentage
 $9 \div 12 = .75$
- Multiply by 600 possible tactical points:
 $.75 \times 600 = 450$
- The result is the points awarded for the tactical evaluation.

Gunnery is worth 40 percent or 400 points. Use the following formula to determine the number of gunnery points awarded.

- Divide the number of targets destroyed by the number of targets presented (combining day and night phases) to establish a percentage:
Targets Destroyed ÷ Targets Presented = Percentage
 $8 \div 10 = .80$

- Multiply by 400 gunnery points:
.80 X 400= 320
- The total points awarded is determined by adding the scores from the tactical and gunnery portions.
450 (tactical) + 320 (gunnery)= 770 total

Each scout section is required to achieve a minimum qualifying score on Table IX prior to firing Table X. Minimum qualifying scores on tactics and gunnery areas follows:

- 70 percent of tactical tasks-420 points out of 600 points.
- 70 percent of targets presented (gunnery)-280 points out of 400 points.

Note. To determine the gunnery score without mathematical calculations, see the matrix in Figure 10-8 on page 10-75.

AMMUNITION ISSUE

The ammunition for this exercise will be broken down at the ammunition point. The ammunition for this exercise includes 10 rounds of illumination for each section and the following for each crew:

- Caliber .50: 14 rounds per target.
14 rounds for zero.
- 40-mm TP: 10 rounds per target.
4 rounds for zero.

CONDUCT OF THE RANGE

A two-vehicle section uses reconnaissance and engagement techniques against threat targets. The section detects elements of an enemy force, identifies the elements, and acquires and engages targets as appropriate. Moving and stationary targets appear individually and simultaneously. The minimum recommended area for this training is 1 kilometer by 2 kilometers.

Target arrays should be consistent with the type of threat forces a section could expect to encounter in combat. Based on the METL, the commander determines the number and types of targets to be engaged. At no time will the number of targets exceed the number of rounds allocated by DA Pam 350-38. The number and type of targets must be based on the weapons and size of the scout section. Thermal targets should be used to represent accurate thermal signatures of threat vehicles. When appropriate to the scenario, hostile fire simulators may be used to simulate the threat vehicle(s) firing at the section.

ALLOWABLE VARIATIONS

The commander may change the sequence of the tasks.

Table IX may be conducted in a live-fire or laser-fire mode, at the commander's discretion.

Live-fire, full-caliber gunnery integrated with tactical tasks is preferred; however, range and maneuver constraints may dictate conducting separate tactical and gunnery portions.

Note. On the advanced tables (Tables IX and X), the section is evaluated on its ability to perform tactical operations, in accordance with ARTEP 17-57-10 MTP, FM 17-98, and unit SOP.

Table IX A. Section Training Course (Day).

Task	Conditions/ Target/Situation	Tactical Tasks	Score	
			Gunnery	Tactics
1. Conduct zone reconnaissance.	Order to conduct zone reconnaissance.	Conduct zone reconnaissance.	_____	_____
2. Establish screen.	Order to establish screen.	Conduct screen. Select firing positions.	_____	_____
3. Section detects reconnaissance patrol.	Section observes 2 BRDMs, 1 BMP 1,000 to 1,500 meters.	Perform action on contact. Report enemy information.	_____	_____
4. Section develops situation and reports.	Section observes 5 BTR 60s, 4 T72s; 3,000 to 3,500 meters.	Call for and adjust indirect fire. Report enemy information.	_____	_____
5. Section develops situation and reports.	Section observes enemy advancing and is engaged by direct fire. 3 BTR 60s, 1 T72; 1,500 to 2,000 meters.	Call for and adjust indirect fire. Control scout section fires. Report enemy information.	_____	_____
6. Section continues to develop situation and requests permission to delay back to phase line specified in OPOD.	Section observes enemy continuing to advance. 3 BMPs, 2 BTRs; 800 to 1,200 meters.	Control scout section fires. Conduct tactical movement. Report enemy information.	_____	_____
7. Section bounds to subsequent phase line and conducts passage of lines.	Section observes enemy continuing to advance and is ordered to conduct passage of lines at grid.	Conduct passage of lines. Reorganize and reconsolidate.	_____	_____

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tactical Points _____ Gunnery Points _____
 Evaluator's Signature _____ Score _____

Table IX B. Section Training Course (Night).

Task	Conditions/ Target/Situation	Tactical Tasks	Score	
			Gunnery	Tactics
1. Establish screen.	Order to establish screen.	Conduct screen. Select firing positions.	_____	_____
2. Detect reconnaissance patrol.	Section observes 3 BTR 60s; 1,200 meters.	Perform actions on contact. Report enemy information.	_____	_____
3. Section engages with direct and indirect fire.	Section observes enemy advancing and is engaged by direct fire. 5 BTR 60s, 4 T72s; 800 to 1,200 meters.	Call for and adjust indirect fire. Control scout section fires. Report enemy information.	_____	_____
4. Section continues to engage while requesting permission to delay back to screen line specified in OPORD.	Section observes enemy continuing to advance. 3 BMPs, 1 T72, 2 BTRs; 600 to 1,200 meters.	Control scout section fires. Conduct tactical movement. Report enemy information.	_____	_____
5. Section bounds to subsequent screen line and conducts passage of lines.	Section observes enemy continuing to advance and is ordered to conduct passage of lines at grid.	Conduct passage of lines.	_____	_____

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tactical Points _____ Gunnery Points _____
 Table IXA Score _____ Table IXB Score _____
 Evaluator's Signature _____ Total Score _____

Table X-Section Qualification Course

The *Section Qualification Course* is used to evaluate the scout section's tactical and gunnery proficiency in a realistic tactical and live-fire scenario. Day firing (Table X A) should precede night firing (Table X B) whenever possible.

Table X should be similar in task content to Table IX. Table X is a full-caliber gunnery exercise designed for a multilane range facility (such as an MPRC). Where range facilities permit free maneuvering, the tactical phase of the table should be conducted simultaneously with the gunnery phase.

Each vehicle crew member must have passed the gunnery skills test (tasks appropriate for the weapon system) in the position he will occupy (in accordance with Appendix A).

Each scout section should achieve a minimum passing score on Table IX, within three months before firing Table X.

SCORING PROCEDURES

All tasks are scored (see *Evaluation Procedures* on page 10-4).

Each table uses a 1,000-point scoring system (maximum points for tactics and gunnery combined is 1,000). The breakdown of scoring is as follows:

Tactics are worth 60 percent (600 points).

Note. Commanders may use the following formula to determine total tactical points; or, at the commander's option based on METL importance, point values may be assigned for each task. Total cumulative tactical points must not exceed 600.

To determine the number of tactical points awarded—

- Divide the number of tactical tasks passed by the number of tactical tasks possible (day and night combined) to establish a percentage:
Tasks Passed ÷ Tasks Possible = Percentage
 $9 \div 12 = .75$
- Multiply by 600 possible tactical points:
 $.75 \times 600 = 450$
- The result is the points awarded for the tactical evaluation.

Gunnery is worth 40 percent or 400 points. Use the following formula to determine the number of gunnery points awarded:

- Divide the number of gunnery tasks passed by the number of gunnery tasks possible (combining day and night phases) to establish a percentage:
Targets Destroyed ÷ Targets Presented = Percentage
 $8 \div 10 = .80$
- Multiply the decimal by 400 gunnery points:
 $.80 \times 400 = 320$

- The total points awarded is determined by adding the scores from the tactical and gunnery portions.

$$450 \text{ (tactical)} + 320 \text{ (gunnery)} = 770 \text{ total}$$

To qualify on Table X, the section must receive a minimum of—

- 70 percent of tactical tasks-420 out of 600 points.
- 70 percent of targets presented (gunnery)-280 out of 400 points.

Note. To determine the gunnery score without mathematical calculations, see the matrix in Figure 10-8 on page 10-75.

Sections will be rated by the following standards:

Distinguished: Combined score of 900 points or higher (420 tactical and 280 gunnery points).

Superior: Combined score of 800 to 899 points (420 tactical and 280 gunnery points).

Qualified: Combined score of 700 to 799 points (420 tactical and 280 gunnery points).

Unqualified: Combined score of 699 points or less, or section fails to achieve 420 tactical points or 280 gunnery points.

AMMUNITION ISSUE

The ammunition for this exercise will be broken down at the ammunition point. The ammunition for this exercise includes 10 rounds of illumination for each section and the following for each crew:

- Caliber .50: 14 rounds per target.
14 rounds for zero.
- 40-mm TP: 10 rounds per target.
4 rounds for zero.

CONDUCT OF THE RANGE

The gunnery phase of Table X requires a multilane facility capable of allowing at least two vehicles to maneuver as a section. The gunnery phase will be conducted live-fire, fill-caliber.

Note. Local range SOPs dictate the conduct of the range. Scenarios should be developed and approved for firing well in advance of the conduct of Table X.

The tactical phase of Table X requires a free-maneuver range facility or a separate 1-kilometer-by-2-kilometer training area. OPFOR or target lift mechanisms may be used in the training area to reinforce acquisition, reporting, and call for fire procedures.

Target arrays should be consistent with the type of threat forces a section could expect to encounter in combat. Based on the METL, the commander determines the number and types of targets to be engaged. At no time will the number of targets exceed the number of rounds allocated by DA Pam 350-38. The number and type of targets must be based on the weapons and size of the scout section.

Thermal targets should be used to represent accurate thermal signatures of threat vehicles. When appropriate to the scenario, hostile fire simulators may be used to simulate the threat vehicle(s) firing at the section.

ALLOWABLE VARIATIONS

Depending on the availability of maneuver area and range time, sections may conduct the tactical portion of Table X in a local training area with MILES. The commander must decide, based on range time availability and his design of Table X, the most appropriate location to conduct the table. MILES-conducted exercises, using force-on-force engagements or target lift mechanisms with LTID, represent realistic threat scenarios.

Notes. MILES may be used for the tactical portion only; the gunnery portion must be fired live.

On the advanced tables (Tables IX and X), the section is evaluated on its ability to perform tactical operations, in accordance with ARTEP 17-57-10-MTP, FM 17-98, and unit SOP.

Table X A. Section Qualification Course (Day).

Task	Conditions/ Target/Situation	Tactical Tasks	Score	
			Gunnery	Tactics
1. Conduct zone reconnaissance.	Order to conduct zone reconnaissance during daylight.	Conduct zone reconnaissance.	_____	_____
2. Establish screen.	Order to establish screen.	Conduct screen. Select firing positions.	_____	_____
3. Section detects reconnaissance patrol.	Section observes 1 BTR 60, 2 BMPs; 2,000 to 2,500 meters.	Perform actions on contact.	_____	_____
4. Section develops situation and reports.	Section observes 3 BTR 60s, 2 BMPs; 1,000 to 1,400 meters.	Call for and adjust indirect fire. Report enemy information.	_____	_____
5. Section engages with direct and indirect fire.	Section observes enemy advancing and is engaged by direct fire. 3 BTR 60s, 2 BMPs; 800 to 1,200 meters.	Call for and adjust indirect fire. Control scout section fires. Report enemy information.	_____	_____
6. Section continues to develop situation while requesting permission to delay back to phase line specified in OPORD.	Section observes enemy continuing to advance. 3 BMPs, 3 T72s, 2 BTRs; 2,500 to 3,000 meters.	Conduct tactical movement.	_____	_____
7. Section bounds to subsequent phase line and conducts passage of lines.	Section observes enemy continuing to advance and is ordered to conduct passage of lines at grid.	Conduct passage of lines. Reorganize and reconsolidate.	_____	_____

Table _____ Date _____ Vehicle Number _____
 Gunner _____ Assistant Gunner _____
 Tactical Points _____ Gunnery Points _____
 Evaluator's Signature _____ Score _____

Table X B. Section Qualification Course (Night).

Task	Conditions/ Target/Situation	Tactical Tasks	Score	
			Gunnery	Tactics
1. Establish screen.	Order to establish screen.	Conduct screen. Select firing positions.	_____	_____
2. Detect reconnaissance patrol.	Observes 4 BTR 60s; 800 to 1,200 meters.	Perform actions on contact. Report enemy information.	_____	_____
3. Section engages with direct and indirect fire.	Section observes enemy advancing and is engaged by direct fire. 3 BTR 60s; 600 to 1,000 meters.	Call for and adjust indirect fire. Control scout section fires. Report enemy information.	_____	_____
4. Section continues to engage while requesting permission to delay back to phase line specified in OPOD.	Section observes enemy continuing to advance. 3 BMPs, 2 BTRs; 800 to 1,500 meters.	Control scout section fires. Conduct tactical movement.	_____	_____
5. Section bounds to subsequent phase line and conducts passage of lines.	Section observes enemy continuing to advance and is ordered to conduct passage of lines at grid.	Conduct passage of lines.	_____	_____

Table _____ Date _____ Vehicle Number _____

Gunner _____ Assistant Gunner _____

Tactical Points _____ Gunnery Points _____

Table XA Score _____ Table XB Score _____

Evaluator's Signature _____ Total Score _____

Figure 10-8. Target Destruction Matrix.

	TARGETS DESTROYED										TARGETS PRESENTED																															
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40												
5	200	182	166	154	142	132	124	118	110	104	100	96	90	86	84	80	76	74	72	68	66	64	62	60	58	56	54	52	51	50	50											
6	240	218	200	184	172	160	150	142	132	126	120	114	108	104	100	96	92	88	84	82	80	78	74	72	70	68	66	64	62	60	60											
7	280	254	234	214	200	186	174	164	156	148	140	132	126	122	116	112	108	104	100	96	92	90	88	84	82	80	78	76	74	72	70											
8	320	290	266	245	228	214	200	188	178	168	160	152	146	140	132	128	124	118	114	110	106	102	100	96	94	92	88	86	84	82	80											
9	360	328	300	276	258	240	226	212	200	190	180	172	164	156	150	144	138	132	128	124	120	116	112	108	106	102	100	96	94	92	90											
10	400	364	334	308	286	266	250	234	222	210	200	190	182	174	166	160	154	148	142	138	132	128	124	122	118	114	112	108	106	102	100											
11	400	366	338	314	294	276	258	244	232	220	210	200	192	184	176	170	162	158	152	146	142	138	132	130	126	122	118	116	112	110	110											
12	400	370	342	320	300	282	266	252	240	228	218	208	200	192	184	178	172	166	160	154	150	146	142	136	132	130	126	122	120	120	120											
13	400	372	346	326	306	288	274	260	248	236	226	216	208	200	192	186	180	176	168	162	158	152	148	144	140	136	132	130	126	122	120	120										
14	400	374	370	330	312	294	280	266	254	244	234	224	216	208	200	194	186	180	176	170	164	160	156	152	148	144	140	136	132	130	126	122	120									
15	400	376	352	334	316	300	286	272	260	250	240	230	222	214	206	200	194	188	182	176	172	166	162	158	154	150	146	142	138	134	130	126	122	120								
16	400	376	366	336	320	304	290	278	266	256	246	238	228	220	214	206	200	194	188	182	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120							
17	400	378	358	340	324	312	296	284	272	262	252	242	234	226	220	212	206	200	194	188	184	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120						
18	400	378	360	342	328	314	300	288	276	266	258	248	240	232	226	218	212	206	200	194	188	184	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120					
19	400	380	362	346	330	316	304	292	282	272	262	254	246	238	230	224	218	212	206	200	194	188	184	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120				
20	400	380	364	348	334	320	308	296	286	276	266	258	250	242	236	228	222	216	210	206	200	194	188	184	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120			
21	400	382	366	350	336	324	312	300	290	280	270	262	254	248	240	234	228	222	216	210	206	200	194	188	184	178	172	168	164	160	156	152	148	144	140	136	132	128	124	120		
22	400	382	366	352	338	326	314	304	294	284	276	266	258	252	244	238	232	226	220	214	208	202	196	190	184	178	172	166	160	154	148	142	136	130	124	118	112	106	100			
23	400	384	368	354	340	328	318	306	296	288	278	270	262	256	248	242	236	230	224	218	212	206	200	194	188	182	176	170	164	158	152	146	140	134	128	122	116	110	104	98	92	
24	400	384	370	356	342	332	320	310	300	290	282	274	266	260	252	246	240	234	228	222	216	210	204	198	192	186	180	174	168	162	156	150	144	138	132	126	120	114	108	102	96	90
25	400	384	370	358	344	334	322	312	304	294	286	278	270	264	256	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48	
26	400	386	372	358	346	336	326	316	306	298	288	282	274	266	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48	
27	400	386	372	360	348	338	328	318	308	300	292	284	276	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48	
28	400	386	374	362	350	340	330	320	312	302	294	286	278	270	262	254	246	238	230	222	214	206	198	190	182	174	166	158	150	142	134	126	118	110	102	94	86	78	70	62	54	
29	400	386	374	362	352	342	332	322	314	306	298	290	282	274	266	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
30	400	388	376	364	352	342	334	324	314	308	298	290	282	274	266	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
31	400	388	376	364	354	344	336	326	316	310	300	292	284	276	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
32	400	388	376	366	356	346	336	326	316	310	300	292	284	276	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
33	400	388	378	366	356	346	336	326	316	310	300	292	284	276	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
34	400	388	378	368	358	348	338	328	318	312	302	294	286	278	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
35	400	388	378	368	358	348	338	328	318	312	302	294	286	278	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
36	400	390	378	368	358	348	338	328	318	312	302	294	286	278	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
37	400	390	378	368	358	348	338	328	318	312	302	294	286	278	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
38	400	390	378	368	358	348	338	328	318	312	302	294	286	278	268	258	248	240	232	224	216	208	200	192	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	64	56	48
39	400	390	378	368	358	348	338	328	318	312																																