TANK CREWMAN (M60A1) READINESS TESTS

ARI Field Unit at Fort Knox, Kentucky

NOVEMBER 1979
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Commander

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## Title
Tank Crewman (M60A1) Readiness Tests

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### Abstract
This document provides tests and administrative guidance for evaluating M60A1 tank crewman job readiness. General procedures, time estimates, and support equipment for using the tests in a unit setting are given first. Remaining sections of the report give detailed test administration and scoring procedures for the crew positions, driver, loader, gunner, and tank commander.
The tests cover knowledge and skill aspects of the important crewman tasks: those tasks that are most relevant to crew gunnery proficiency. The tests are designed for use by the unit commander in diagnosing crewmen abilities in conducting before-operations checks, disassembling and assembling weapons, and driving, loading, and shooting in a tactical setting. When used with the three companion documents, Tank Crewman (M60A1) Training Modules, Tank Crew (M60A1) Performance Exercise, and Program Management for a Tank Crewman Skills Training Program, the readiness tests provide an integrated train-up package for annual gunnery evaluation.
TANK CREWMAN (M60A1) READINESS TESTS

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Approved for public release; distribution unlimited.
The Fort Knox Field Unit of the Army Research Institute for the Behavioral and Social Sciences (ARI) carries out research and exploratory development in the area of Armor training. An objective of this work is to develop, through analytic and field research, tank crew training methods that are effective and efficient.

This report is one of a set of four dealing with the development and maintenance of proficiency in M60AI tank crewman with special emphasis on application in reserve training.

Companion documents are:


The project of which this report is a part was conducted by personnel of the Human Resources Research Organization (HumRRO) under Contract No. DAHC 19-76-C-0001 and monitored by Donald F. Haggard, Chief of ARI Field Unit at Fort Knox. The research was done under Army Project 2Q763743A773 and is responsive to requirements of the U.S. Army Armor School at Fort Knox, the Army Training and Doctrine Command, and the Army Forces Command.

Joeseph Zeinner
Technical Director
SUMMARY

This report includes readiness tests for each of the four M60A1 duty positions (Driver, Loader, Gunner, Tank Commander). The individual readiness tests are to be used in three ways:

- As pre-tests, they are administered to crewmen before training begins. The crewmen then follow a particular instructional sequence, depending on the results of the pre-tests.

- As end of training mastery tests, after crewmen complete the instructional sequence directed by the results of the first administration.

- Diagnostically throughout training, to identify needs for refresher training.

The readiness tests consist of two types:

- Written readiness tests measure a crewman's knowledge level of particular tasks. These tests were developed from the technical audio-visual training program.

- Hands-on readiness tests measure a crewman's skill level for particular tasks. They were developed from a priority individual task list.

The battery of readiness tests for each crewman consists of:

- **Driver:** Operational Checks and Services (k)  
  Before Operations Procedures and  
  Tank Start-Up (s)  
  Target Acquisition (k)  
  Locating and Reporting Targets (k)  
  Tactical Driving (s)

- **Loader:** Weapons Maintenance (k and s)  
  Mission Preparation (k and s)  
  Combat Loading (k and s)  
  Target Acquisition (k)  
  Locating and Reporting Targets (s)
. **Gunner:** Weapons Maintenance (k and s)
   - Before Operations Procedures (s)
   - Weapon Systems Preparation (k and s)
   - Combat Loading (k and s)
   - Target Acquisition (k)
   - Locating and Reporting Targets (s)
   - Tactical Operations (k and s)

. **Tank Commander:** Weapons Maintenance (k and s)
   - Before Operations Procedures (s)
   - Weapon Systems Preparation (k and s)
   - Combat Loading (k and s)
   - Target Acquisition (k)
   - Locating and Reporting Targets (s)
   - Tactical Operations (k and s)

Time estimates to complete the readiness tests are:

. Driver  5 1/4 hours  . Loader  7 1/2 hours
. Gunner 11 hours  . Tank Commander 11 hours

The readiness tests provide the commander with a diagnostic tool for determining crewman proficiency. They can also be used as a screening device for the assignment of replacements or the reassignment of crewmembers.
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<td>2</td>
<td>CONSOLIDATED EQUIPMENT LIST FOR READINESS TESTS</td>
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</table>
TANK CREWMAN (M60A1) READINESS TESTS

INTRODUCTION

This research product contains procedures for administering individual readiness tests and a battery of tests for each crew position.

BACKGROUND

In 1977 the training needs of reserve component units were changing. The M48A1 tank was being replaced by the M48A5 tank and the draft had been eliminated. Equipment and personnel turbulence was on the increase and the cost of training related items continued to rise.

In response to the need for a new approach to reserve component training, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) initiated research to design training plans for operating and maintaining the M48A5 tank. In 1977, the Tank Crewman Skills Training Program (TCST) (Harris, Osborn, and Boldovici, 1977) was developed to accommodate the ARI requirement. The TCST program consisted of three major components:

- Crew Interaction Performance Test (CIPT)
- Duty Position Readiness Tests (DPRTs)
- Duty Position Training Modules (DPTMs)

PURPOSE

The purpose of the readiness tests is to measure the knowledge and skill levels of tank crewmembers in regards to performing various priority tasks.
This section provides guidance for administering duty position readiness tests. Specific items covered are:

- Standardized conditions
- Rater preparation
- Test interruptions
- Gunnery engagements
- Test site requirements
- Time requirements
- Training aids/devices requirements

STANDARDIZED CONDITIONS

Accurate assessment of individual crewman readiness requires standardized test conditions. All personnel tested must be presented with identical stimulus conditions. The test conditions described for each readiness test must be strictly adhered to. Events must occur according to the directions for establishing and administering each readiness test.

RATER PREPARATION

The raters are the key to a successful test. Rater responses must not be left to chance and every effort must be made to minimize rater subjectivity. The key to good rating lies in rater motivation and familiarity of the rater with the test as conducted "on the ground." The test administrator must frequently check the raters to insure objectivity and continuity.

The rater must know tank crewman requirements, the procedure for each test item, the purpose of the test, and the mechanics of evaluation. Raters must be prepared in advance and given a briefing on the subject matter they are to rate. They must be impressed with the importance of their duty, the need for objectivity, and the requirements for test security. Raters must be provided reference material such as FMs, TMs, job aids, and copies of pertinent SOPs.
TEST INTERRUPTIONS

It is recognized that events will occur that are not listed as test items. These may include equipment failures and reactions to events not planned for testing. The interruptions must not be treated administratively. If a serious event such as equipment failure occurs, the test should be terminated until the situation is corrected. A new order should be given starting the test where it stopped.

GUNNERY ENGAGEMENTS

Readiness tests entitled, "Tactical Driving," "Combat Loading," and "Tactical Operations," include tank gunnery engagements for the evaluation of specific crewmen's ability to accomplish various related tasks. Most of these test elements will be conducted in a simulated "dry firing" situation; however, some will be conducted during actual firing using the laser or sub-caliber firing devices.

TEST SITE REQUIREMENTS

The written readiness tests can be conducted in a classroom and some hands-on readiness tests can be conducted in the company area. However, those tests which involve tactical driving, combat loading, locating and reporting targets, and tactical operations require sufficient terrain (2 x 4 km) to set-up appropriate courses. Testing of tactical driving and combat loading can be accomplished simultaneously. One piece of terrain which has natural or man-made obstacles (vertical obstacles, ditches, hills, and water obstacles), depressions suitable for tank defilade, and simulated targets can be used to accommodate the "move-out" type tests.

TIME REQUIREMENTS

Time requirements to conduct the tests have been determined as the result of administering these tests to a large number of tank crewmen. However, the time requirements for hands-on tests are only estimates. Actual time will vary among units because of different terrain, availability of equipment, and location of facilities. Therefore, a dry run to determine realistic times to conduct hands-on readiness tests, is necessary before the tests can be administered. Table 1 indicates estimated hours to complete the tests.
TRAINING AIDS/DEVICE REQUIREMENTS

Table 2 indicates training aids/device required to administer readiness tests. TEC tapes pre-tests are used for written tests and the remaining items are used for the hands-on tests.

NOTE: A companion research product, "Program Management for Tank Crewman Skills Training Program," explains in detail the development of the program and provides implementing guidance for training managers and trainers.
### TABLE 1. TIME ESTIMATES FOR DUTY POSITION READINESS TESTS.

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<tr>
<th>POSITION</th>
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<th>HOURS</th>
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<td>1/2</td>
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<td>B</td>
<td>Before Operations Procedures and Tank Start-up (s)</td>
<td>1 1/2</td>
<td>-</td>
<td>1 1/2</td>
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<tr>
<td>C</td>
<td>Target Acquisition (k)</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>Locating and Reporting Targets (s)</td>
<td>3/4</td>
<td>-</td>
<td>3/4</td>
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<tr>
<td>E</td>
<td>Tactical Driving (s)</td>
<td>1 1/2</td>
<td>-</td>
<td>1 1/2</td>
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<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>5 1/4</strong></td>
<td><strong>-</strong></td>
<td><strong>5 1/4</strong></td>
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<td><strong>7 1/2</strong></td>
<td><strong>(1/4)</strong></td>
<td><strong>7 1/2</strong></td>
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<td><strong>GUNNER</strong></td>
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<td>-</td>
<td>1/2</td>
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<td>Weapons Maintenance (s)</td>
<td>1 (1/4)</td>
<td>-</td>
<td>1/4</td>
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<td>C</td>
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<td>3/4</td>
<td>-</td>
<td>3/4</td>
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<tr>
<td>D</td>
<td>Weapon Systems Preparation (k)</td>
<td>1 1/4 (1/4)</td>
<td>-</td>
<td>1 1/4</td>
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<td><strong>(3 1/4)</strong></td>
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**NOTE:** (k) indicates knowledge (written tests) and (s) indicates skill (hand-on tests).
### TABLE 2. CONSOLIDATED EQUIPMENT LISTS FOR READINESS TESTS

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(TEC pre-tests, 1 per crewmember)

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<td>Dummy main gun rounds</td>
<td>LD, GN, TC</td>
<td>3</td>
<td>APDS 3 HEAT 2 HEP</td>
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<tr>
<td>Ammunition Stowage Plan</td>
<td>LD, GN, TC</td>
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<tr>
<td>Dummy 7.62 ammunition</td>
<td>LD, GN, TC</td>
<td>3</td>
<td>ten rd. belts</td>
</tr>
<tr>
<td>Dummy caliber .50 ammunition</td>
<td>LD, GN, TC</td>
<td>3</td>
<td>ten rd. belts</td>
</tr>
<tr>
<td>Cardboard representation of 7.62 box ammunition</td>
<td>LD, GN, TC</td>
<td>3</td>
<td>sets, 15 ea.</td>
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<tr>
<td>Cardboard representation of caliber .50 box ammunition</td>
<td>LD, GN, TC</td>
<td>3</td>
<td>sets, 15 ea.</td>
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<td>Replenisher tape mockup</td>
<td>LD, GN, TC</td>
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<tr>
<td>Coax</td>
<td>LD, GN, TC</td>
<td>1</td>
<td>per tank</td>
</tr>
<tr>
<td>M85 machinegun</td>
<td>LD, GN, TC</td>
<td>1</td>
<td>per tank</td>
</tr>
<tr>
<td>Item</td>
<td>Used by</td>
<td>Quantity</td>
<td>Remarks</td>
</tr>
<tr>
<td>-------------------------------------------</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Block of wood 1&quot;x6&quot;x6&quot;</td>
<td>LD</td>
<td>1 per tank</td>
<td></td>
</tr>
<tr>
<td>Heavy black thread</td>
<td>LD</td>
<td>1 ball</td>
<td></td>
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<tr>
<td>Tape (masking)</td>
<td>LD</td>
<td>1 roll</td>
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<tr>
<td>Equipment to remove breechblock</td>
<td>LD, GN, TC</td>
<td>1 per tank</td>
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<tr>
<td>Main gun zero target</td>
<td>LD, GN, TC</td>
<td>1</td>
<td></td>
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<tr>
<td>Coax zero panel</td>
<td>LD, GN, TC</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>M85 machinegun zero panel</td>
<td>TC</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Targets</td>
<td>LD, GN, TC</td>
<td>1 set</td>
<td>See TC Readiness Test, Part K.</td>
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<tr>
<td>Beseler Cue/See</td>
<td>DV, LD, GN, TC</td>
<td>4</td>
<td></td>
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<tr>
<td>Binoculars</td>
<td>LD, GN, TC</td>
<td>1 per tank</td>
<td></td>
</tr>
<tr>
<td>Stopwatch</td>
<td>LD, GN, TC</td>
<td>1 per tank</td>
<td></td>
</tr>
<tr>
<td>Protective mask</td>
<td>DV, LD, GN, TC</td>
<td>1 per crewman</td>
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<tr>
<td>M60AI tank</td>
<td>DV, LD, GN, TC</td>
<td>1 per crew</td>
<td>See DV Readiness Test, Park E.</td>
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<tr>
<td>Driving course</td>
<td>DV</td>
<td>1</td>
<td>See DV, LD, GN, TC Readiness Test on &quot;Locating and Reporting Targets&quot;</td>
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<tr>
<td>Target acquisition course</td>
<td>DV, LD, GN, TC</td>
<td>1</td>
<td>See GN, TC Readiness Test on Tactical Operations</td>
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<tr>
<td>Target engagement course</td>
<td>GN, TC</td>
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READYNESS TESTS

Readiness tests for each crewmember are contained in Appendixes A through D. Each appendix includes a consolidated listing of each crew position readiness test battery, written readiness tests, and hands-on readiness tests.

CONSOLIDATED READINESS TEST LISTING

The consolidated listing includes the following information about the readiness test battery:

- Required time
- Cross training
- Part identification
  - Type
  - Time
  - Location
  - Support
  - Scoring

WRITTEN READINESS TESTS

These tests include the following subsections:

- Test overview
  - Title
  - Part identification
  - Conditions
  - Instructions to specific crewman
  - Tasks
  - Explanatory notes
- List of TEC lesson pre-tests
- Answer sheet
- Answer key
HANDS-ON READINESS TESTS

These tests include the following information:

- Title
- Part identification
- Conditions
- Instructions to specific crewman
- Tasks
- Explanatory notes
- Performance measures
# APPENDIXES

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<td>Before Operations Procedures and Tank Start-Up (Part B, Skill)</td>
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<td>Mission Preparation (Part C, Knowledge)</td>
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<td>Mission Preparation (Part I, Skill)</td>
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<td>Combat Loading (Part F, Skill)</td>
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<td>Target Acquisition (Part G, Knowledge)</td>
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<td>Weapon Systems Preparation (Part E, Skill)</td>
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<tr>
<td>Combat Loading (Part G, Skill)</td>
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</tr>
<tr>
<td>Target Acquisition (Part H, Knowledge)</td>
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<td>Locating and Reporting Targets (Part I, Skill)</td>
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<td><strong>D</strong> Tank Commander's Readiness Tests</td>
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<tr>
<td>Weapons Maintenance (Part A, Knowledge)</td>
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<tr>
<td>Weapons Maintenance (Part B, Skill)</td>
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</tr>
<tr>
<td>Before Operations Procedures (Part C, Skill)</td>
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<td>Weapon Systems Preparation (Part D, Knowledge)</td>
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<td>Weapon Systems Preparation (Part E, Skill)</td>
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<td>Combat Loading (Part F, Knowledge)</td>
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<td>Target Acquisition (Part H, Knowledge)</td>
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<td>Tactical Operations (Part J, Knowledge)</td>
<td></td>
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<tr>
<td>Tactical Operations (Part K, Skill)</td>
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</tr>
</tbody>
</table>
APPENDIX A

DRIVER'S READINESS TEST
REQUIRED TIME. 5 1/4 hours

CROSS TRAINING. Tank Crew Gunnery Skills Test (TCGST) tasks, FM 17-12-2 are indicated by an *; Cross Training tasks are indicated by a # symbol.

PART A. OPERATIONAL CHECKS AND SERVICES (W)

Type: Written pre-tests for TEC Lessons:

- 020-171-5366-F (Before Operations Maintenance, Part I)
- 020-171-5367-F (Before Operations Maintenance, Part II)
- 020-171-5368-F (Before Operations and At Halt Maintenance Checks and Services)
- 020-171-5369-F (After Operations Maintenance Checks and Services, Part I)
- 020-171-5370-F (After Operations Maintenance Checks and Services, Part II)

Time: 1/2 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART B. BEFORE OPERATIONS PROCEDURES AND TANK START-UP (HO)

Type: Hands-On

Time: 1 1/2 hours
Location: Company Area or UTS
Support: Tank and TC Scorer
Scoring: 100% correct
PART C. TARGET ACQUISITION (W)

Type: Written pre-tests for TEC Lessons:
- 020-171-1611-F (Target Range Determination)
- 020-171-1612-F (Locating and Reporting Targets)
- 020-171-1614-F (Target Acquisition Scanning Techniques)
- 935-171-0203-F (Armor Vehicle Recognition)

Time: 1 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART D. LOCATING AND REPORTING TARGETS (HO)

Type: Hands-On
Time: 3/4 hour
Location: UTS
Support: Tank and TC Scorer
Scoring: 100% correct

PART E. TACTICAL DRIVING (HO)

Type: Hands-On
Time: 1 1/2 hour
Location: UTS
Support: Tank and TC Scorer
Scoring: 100% correct
PART A. OPERATIONAL CHECKS AND SERVICES (W)

CONDITIONS. The Driver is in a classroom and is administered TEC pre-tests 020-171-5366-F through 020-171-5370-F.

INSTRUCTIONS TO DRIVER. "You have received a test booklet and answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of one part: Before, During and After Operations Maintenance Checks and Services (TEC Lessons 020-171-5366-F through 020-171-5370-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Identify deficiencies in the tank suspension system:

- road wheels
- center guides
- support rollers
- torsion bars
- driving sprockets
- shocks
- track adjusting link assembly
- track tension

Identify deficiencies in:

- battery cables
- hatch latches
- fire extinguisher
- oil coolers

Explain the meaning of oil dip stick markings.
Explain the procedure for checking the brakes.
Explain the procedure for checking the IR headlights.
Explain the safety precautions during refueling.

NOTES.

a. See Module D-1 for remedial training of deficiencies.

b. Estimated time, 1/2 hour.
The Test Proctor will administer the following TEC Lesson pre-tests and the Driver will answer only those questions so indicated:

- Before, During, and After Operation Maintenance Checks and Services (020-171-5366-F through 020-171-5370-F).

- Driver will answer all questions.
DRIVER'S READINESS TEST

PART A: OPERATIONAL CHECKS AND SERVICES

TEC Lessons 020-171-5366-F
through 020-171-5370-F

ANSWER SHEET

Name

SSN_________________________ Tank No._________________________

Scorer_________________________ Test Date_________________________

020-171-5366-F through
020-171-5370-F

1.a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

2.a.

b.

c.
3.a.
b.
4.
5.
6.
7.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
DRIVER'S READINESS TEST

PART A: OPERATIONAL CHECKS AND SERVICES

PRE-TEST ANSWER KEY

TEC Lessons 020-171-5366-F
through 020-171-5370-F

ANSWER KEY

BEFORE, DURING AND AFTER OPERATION MAINTENANCE CHECKS AND SERVICES
M60/M60A1 TANK
(020-171-5366-F through 020-171-5370-F)

1. For each of the pictures in question one the soldier should have identified the problem, if any, and stated the action needed.

a. This road wheel is cracked and must be replaced. Report it on a DA 2404 to organizational maintenance. (Reference Lesson 5366)

b. OK. (Reference Lesson 5366)

c. The support roller bearing is frozen up; the support roller and the bearing must be replaced. Report this on a DA 2404. (Reference Lesson 5366)

d. The road wheel seal is leaking and must be replaced. Report this on a DA 2404. (Reference Lesson 5366 and 5368)

e. This visual shows a broken torsion bar. Report it on a DA 2404. (Reference Lesson 5366)

f. OK. (Reference Lesson 5366)

g. This sprocket is excessively worn and must be replaced. Report it on a DA 2404. (Reference Lesson 5366)

h. OK. (Reference Lesson 5366)

i. This shock is leaking and should be replaced. Report this situation on a DA 2404. (Reference Lesson 5366)

j. In this picture the track tension is too tight. It must be adjusted by the crew. (Reference Lesson 5370)

k. The hold open latch is not in its proper UP position. Lock the hatch securely UP or DOWN. (Reference Lesson 5367)
1. There is no green inspection tag on this extinguisher. Turn this one in to organizational maintenance for inspection. (Reference Lesson 5367)

m. Replace the frayed cable on this battery. (Reference Lesson 5370)

2. Here are the actions you must take for each situation:

a. Add oil to the full mark. (Reference Lesson 5366)

b. Add oil to the add mark. (Reference Lesson 5366)

c. Notify organizational maintenance, you may have to have some oil drained. (Reference Lesson 5366)

3. Check your answers against these:

a. Press on the brake pedal until the brake pressure gage reads between 750 and 900 psi. Maintain that position on the pedal for 30 seconds. If the pressure drops you have a brake problem. (Reference Lesson 5367 and 5368)

b. Insure that the brake pedal does not go to the floor, that the brakes will stop the vehicle, and that the pedal linkage appears to be in good working condition. (Reference Lesson 5367)

4. When refueling have a man stand by with a fire extinguisher, turn the master battery switch OFF, ground the hose nozzle to the tank, and never allow anyone to smoke in the immediate area. (Reference Lesson 5369)

5. You should check for oil leaks, obstructed screen, and loose mounting bolts. (Reference Lesson 5369)

6. Turn on the light to the IR mode and then feel for heat coming from the lens. Never look into the light. (Reference Lesson 5369)

7. The red groove means that the track adjusting link is extended as far as it can be. A track block should be removed and the track tension readjusted. (Reference Lesson 5370)

SCORING KEY.

Award 5 points for each correct response (105 points possible).

PASSING SCORE = 95 points.
PART B. BEFORE-OPERATIONS PROCEDURES AND TANK START-UP (HO)

CONDITIONS. Fully operational M60A1 tank situated on level ground with main gun over rear deck and drain valves open. The tank has loose track tension and a M24 periscope which is dirty or has parts missing.

INSTRUCTIONS TO DRIVER. "Prepare the tank for night driving in an NBC environment. Your activities will include Driver requirements for: checking the suspension system, battery cables, hatch latches, fire extinguishers, and oil coolers for deficiencies, checking engine and transmission oil levels, and explaining safety precautions during refueling. You will be scored on what you do as well as how you do it. I will observe your performance and serve as TC and Loader as needed."

TASKS.

- Inspect tank suspension system for deficiencies.
- Inspect battery cables, hatch latches, fire extinguishers, and oil coolers for deficiencies.
- Check brakes for proper operation.
- Explain safety precautions for refueling.
- Remove M27 periscope.
- Perform before-operations checks and services on M24 (IR) and M27 periscope.
- Install M24 (IR) periscope.
- *Place M24 (IR) periscope into operation.
- Start tank engine.
- *Perform before-operations checks and services on engine and transmission oil levels.
- Place tank in motion.
- *Position tank for checking track tension.
- Operate tank intercommunications system.
- *Perform main gun prepare-to-fire procedures.
- Perform before-operations checks and services on gas particulate unit.

NOTES.

a. Driver should not be given this test until he has passed Driver's Readiness Test, Part A.
b. Remedial training on tasks failed should be provided on the spot but after Driver has completed all of Part B. See Module D-2 for remedial training.

c. It is not necessary to perform the tasks in the order given; however, the steps within each task must be performed in order.

d. Estimated time, 1 1/2 hours.

PERFORMANCE MEASURES.

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<tr>
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<tr>
<td>1.</td>
<td>INSPECT TANK SUSPENSION SYSTEM FOR DEFICIENCIES</td>
<td>Yes No NA</td>
</tr>
<tr>
<td></td>
<td>Road wheels.</td>
<td></td>
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<tr>
<td></td>
<td>Center guides.</td>
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<td></td>
<td>Support rollers.</td>
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<td></td>
<td>Torsion bar.</td>
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<td></td>
<td>Driving sprockets.</td>
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<td></td>
<td>Shocks.</td>
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<tr>
<td></td>
<td>Track adjusting link assembly.</td>
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<tr>
<td>2.</td>
<td>INSPECT OTHER COMPONENTS FOR DEFICIENCIES</td>
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</tr>
<tr>
<td></td>
<td>Battery cables.</td>
<td></td>
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<td></td>
<td>Hatch latches.</td>
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<tr>
<td></td>
<td>Fire extinguishers.</td>
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</tr>
<tr>
<td></td>
<td>Oil coolers.</td>
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<tr>
<td>3.</td>
<td>CHECK BRAKES FOR PROPER OPERATION</td>
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<tr>
<td></td>
<td>Depressed brake pedal until brake pressure gage read between 750-900 psi.</td>
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</tr>
<tr>
<td></td>
<td>Maintained pressure on brake pedal for 30 seconds.</td>
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</tr>
<tr>
<td></td>
<td>Checked brake pressure gage to determine if there was a pressure drop.</td>
<td></td>
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<tr>
<td>4.</td>
<td>EXPLAIN SAFETY PRECAUTIONS FOR REFUELING</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicated one crewmember stood by with a fire extinguisher.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicated master battery switch was in OFF position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicated hose nozzle must be grounded to tank.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicated no smoking was allowed in immediate area.</td>
<td></td>
</tr>
</tbody>
</table>
5. **REMOVE M27 PERISCOPE**

- Loosened wing nuts on both sides of periscope.
- Rotated retainers until clear of periscope mounting lugs.
- Removed periscope from bracket.

6. **PERFORM BEFORE-OPERATIONS MAINTENANCE CHECKS AND SERVICES ON THE M24 (IR) PERISCOPE AND M27 PERISCOPE**

   a. **M24 (IR) Periscope**

      - Inspected M24 (IR) periscope and spare head for cracked and dirty lenses and completeness.
      - Recorded on DA Form 2404 damaged or unserviceable parts detected.

   b. **M27 Periscope**

      - Inspected M27 periscope and spare head for cracks and dirty lenses.
      - Cleaned dirty lenses.
      - Recorded on DA Form 2404 any damaged lenses.

7. **INSTALL THE M24 (IR) PERISCOPE**

   - Closed Driver's hatch.
   - Placed mastery battery switch in OFF position.
   - Instructed crew member to rotate turret so gun tube was forward.
   - Pulled periscope holder lid handle down with fingers of left hand while pushing up on lid latch with thumb.
   - Pushed upward and opened lid.
   - Reached to rear of seat and unlatched both catches on IR periscope stowage box.
   - Removed periscope from stowage box.
   - Pulled up (rearward) on elevating adjustment lever insuring bind (tension) has been released on elevation clamp and elevation clamp pivots.
   - Loosened jam nut on front (forward) inside of elevation clamp.
   - Used both hands and positioned periscope in periscope holder.
   - Pushed up on periscope until it locked in holder, (insured periscope was locked in holder before released.)
   - Insured elevation clamp was positioned in periscope holder detent.
- Tightened adjustment screw on front right hand inside the elevation clamp until elevation clamp was firmly seated in periscope holder detent.
- Tightened elevation clamp adjustment screw jam nut.
- Pushed elevation adjustment lever downward (forward) and locked periscope.
- Unscrewed dust cap from power receptacle (center) location.
- Unscrewed power cable connecting plug from stowage receptacle on right hand side of compartment.
- Threaded power cable connecting plug into periscope receptacle and hand tightened.
- Installed periscope without exposing it to direct sunlight.

8. **PLACE THE M24 (IR) PERISCOPE INTO OPERATION**

- Turned master battery switch ON.
- Placed blackout selector switch in BO DRIVE.
- Turned IR switch ON.
- Visually checked to insure IR indicator lamp was lit.
- Turned lighting control switch handle to the left.
- Pulled elevation adjustment lever up.
- Adjusted periscope elevation angle to a comfortable position by moving periscope with both hands.
- Pushed elevation adjustment lever down to lock periscope in position.
- As necessary, loosened two inner wing nuts on headrest until the proper eye distance was obtained, then retightened (hand tight) both wing nuts.
- As necessary, bent headrest to fit head contour by pulling, pushing or twisting on each side of headrest.
- Allowed periscope to warm up for 5 minutes before adjusting focus.
- Unscrewed left and right dust caps from bottom of focus controls.
- Rotated left and right focus control knobs until view from each eyepiece appeared with maximum sharpness.
- Screwed left and right dust covers back over focus control knobs and tightened finger tight.
9. START TANK ENGINE

. Locked hatches in open or closed position.  
. Checked that drain valves were closed.  
. Locked parking brakes by depressing brake pedal and placing the transmission shift lever in PARK.  
. Placed steering control in center position.  
. Placed fuel shut-off valve handle in ON position.  
. Placed fuel pump switch in ON position.  
. Placed generator switch in ON position.  
. Placed master battery switch in ON position.  
. Checked that power plant warning lamp and master control switch indicator lamps were lit.  
. Checked to insure fuel gages were operating.  
. Purged the fuel lines of air, if tank had not been operated within the past week.  
. Depressed accelerator pedal about 2/3 to 3/4 of full displacement and firmly pressed and held starter switch until engine started (but no longer than 15 seconds).  
. As soon as engine started, released starter switch and checked that generator blower was operating.  
. Allowed engine to warm up for at least three minutes at 1000 to 1200 rpm.  
. Reduced engine rpm to idle speed (700 to 750 rpm) just prior to shifting.

10. PERFORM BEFORE-OPERATIONS CHECKS AND SERVICES ON TANK ENGINE AND TRANSMISSION OIL LEVELS

(Loader checks oil levels while Driver performs required related tasks.)

. Set parking brake (on "Loader's" command to start engine).  
. Started tank engine (on "Loader's" command to start engine).  
. Idled engine between 1000-1200 rpm for 5 minutes.  
. Reduced engine idle to 700-750 rpm.

11. PLACE TANK IN MOTION

. Told crew members to secure hatches in the open or closed position.  
. Turned on appropriate lights.  
. Depressed accelerator to disengage the accelerator lock.  
. Released accelerator.  
. Depressed brake pedal and moved transmission shift lever to NEUTRAL with engine idle speed at 700-750 rpm.
Yes No NA

. Released parking brake. __________________________
. Maintained pressure on brake pedal and moved trans-
mission shift lever to LOW. __________________________
. Released brake pedal and depressed accelerator slowly. __________________________

12. POSITION TANK FOR CHECKING TRACK TENSION

(Loader checks and adjusts track tension while Driver performs required related tasks.)

. Moved tank forward on level hard surface and, when
   signaled by the Loader, coasted to a stop without
   applying brakes. __________________________
. Made final forward adjustments (without applying
   brakes) in response to Loader's signals in order
   to aline a track link on #2 support roller. __________________________

13. OPERATE TANK INTERCOMMUNICATIONS SYSTEM

. Adjusted CVC helmet to head. __________________________
. Insured CVC helmet radio-interphone switch is in
   center position. __________________________
. Connected interphone connector to plug at left bottom
   of control box. __________________________
. Connected radio-audio connector to plug at right bottom
   of control box. __________________________
. Placed control box monitor switch in either the ALL,
   A, INT ONLY, or B position. __________________________
. Transmitted to TC, DRIVER READY. __________________________

(TC insures tank is running and radio is ON.)

14. PERFORM MAIN GUN PREPARE-TO-FIRE PROCEDURES

. Cleared periscope. __________________________
. Lowered seat for close hatch driving. __________________________
. Closed and locked Driver's hatch. __________________________
. Turned master control switch to ON. __________________________
. Started engine on TC's command, CHECK FIRING SWITCHES. __________________________
. Reported DRIVER READY on TC's command, REPORT. __________________________

15. PERFORM BEFORE-OPERATIONS CHECKS AND SERVICES ON THE GAS PARTICULATE UNIT

. Inspected precleaner, particulate filter unit housing,
gas filter cannisters and air heater for dents,
missing or loose control knob and/or pinched or
blocked air hose. __________________________

26
Wiped precleaner, particulate filter housing, gas filter cannisters and air heater clean with a damp rag.
- Insured hose assemblies and electrical cables were tight and serviceable.
- Removed spring clip from air inlet openings.
- Placed gas particulate switch ON.
- Disconnected air duct hose from Driver's airface connector and checked for air flow.
- Rotated air heater knob to ON and checked for indicator lamp operation.
- Checked air flow through hose.
- Allowed air to warm up at least 5 minutes.
- Checked air temperature.
- Adjusted protective mask and attached air hose.
- Requested other crew members to check gas particulate unit.
- Removed and stowed air hose and protective mask.
- Rotated air heater knob to OFF and listened for audible click.
- Placed gas particulate switch OFF.
- Replaced spring clip to air inlet openings.
- Recorded on DA Form 2404 any damaged or unserviceable components.

### SCORING.

To pass, Driver must have:

a. Removed M27, installed M24, and inspected both without cueing by the scorer.

b. Been checked "Yes" or "NA" on each performance measure.

c. Task steps which do not apply to the situation, i.e., DA Form 2404 entries when no deficiencies are found will be scored "NA."

### COMMENTS.
(Recommended remedial training, etc.)

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PASS FAIL

27
DRIVER'S READINESS TEST

PART C. TARGET ACQUISITION (W)

CONDITIONS. The Driver is in a classroom and is administered TEC pre-tests 020-171-1611-F, 020-171-1612-F, 020-171-1614-F, and 935-171-0203-F.

INSTRUCTIONS TO DRIVER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of four parts: Target Range Estimation (TEC Lesson 020-171-1611-F), Locating and Reporting Targets (TEC Lesson 020-171-1612-F), Target Acquisition Scanning Techniques (TEC Lesson 020-171-1614-F), and Armor Vehicle Recognition (TEC Lesson 935-171-0203-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any key questions concerning test context. When you finish turn in the test booklet and answer sheet to the Test Proctor.

TASKS.

Explain the range estimation method in which you estimate the range half the distance to the target.
Explain the range estimation method in which a target at a known range appears half as big as a like target at an unknown range.
Explain the range estimation method in which a target at a known range appears twice as big as a like target at an unknown range.
Explain location of targets by the clock system.
Explain reporting of targets by the clock system.
Explain the technique of quick search scanning of an area.
Explain ways to adapt your eyes to the darkness.
Explain how to preserve night vision.
Explain how to scan an area at night.
*Identify US and Foreign Armor Vehicles.

NOTES.

a. See Module D-3 for remedial training of deficiencies.
b. Estimated time, 1 hour.
DRIVER'S READINESS TEST

PART C: TARGET ACQUISITION

The Test Proctor will administer the following TEC Lesson pre-tests and the Driver will answer only those questions so indicated:

- Target Range Estimation (020-171-1611-F)
  - Driver will answer questions 2, 4, and 5.
- Locating and Reporting Targets (020-171-1612-F)
  - Driver will answer question 1.
- Target Acquisition Scanning Techniques (020-171-1614-F)
  - Driver will answer questions 1, 3, 4, and 6
- Armor Vehicle Recognition (935-171-0203-F)
  - Driver will identify all vehicles shown on TEC tape, vehicle 1 through vehicle 17.
DRIVER'S READINESS TEST

PART C. TARGET ACQUISITION


ANSWER SHEET

Name ____________________________

SSN ____________________________  Tank No. ____________________________

Scorer ____________________________  Test Date ____________________________

020-171-1611-F
2. Step a.
   Step b.
   Step c.
4.
5.

020-171-1612-F
1.a. Target
   b. Posture
   c. Direction
   d. Range

020-171-1614-F
1.
3.
4.
6.a.
   b.
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COMMENT. (Recommended remedial training, etc.)

PASS FAIL
DRIVER'S READINESS TEST

PART C. TARGET ACQUISITION

PRE-TEST ANSWER KEY

TARGET RANGE ESTIMATION
(020-171-1611-F)

2. The Driver's diagram or description must include three steps:
   Step a. Divide the distance to the target in half.
   Step b. Estimate the distance to the halfway point in 100 meter increments.
   Step c. Double the range for estimated range to target.

4. 1000 meters
5. 600 meters

LOCATING AND REPORTING TARGETS
(020-171-1612-F)

1.a. Target TANK
     b. Posture MOVING LEFT
     c. Direction ONE O'CLOCK (12:00 or 2:00 is acceptable)
     d. Range ONE FIVE HUNDRED

TARGET ACQUISITION SCANNING TECHNIQUES
(020-171-1614-F)

1. A, C
2. B, C
3. A

6.a. Short, jerky movements
     b. Pause a few seconds at each point
# Armor Vehicle Recognition

**Vehicle** | **Country** | **Vehicle** | **Country**
---|---|---|---
1. AMX-30 | French | 10. AMX-13 | French
3. CHIEFTON | British | 12. JAG-PANZER | German
4. ASU-57 | Soviet | 13. PT-76 | Soviet
6. T-10 | Soviet | 15. LEOPARD | German
7. CENTURIAN | British | 16. ASU-85 | Soviet
9. T-55 | Soviet

**Scoring Key.**

Award 5 points for each correct response (165 points possible).

**Passing Score = 150 points.**
PART D. LOCATING AND REPORTING TARGETS (HO)

CONDITIONS. Fully operational M60A1 tank located at observation point on target acquisition course. The course includes silhouette, tank and truck targets located at ranges from 400 meters to 1500 meters. The Driver will be buttoned up and while looking through his M27 periscope respond to the TC's instructions. (The tank will be positioned with the front pointing directly down the center of the range, Driver's target area of responsibility is from 10 o'clock to 2 o'clock.

INSTRUCTIONS TO DRIVER. "This is a test of your target acquisition ability. You will be required to scan the area, locate targets in the area, estimate range to various targets, and report target locations. React to my instructions."

TASKS.

Conduct a quick search scan of the area.
*Locate and identify targets in the area.
Estimate range to targets in the area.
Report location of targets in the area.

NOTES.

a. Driver should not be given this test until he has passed Driver's Readiness Test, Part C.
b. Tasks should be performed in order given.
c. See example layout of target acquisition course.
d. See Module D-4 for remedial training of deficiencies.
e. Estimated time, 3/4 hour.
PERFORMANCE MEASURES.

1. CONDUCT A QUICK SEARCH SCAN OF THE AREA

   Given the special command to SCAN YOUR TARGET AREA OF RESPONSIBILITY:
   
   . Scanned area directly to the front, going from close in to far out.  
   . Scanned area to the left (or right) of initial area, overlapping initial area, going from close in to far out. 
   . Scanned area to the right (or left) of initial area overlapping initial area, going from close in to far out.

2. LOCATE AND IDENTIFY TARGETS IN THE AREA

   Given the special command, LOCATE AND IDENTIFY TARGETS IN THE AREA, the Driver will have five minutes to locate and identify all targets.

   . Located and identified Target 1 (TROOPS). 
   . Located and identified Target 2 (TANK). 
   . Located and identified Target 3 (TANK). 
   . Located and identified Target 4 (TRUCK). 
   . Located and identified Target 5 (TROOPS). 
   . Located and identified Target 6 (TRUCK). 
   . Located and identified Target 7 (TANK). 
   . Located and identified Target 8 (TROOPS).

3. ESTIMATE RANGE TO TARGETS IN THE AREA

   Given the range of 1000 meters to Target 2 and the special command to DETERMINE RANGE TO ALL TARGETS IN THE AREA, the Driver will determine the range to all targets to within ± 100 meters.

   . Determined range to Target 1 as 400 meters. 
   . Determined range to Target 3 as 500 meters. 
   . Determined range to Target 4 as 1200 meters. 
   . Determined range to Target 5 as 1000 meters. 
   . Determined range to Target 6 as 1200 meters. 
   . Determined range to Target 7 as 1500 meters. 
   . Determined range to Target 8 as 900 meters.
4. REPORT LOCATION OF TARGETS IN AREA

Given a designated target and the special command, REPORT LOCATION OF TARGET NO. ____, the Driver will report the type, posture (moving or stationary), location (by clock system, within one hour deviation), and range to the target (within ± 100 meters).

* Target 1. TROOPS, STATIONARY, TEN O'CLOCK, FOUR HUNDRED
* Target 3. TANK, STATIONARY, ONE O'CLOCK, FIVE HUNDRED
* Target 4. TRUCK, MOVING LEFT TO RIGHT, ELEVEN O'CLOCK, TWELVE HUNDRED
* Target 5. TROOPS, STATIONARY, ONE O'CLOCK, THOUSAND
* Target 6. TRUCK, STATIONARY, TWELVE O'CLOCK, ONE TWO HUNDRED
* Target 7. TANK, STATIONARY, TWELVE O'CLOCK, ONE FIVE HUNDRED
* Target 8. TROOPS, STATIONARY, TWO O'CLOCK, NINE HUNDRED.

SCORING.

To pass, Driver must have:

a. Located and identified all targets in area within five minutes.

b. Estimated range to all targets within ± 100 meters.

c. Given location of all targets, within one hour deviation.

d. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)
TARGET ACQUISITION COURSE

Example. (Driver's target area of responsibility is from 10 o'clock to 2 o'clock)

Left Limit 1600 meters Right Limit

(No marker)

800 meters

(No marker)

1/2" = 100 meters

Observation Point 37
DRIVER'S READINESS TEST

PART E. TACTICAL DRIVING (HO)

CONDITIONS. Fully operational M60Al. Tactical driving course including obstacles (ditch and vertical incline) and simulated targets. Scenario of fire commands and driving commands to be given by TC.

INSTRUCTIONS TO DRIVER. "This is a test of your tactical driving ability. We are going on a simulated mission. You will drive buttoned up and you should listen and react to my commands when I give them; but you should also react as necessary if I fail to give you a command. Watch for targets and report them as you normally would."

TASKS.

Drive over varied terrain.
Drive to defilade firing position upon enemy contact.
Drive in response to fire commands.
Acquire targets.
*Observe and sense rounds.

NOTES.

a. Driver should not be given this test until he has passed Driver's Readiness Test, Parts A through D.
b. Portions of Part B of the test that were failed previously can be retested as part of the preparation for this test.
c. It is not necessary to perform the tasks in the order given.
d. If available a grade of 50%-60% should be used for performance measures 2c and 2d. If such a grade is not available, attempt to use a grade steep enough to descend forward with the transmission in Reverse.
e. See example layout of tactical driving course.
f. See example target layout for sensing rounds.
g. See Module D-5 for remedial training of deficiencies.
h. Estimated time, 1 1/2 hours.
PERFORMANCE MEASURES.

1. DRIVE OVER VARIED TERRAIN

a. Cross a Vertical Obstacle.

- Warned crew members of the obstacle.
- Pushed transmission shift lever up in L when speed reached 9 mph or less.
- Met obstacle with both tracks simultaneously.
- Applied sufficient acceleration to climb obstacle.
- Continued to accelerate until tank started to counter balance.
- Decelerated as tank counter balanced forward.
- Did not attempt to steer when climbing obstacle.

b. Cross a Ditch.

- Warned crew of ditch.
- Pushed transmission shift lever up to L when speed reached 9 mph or less.
- Decelerated as tank counter balanced into ditch.
- Eased tank to bottom by braking and releasing brake.
- Met bottom of ditch with both tracks simultaneously.
- Accelerated tank as tracks struck bottom.
- Decelerated tank as it pitched over top.

c. Ascend a Steep Grade.

- Pushed transmission shift lever up to L position when speed reached 9 mph or less.
- Accelerated to climb incline.
- On steep grade (50%-60%) ascended backwards using reverse.

d. Descend a Steep Grade.

- Pushed transmission lever up to L position when speed reached 9 mph or less.
- Used brake to maintain engine speed at less than 2600 rpm.
- On a steep grade (50%-60%) stopped tank, pulled transmission shift lever to REVERSE and allowed tank to move forward.
- Accelerated to slow tank's descent, maintaining sufficient engine speed to keep engine above a stall.
- Pulled steering wheel down counterclockwise to turn right, pulled steering wheel down clockwise to turn left.
- Stopped tank if engine stalled.
- Stopped and restarted the engine, if engine started to run backwards.
Pushed transmission shift lever up to NEUTRAL, maintained brake pressure, and allowed tank to slide down incline without steering if the engine started to run backwards and brakes would not stop the tank.

2. PERFORM EVASIVE MANEUVERS UPON ENEMY CONTACT

a. Follow TC Commands.
   . Took up correct firing position in response to TC's directions.
   . Followed route given by TC.

b. Begin Evasive Maneuvers on Own Initiative as Necessary.
   . Selected a hull defilade position where available.
   . Oriented hull toward target.
   . Selected a route with cover and concealment.

3. DRIVE INTO DEFI LADE FIRING POSITION UPON ENEMY CONTACT

   . Drove to initial defilade firing position following direction from TC.
   . Moved tank into the defilade position with front portion of tank toward target.
   . Drove vehicle into position slowly.
   . Coordinated with TC and Gunner in positioning tank as level as terrain permitted.
   . Brought vehicle to a smooth and gradual halt.

4. DRIVE IN RESPONSE TO FIRE COMMANDS

a. Drive During Coax Area Target Engagement.
   . Continued to drive in response to coax area target element in fire command.
   . Maintained steady rate of speed.
   . Maneuvered hull toward target.
   . Announced adverse terrain conditions.
   . Selected best available route.
   . Avoided obstacles and ditches.
   . Minimized directional changes.

b. Drive During .50 Caliber Area Target Engagement.
   . Continued to drive in response to .50 caliber, area target element in fire command.
   . Maintained steady rate of speed.
   . Maneuvered hull toward target.
   . Announced adverse terrain conditions.
   . Selected best available route.
   . Avoided obstacles and ditches.
   . Minimized directional changes.
c. Drive to a Halt for Coax Point Target Engagement.
   * Maintained steady speed during initial part of coax, point target element in fire command.
   * Maneuvered hull toward target.
   * Announced adverse terrain conditions.
   * Moved to a hull down firing position.
   * Brought tank to a smooth gradual halt.

d. Drive to a Halt for .50 Caliber Point Target Engagement.
   * Maintained steady speed during initial part of .50 caliber, point target element in fire command.
   * Maneuvered hull toward target.
   * Announced adverse terrain conditions.
   * Moved to a hull down firing position.
   * Brought tank to a smooth gradual halt.

e. Drive to a Halt for Main Gun Target Engagement.
   * Maintained steady speed during initial part of main gun element in fire command.
   * Maneuvered hull toward target.
   * Announced adverse terrain conditions.
   * Moved to a hull down firing position.
   * Brought tank to a smooth gradual halt.

5. ACQUIRE TARGETS
   * Detected targets in assigned sector.
   * Announced target type.
   * Announced estimated range to target in 100's of meters.
   * Announced direction to target by clock system.

6. OBSERVE AND SENSE ROUNDS
   * Announced correct sensing for Target 1.
   * Announced correct sensing for Target 2.
   * Announced correct sensing for Target 3.
   * Announced correct sensing for Target 4.

SCORING.

To pass, Driver must have:

a. Detected and reported all targets. Delay in detection is not cause for failure.

b. Responded without hesitation to all fire commands.

c. Correctly sensed each round.

d. Been checked "yes" or "NA" on all performance measures.

COMMENTS. (Recommended remedial training, etc.)

PASS  FAIL
TACTICAL DRIVING COURSE
(Example)

Main Gun Target

.50 Caliber Area Target

.50 Caliber Point Target

Main Gun Target

COAX Area Target

Defilade Position

Ascend Steep Grade

Descend Steep Grade

Start Point

3' Vertical Obstacle

Ditch

1" = 500 meters
TARGET LAYOUT FOR SENSING ROUNDS
(Example)

At the end of the tactical driving course the Driver will be directed to move to a firing position. Approximately 50 yards in front of the firing position will be four silhouette targets with a simulated tracer element positioned as a target hit or a target miss.

The TC will lay the gun on a target and give a fire command. The Gunner will identify the target, make a final precise lay, and simulate firing. The Gunner and TC will announce LOST and the Driver will immediately announce his sensings. (The scorer will act as TC, GN, and LD. The Driver will be buttoned up and use his M27 periscope to sense.

Tgt #1
TC GUNNER-BATTLE SIGHT-TANK (GN) IDENTIFIED
UD UP (GN) ON THE WAY (GN) LOST
TC LOST (DV) OVER-LEFT

Tgt #2
TC GUNNER-SABOT-TANK (GN) IDENTIFIED
UD UP (GN) ON THE WAY (GN) LOST
TC LOST (DV) TARGET

Tgt #3
TC GUNNER-HEAT-PC (GN) IDENTIFIED
UD UP (GN) ON THE WAY (GN) LOST
TC LOST (DV) DOUBTFUL-RIGHT

Tgt #4
TC GUNNER-BATTLE SIGHT-TANK (GN) IDENTIFIED
UD UP (GN) ON THE WAY (GN) LOST
TC LOST (DV) SHORT-RIGHT
LOADER'S READINESS TEST

REQUIRED TIME: 7 1/2 hours

CROSS TRAINING: Tank Crew Gunnery Skills Test (TCGST) tasks, FM 7-12-2 are indicated by an *. Cross training tasks are indicated by a # symbol.

PART A. WEAPONS MAINTENANCE (W)

Type: Written pre-tests for TEC Lessons.
020-171-1132-F (Cleaning, Inspection, and Lubrication Coax)
020-171-1133-F (Trouble Shooting Coax)
020-171-5229-F (Trouble Shooting M85 Machinegun)

Time: 1/2 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART B. WEAPONS MAINTENANCE (HO)

Type: Hands-On
Time: 1 hour.
Location: Company Area or UTS
Support: Tank with dummy rounds and TC Scorer
Scoring: 100% correct
PART C. MISSION PREPARATION (W)

**Type:** Written pre-tests for TEC Lessons.

- 020-171-5366-F (Before Operations Maintenance, Part 1)
- 020-171-5367-F (Before Operations Maintenance, Part 2)
- 020-171-5368-F (Before Operations and At Halt Maintenance Checks and Services)
- 020-171-5369-F (After Operations Maintenance Checks and Services, Part 1)
- 020-171-5370-F (After Operations Maintenance Checks and Services, Part 2)
- 020-171-5331-F (Tank Ammo: Selecting Ammunition)
- 020-171-5332-F (Tank Ammo: Handling, Main Gun)
- 020-171-5352-F (Boresighting the Machineguns [Exclusive of M85 machinegun])

**Time:** 1/2 hour

**Location:** Company Area or UTS

**Support:** Test Administrator/Scorer

**Scoring:** 90% correct

PART D. MISSION PREPARATION (HO)

**Type:** Hands-On

**Time:** 2 hours

**Location:** Company Area or UTS

**Support:** Tank and TC Scorer

**Scoring:** 100% correct

PART E. COMBAT LOADING (W)

**Type:** Written pre-tests for TEC Lessons.

- 020-171-5346-F (105mm Gun: Loading)
- 020-171-5347-F (105mm Gun: Misfire Procedures)
- 020-171-5348-F (105mm Gun: Unloading)

**Time:** 1/2 hour
PART F. COMBAT LOADING (HO)

Type: Hands-On
Time: 1 1/4 hours
Location: Company Area or UTS
Support: Tank with dummy rounds and TC Scorer
Scoring: 100% correct

PART G. TARGET ACQUISITION (W)

Type: Written pre-tests for TEC Lessons
- 020-171-1611-F (Target Range Determination)
- 020-171-1612-F (Location and Reporting Targets)
- 020-171-1614-F (Target Acquisition Scanning Techniques)
- 935-171-0203-F (Armor Vehicle Recognition)
Time: 1 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART H. LOCATING AND REPORTING TARGETS (HO)

Type: Hands-On
Time: 3/4 hour
Location: UTS
Support: Tank and TC Scorer
Scoring: 100% correct
LOADER'S READINESS TEST

PART A. WEAPONS MAINTENANCE (W)

CONDITIONS. Loader is in a classroom and is administered TEC pre-tests 020-171-1132-F, 020-171-1133-F and 020-1715229-F.

INSTRUCTIONS TO LOADER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number and today's date on the answer sheet. The test consists of three parts: Cleaning, Inspection, and Lubrication Coax (TEC Lesson 020-171-1132-F), Troubleshooting Coax (TEC Lesson 020-171-1133-F), and Troubleshooting M85 Machinegun (TEC Lesson 020-171-5229-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain correct method of cleaning coax backplate assembly.
Identify various compounds for cleaning coax barrel.
Identify coax unserviceable parts.
Identify various lubricants to use on coax.
Identify coax parts that should be free of lubricants.
Identify coax parts that are lubricated just prior to firing.
Explain Loader's action upon hearing STOPPAGE announced first time and second time with a hot or a cold gun.
Explain Loader's action upon hearing STOPPAGE announced second time with a hot gun, and the coax cannot be cleared quickly.
Explain Loader's action if coax has a ruptured cartridge and the stoppage must be corrected quickly.
Explain Loader's action (in TC position) upon initial stoppage of M85.
Explain Loader's action (in TC position) when hot M85 fails to fire and immediate action has failed and a round remains in the chamber.
Explain Loader's action (in TC position) when a M85 gun fails to fire after two attempts.
Explain Loader's action (in TC position) if M85 has a ruptured cartridge and there is no spare barrel.
Explain Loader's action (in TC Position) after M85's extractor has been driven through the ruptured cartridge.

NOTES.

a. See Module L-1 for remedial training of deficiencies.
b. Estimated time, 1/2 hour.
LOADERS READYNESS TEST

PART A: WEAPONS MAINTENANCE

The Test Proctor will administer the following TEC Lesson pre-tests and the Loader will answer only those questions so indicated:

- Cleaning, Inspection, and Lubrication Coax (020-171-1132-F)
  - Loader will answer all question.
- Troubleshooting Coax (020-171-1133-F)
  - Loader will answer all questions.
- Troubleshooting M85 Machinegun (020-171-5229-F)
  - Loader will answer all questions.
LOADER'S READINESS TEST

PART A: WEAPONS MAINTENANCE


ANSWER SHEET

Name __________________________________________
SSN ____________________________ Tank No. ________________
Scorer ____________________________ Test Date ________________

020-171-1132-F
1.
2.
   a.
   b.
   c.
3.
   a.
   b.
   c.
4.
5.
6.
7.
8.

020-171-1133-F
1.
2.
3.
4.
5.

020-171-5229-F

1.
2.
3.
4.
5.

COMMENT. (Recommended remedial training, etc.)

PASS  FAIL
LOADER'S READINESS TEST

PART A: WEAPONS MAINTENANCE

PRE-TEST ANSWER KEY

M73/M219 MACHINEGUN: CLEANING, INSPECTION AND LUBRICATION
(020-171-1132-F)

1. Wipe it off with a clean, dry cloth.
2.a. A. Solvent (SD)
     b. B. RBC
     c. C. RBC
3.a. A. (Barrel cracked)
     b. B. (Camway burred)
     c. C. (Guide rod is bent)
4. C. (LSA)
5. E. (LAW)
6. B. (PL Special)
7. A. (The barrel)
8. Both

TROUBLESHOOTING THE COAX
(020-171-1133-F)

1. A
2. B
3. A
4. C
5. Change the barrel
TROUBLESHOOTING THE M85 MACHINEGUN
(020-171-5229-F)

1. Wait five seconds, charge gun, attempt to fire (or equivalent answer).
2. Wait five minutes (or equivalent answer).
3. Wait five seconds, clear gun, hand function, reload and attempt to fire (or equivalent answer).
4. C. Insert extractor into bolt, fire manually.
5. B. Pull the charger handle back so that the extractor and cartridge are just clear of the chamber.

SCORING KEY.
Award 5 points for each correct response (110 points possible).

PASSING SCORE = 100 points
LOADERS READINESS TEST

PART B. WEAPONS MAINTENANCE (MO)

CONDITIONS. An M60A1 tank with coax and M85 machineguns mounted, and complete gun-tool roll stowed according to unit loading plan.

INSTRUCTIONS TO LOADER. "This test is in three parts. In the first part you are to remove the coax from the tank, disassemble and assemble it, and remount the coax in the tank. In the second part you will do the same for the M85. In the third part you will remove, disassemble, assemble and install the breechblock. You will have 3 minutes for disassembly and 3 minutes for assembly of each machinegun, and 6 minutes for removal and disassembly of the breechblock and 6 minutes for assembly and installation of the breechblock. I will alert you before I start timing on each of these tasks. I will not assist you during the test. . . Do you have any questions? Work quickly, but carefully. . . Ready? . . . Begin. . . ."

TASKS.

- Remove the coax from a tank.
  - *Disassemble the coax
  - Inspect the coax
  - *Assemble the coax
  - Check operation of the coax.
  - Mount the coax in a tank.
- Remove the M85 from a tank.
  - *Disassemble the M85.
  - Inspect the M85.
  - *Assemble the M85.
  - Check operation of the M85.
  - Mount the M85 in a tank.
  - *Disassemble the main gun breechblock.
  - *Assemble the main gun breechblock.

NOTES.

a. Loader should not be given this task until he has passed Loader's Readiness Test, Part A.

b. Remedial training of tasks failed should be provided on the spot, but after the Loader has completed all of Part B. See Module L-2 for remedial training.

c. All performance measures and steps within each task must be performed in the order given.

d. Estimated time, 1 hour.
PERFORMANCE MEASURES.

1. REMOVE THE COAX FROM A TANK

   . Disconnected electrical lead from solenoid. 
   . Loosened three support set screws in collar on gun mount cover shield. 
   . Removed machinegun retainer. 
   . Removed machinegun. 
   . Removed spent cartridge bag. 
   . Removed case ejection shield.

2. DISASSEMBLE THE COAX (3 minutes)

   . Removed barrel and jacket assembly from receiver. 
   . Separated barrel from jacket assembly. 
   . Removed cover assembly. 
   . Removed feed tray. 
   . Removed guide rod springs while holding barrel extension forward. 
   . Separated guide rods from guide rod springs. 
   . Removed backplate assembly. 
   . Retracted barrel assembly. 
   . Depressed buffer support lever and removed barrel extension. 
   . Removed breechblock from barrel extension assembly. 
   . Removed retainer clip and charger assembly from projecting stud.

3. INSPECT THE COAX

   . Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust and foreign matter. 
   . Checked all moving parts for looseness, binding, wear or damage.

4. ASSEMBLE THE COAX (3 minutes)

   . Installed charger assembly. 
   . Placed breech block assembly in barrel extension. 
   . Installed barrel extension. 
   . Installed backplate assembly. 
   . Joined guide rods and guided rod springs. 
   . Installed feed tray. 
   . Installed cover assembly. 
   . Joined barrel to jacket assembly. 
   . Joined barrel and jacket assembly with receiver.
5. CHECK OPERATION OF THE COAX

- Placed safety in FIRE position.
- Charged weapon to lock moving parts to rear.
- Allowed barrel extension to ease forward by keeping tension on charging handle and depressing manual firing trigger.

6. MOUNT THE COAX IN A TANK

- Physically examined gun mount cover shield to see that three support set screws were backed off flush with collar of gun port.
- If set screws were not flush with collar of gun port, unscrewed set screws so that flash suppressor of machinegun did not hit set screws when inserted through machinegun port.
- Had the Gunner, if necessary, depress the gun tube so that it was horizontal or slightly below.
- Placed the shell ejection shield on the shield support and fastened six snap fasteners which hold it in place.
- Installed spent cartridge bag on empty cartridge bag support by fastening eight snap fasteners which hold it in place.
- Slid machinegun into machinegun port until rearmost portion of jacket assembly (disconnector holes) were flush with machinegun bracket assembly.
- Placed machinegun retainer over rearmost position of jacket assembly, alining it with machinegun bracket assembly.
- Inserted two cap screws and lock washers in their respective holes and tightened them down.
- Plugged in machinegun electrical lead to solenoid on machinegun's backplate assembly.

7. REMOVE THE M85 FROM A TANK

- Cleared the weapon and left the Safety in SAFE (S).
- Removed the M36 periscope.
- Disconnected the solenoid lead connector from the backplate assembly.
- Opened cradle access doors and removed barrel.
- Manually elevated cradle 20°.
- Removed rear mounting pin and slid machinegun out of cradle.
- Passed machinegun out of turret through cupola hatch.
- Replaced rear mounting pin in cradle.
- Replaced M36 periscope.
8. **DISASSEMBLE THE M85 (3 minutes)**

- Cleared weapon.
- Removed barrel.
- Removed backplate group.
- Disengaged retainer lug of guide rod.
- Removed bolt buffer group.
- Separated helical spring, buffer sleeve and spring and guide rod.
- Removed feed and ejector assembly.
- Removed sear assembly.
- Removed barrel extension and bolt assembly.
- Separated bolt assembly from barrel extension.
- Removed hand charger assembly.
- Removed accelerator quick release pin.
- Removed cover assembly and feed tray assembly.
- Separated cover assembly from feed tray assembly.
- Removed accelerator assembly.

9. **INSPECT M85**

- Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust and foreign matter.
- Checked all moving parts for looseness, binding, wear or damage.

10. **ASSEMBLE THE M85 (3 minutes)**

- Installed accelerator assembly.
- Replaced cover assembly on feed tray assembly.
- Installed cover assembly and feed tray assembly.
- Installed accelerator quick release pin.
- Installed hand charger assembly.
- Assembled bolt assembly and barrel extension.
- Replaced sear assembly.
- Replaced feed and ejector assembly.
- Assembled helical spring, buffer sleeve and spring and guide rod.
- Installed bolt buffer group.
- Engaged retainer lug or guide rod.
- Replaced the backplate group.
- Installed the barrel.

11. **CHECK OPERATION OF THE M85**

- Placed Safety in FIRE (F).
- Charged weapon to lock moving parts to the rear.
- Kept tension on charger handle and pulled trigger extension handle, depressing trigger to allow bolt assembly to close slowly.
12. MOUNT THE M85 IN A TANK

- Removed machinegun barrel from the receiver.
- Removed M36 periscope body.
- Removed machinegun rear mounting pin.
- Manually elevated cradle 20°.
- Lowered machinegun receiver into turret through cupola hatch.
- Positioned machinegun into cradle and secured rear mounting pin.
- Opened cradle access doors and installed barrel.
- Connected solenoid lead to backplate assembly.
- Manually depressed cradle to horizontal position.
- Replaced M36 periscope body in mount.

13. DISASSEMBLE THE MAIN GUN BREECHBLOCK (6 minutes)

a. Removal

- Insured that main gun safety switch was in SAFE position.
- Insured that breechblock crank stop was in rear position.
- Opened breech.
- Insured chamber was empty.
- Closed breech manually by tripping extractors with an empty cartridge case or a wooden block.
- Removed firing pin spring by depressing plunger, moving plunger to right, twisting firing pin spring retainer counterclockwise until lug aligned with groove in breechblock, and removing retainer and spring.
- Removed firing pin and retractor guide with firing pin retractor by inserting screwdriver blade into retractor guide slot and prying outward.
- Screwed eye bolt into top of breechblock.
- Suspended chain hoist from hook on turret ceiling and connected chain hoist to eye bolt.
- Took up slack with chain hoist to support breechblock.
- Applied tension on closing spring by turning adjuster clockwise with spanner wrench.
- Removed tension from closing spring by depressing plunger from its notch with a screwdriver and allowing adjuster to turn counterclockwise under control of spanner wrench.
- Inserted small screwdriver into hole in breechblock crank stop and slid stop forward.
- Started breechblock downward by rotating operating handle rearward and down, and with chain hoist let breechblock begin descending.
. Returned operating handle to latched position.
. Lowered breechblock until breechblock crank pivot was free of the T-slot, and removed pivot.
. Lowered breechblock until breechblock was on turret floor.
. Released chain hoist from eye bolt.
. Removed right and left extractors from breech ring.

b. Disassembly

. Depressed firing contact plate plunger and turned firing contact plate counterclockwise until arrows on plate and breechblock were aligned with each other.
. Removed firing contact plate, firing contact plate plunger, and spring.
. Removed plastic washer, firing contact, and firing contact sleeve.
. Removed retractor pivot pin and firing pin retractor from retractor guide.
. Removed screw, washers, and clamp securing retractor driver to bottom of breechblock.
   (Use Allen wrench to remove screws.)
. Removed retractor driver, retractor driver shaft, and spring.

14. ASSEMBLE THE MAIN GUN BREECHBLOCK (6 minutes)

a. Assembly

. Installed retractor driver spring, shaft, and retractor driver into bottom of the breechblock.
. Affixed retractor group to bottom of breechblock by installing securing clamp, washers, and screw with Allen wrench.
. Inserted firing contact sleeve, firing contact, plastic washer, spring, and firing contact plate plunger into breechblock.
. Installed firing pin retractor into retractor guide and secured it with retractor pivot pin.
. Replaced firing contact plate by aligning arrow and depressing and rotating plate clockwise until firing contact plate plunger engaged locking notch in plate.

b. Installation

. Installed right and left extractors into extractor pivots in the breech ring.
. Inserted chain hoist into eye bolt on breechblock.
Raised breechblock and guided it into breech ring until breechblock came in contact with extractor plungers.

Depressed plungers and moved breechblock upward.

Installed breechblock crank pivots in breechblock crank.

Inserted pivot in breechblock T-slot.

Tripped extractors with the screwdriver and raised the breechblock to the closed position.

Inserted small screwdriver or rod into the hole in breechblock crank stop and slid stop to rear position.

Released tension on the chain hoist.

Turned adjuster clockwise until plunger entered first recess.

Removed chain hoist and eye bolt.

Installed retractor guide with firing pin retractor and firing pin in its well by pushing guide forward until it was flush with inner surface of well.

Installed firing pin spring and firing pin spring retainer.

Depressed plunger, and twisted retainer clockwise until plunger was seated in its recess.

Opened and closed breech several times to test for binding or shock.

Adjusted tension on the closing spring to contact any binding or shock in breech operation.

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**SCORING.**

To pass, Loader must have:

a. Checked operation of the coax and M85 machinegun (without being told) after assembling them.

b. Completed disassembly and assembly of the coax and M85 machinegun within time specified.

c. Been checked "Yes" or "NA" on all performance measures.

**COMMENTS.** (Recommended remedial training, etc.)

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Yes No NA

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LOADER'S READINESS TEST

PART C. MISSION PREPARATION (W)

CONDITIONS. The Loader is in a classroom and is administered TEC pre-tests 020-171-5366-F through 020-171-5370-F, 020-171-5331-F, 020-171-5332-F, and 020-171-5352-F.

INSTRUCTIONS TO LOADER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of three parts: Before, During, and After Operations Maintenance Checks and Services (TEC Lessons 020-171-5366-F through 020-171-5370-F), Tank Ammunition: Selecting and Handling (TEC Lessons 020-171-5331-F and 020-171-5332-F), and Boresighting the Machinegun [Exclusive of M85] (TEC Lesson 020-171-5352-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Identify deficiencies in the tank suspension system.

- road wheels
- center guides
- support rollers
- torsion bars
- driving sprockets
- shocks
- track adjusting link assembly
- track tension

Identify deficiencies in:

- battery cables
- hatch latches
- fire extinguishers
- oil coolers

Explain the meaning of various oil dip stick markings.
Explain safety precautions for refueling.
Identify various types of main gun ammunition.
Identify various types of machinegun ammunition.
Identify correct method of linking machinegun ammunition.
Match various types of main gun ammunition with various types of targets.
Explain correct method of carrying main gun ammunition.
Explain correct method of passing main gun ammunition into the turret.
List three characteristics of a good coax boresighting target.
Indicate correct actions to take before removing coax receiver.
Explain actions to be taken on solenoid wire and protective shield prior to removing the coax receiver.
Explain reason for aligning the main gun with boresight target prior to boresighting the coax.
Explain steps to align the coax and infinity sight with main gun aligned on boresight panel.

NOTES.

a. See Module L-3 for remedial training of deficiencies.

b. Estimated time, 1/2 hour.
LOADER'S READINESS TEST

PART C: MISSION PREPARATION

The Test Proctor will administer the following TEC Lesson pre-tests and the Loader will answer only those questions so indicated:

- Before, During, and After Operations Maintenance Checks and Services (020-171-5366-F through 020-171-5370-F).
  - Loader will answer questions 1, 2, 4, 5, and 7.

  - Loader will answer all questions for 020-171-5331-F and questions 3, 4, and 6 for 020-171-5332-F.

- Boresighting the Machineguns (020-171-5352-F).
  - Loader will answer questions 1, 2, 3, 4, and 5.
LOADER'S READINESS TEST

PART C: MISSION PREPARATION


ANSWER SHEET

Name

SSN_________________________ Tank No._________________________

Scorer_______________________ Test Date__________________________

020-171-5366-F through 020-171-5370-F

1.a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

2.a.

b.

c.
5.
   a.
   b.
   c.

7.

020-171-5331-F

1.a.
   b.
   c.
   d.
   e.
   f.

2.

3.a. _______Tracer
   b. _______AP (Armor piercing)
   c. _______Ball
   d. _______APIT (Armor piercing-incendiary tracer)
   e. _______API (Armor piercing-incendiary)

4.

5.

6.

7.

8.

9.

10.

11.
020-171-5332-F

3.

4.

6.a.

b.
c.

020-171-5352-F

1.a.

b.
c.

2.a.

b.
c.

3.a.

b.

4.

5.a.

b.

c.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
LOADER'S READINESS TEST

PART C. MISSION PREPARATION

PRE-TEST ANSWER KEY


ANSWER KEY

BEFORE, DURING, AND AFTER OPERATIONS MAINTENANCE AND SERVICES (020-171-5366-F through 020-171-5370-F)

1. For each of the pictures in question one the soldier should have identified the problem, if any, and stated the action needed.

   a. This road wheel is cracked and must be replaced. Report it on a DA 2404 to organizational maintenance. (Reference lesson 5366.)

   b. OK. (Reference lesson 5366.)

   c. The support roller bearing is frozen up; the support roller and the bearing must be replaced. Report this on a DA 2404. (Reference lesson 5366.)

   d. The road wheel seal is leaking and must be replaced. Report this on a DA 2404. (Reference lesson 5366 and 5368.)

   e. This visual shows a broken torsion bar. Report it on a DA 2404. (Reference lesson 5366.)

   f. OK. (Reference lesson 5366.)

   g. This sprocket is excessively worn and must be replaced. Report it on a DA 2404. (Reference lesson 5366.)

   h. OK. (Reference lesson 5366.)

   i. This shock is leaking and should be replaced. Report this situation on a DA 2404. (Reference lesson 5366.)

   j. In this picture the track tension is too tight. It must be adjusted by the crew. (Reference lesson 5370.)

   k. The hold open latch is not in its proper up position. Lock the hatch securely up or down. (Reference lesson 5367.)
1. There is no green inspection tag on this extinguisher. Turn this one in to organizational maintenance for inspection. (Reference lesson 5367.)

m. Replace the frayed cable on this battery. (Reference lesson 5370.)

2. Here are the actions you must take for each situation:
   a. Add oil to the full mark. (Reference lesson 5366.)
   b. Add oil to the add mark. (Reference lesson 5366.)
   c. Notify organizational maintenance, you may have to have some oil drained. (Reference lesson 5366.)

4. When refueling have a man stand by with a fire extinguisher, turn the master battery switch off, ground the hose nozzle to the tank, and never allow anyone to smoke in the immediate area. (Reference lesson 5369.)

5. You should check for oil leaks, obstructed screen, and loose mounting bolts. (Reference lesson 5369.)

7. The red groove means that the track adjusting link is extended as far as it can be. A track block should be removed and the track tension readjusted. (Reference lesson 5370.)

**TANK AMMUNITION: SELECTING AND HANDLING**
(020-171-5331-F and 020-171-5332-F)

020-171-5331-F

1. A - SABOT
   B - HEAT
   C - HEAT
   D - HEP
   E - SMOKE
   F - BEEHIVE

2. A

3. C Trace
   B AP
   A Ball
   E APIT
   D API

4. A

5. C

68
6. D
7. C
8. E
9. D
10. C
11. B

020-171-5332-F

3. A
4. A

6.a. Remove round from tank.
   b. Place in misfire bunker.
   c. Notify supervisory personnel.

BORESIGHTING THE MACHINEGUNS (COAX)
(020-171-5352-F)

1.a. Known range (as close to 1200 meters as possible)
   b. Right angles
   c. Permanent

2.a. safe
   b. unloaded
   c. forward

3.a. A - Solenoid wire being removed
   B - Protective shield being removed
   b. B, then A

4. Aline the main gun on the target aiming point.

5.a. Loosen the vertical mounting screws and vertically aline the coax gun
     bore on the target aiming point, using the vertical adjusting set-
     screws. Retighten vertical mounting screws.

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b. Loosen the horizontal bracket mounting screws and horizontally align the coax gun bore on the target aiming point, using the horizontal adjusting setscrews. Retighten the horizontal bracket mounting screws.

c. Adjust the infinity sight reticle with the infinity sight boresight knobs, so that the reticle encircles the target aiming point.

SCORING KEY.

Award 5 points for each correct response (285 points possible).

PASSING SCORE = 255 points.
LOADERS READYNESS TEST

PART D. MISSION PREPARATION (HO)

CONDITIONS. M60A1 tank with BIT, situated on level ground. Gun tube is aimed at a suitable boresight target, but slightly out of alignment with respect to target. An Ammunition Stowage Plan and dummy rounds (3 - APDS, 3 - HEAT, 2 - HEP, 1 belt empty 7.62 machinegun, and 1 belt empty .50 caliber machinegun) are located next to the tank. All main gun ammunition stowage areas are blocked off with the exception of eight slots in the ready rack; empty slots should correspond to the stowage plan and type of dummy rounds. Two dimensional cardboard representations of 7.62 mm and .50 caliber machinegun ammunition boxes are used for stowage of machinegun ammunition. In addition an AN/VRC-12 or AN/VRC-64 and a CVC helmet with intercommunication components are located next to the tank. The tank has loose track tension.

INSTRUCTIONS TO LOADER. "Assume we are preparing the tank for a combat mission. You are to perform the following Loader tasks (read list of tasks). I realize you would normally perform some additional tasks as the Loader in this situation, but these are the ones you are being tested on today. Perform each task when I instruct you to do so. I will observe and score your performance, and I will serve as Driver, Gunner or TC as needed."

TASKS.

- Inspect suspension system for deficiencies.
- Inspect battery cables, hatch latches, fire extinguishers and oil coolers for deficiencies.
- Explain safety precautions for refueling.
- Perform before-operations checks and services on engine and transmission oil levels.
- Check track tension.
- Adjust track tension.
- Prepare tank for boresighting.
- Check boresight alignment of main gun.
- Boresight and zero coax machinegun.
- Stow main gun rounds according to Ammunition Stowage Plan.
- Stow machinegun ammunition according to Ammunition Stowage Plan.
- Stow coax ammunition in the ready (banana) box.
- Install and operate the AN/VRC-12 or AN/VRC-64 radio.
- Operate tank intercommunications system.
- Perform main gun prepare to fire procedures.
- Check operation of M3 heater.
NOTES.

a. Loader should not be given this test until he has passed Loader's Readiness Tests, Parts A, B and C.

b. Remedial training on tasks failed should be provided on-the-spot but after the Loader has completed all of Part D. See Module L-4 for remedial training.

c. It is not necessary to perform the tasks in the order given, however, the steps within each task must be performed in order.

d. Estimated time, 2 hours.

PERFORMANCE MEASURES.

1. INSPECT TANK SUSPENSION SYSTEM FOR DEFICIENCIES
   
   . Road wheels.
   . Center guides.
   . Support rollers.
   . Torsion bars.
   . Driving sprockets.
   . Shocks.
   . Track adjusting link assembly.

2. INSPECT OTHER COMPONENTS FOR DEFICIENCIES
   
   . Battery cables.
   . Hatch latches.
   . Fire extinguishers.
   . Oil coolers.

3. EXPLAIN SAFETY PRECAUTIONS FOR REFUELING
   
   . Indicated one crew member stands by with a fire extinguisher.
   . Indicated Master Battery switch is in the OFF position.
   . Indicated hose nozzle must be grounded to the tank.
   . Indicated no smoking is allowed in immediate area.

4. PERFORM BEFORE-OPERATIONS CHECKS AND SERVICES ON TANK ENGINE AND TRANSMISSION OIL LEVELS
   
   . Checked engine and transmission oil levels.
   . Added engine oil until presence of oil is indicated on gage (if required).
   . Added transmission oil until level indicated on gage is to the ADD mark (if required).
   . Told Driver to start engine.
5. a. CHECK TRACK TENSION (T97 TRACK)

- Waited until engine was warm and idling at 700 - 750 rpm.
- Added or drained engine oil until level indicated on gage was to the FULL mark (if required).
- Added or drained transmission oil until level indicated on gage was to the FULL mark (if required).

5. a. CHECK TRACK TENSION (T97 TRACK)

- Directed Driver to coast to a stop so that a track link was centered on #2 support roller.
- Coordinated with Driver by arm and hand signals so that tank coasted to a stop with track link in proper position.
- Raised the track with a crowbar at number two support roller and placed a block (1" thick by 6" square) between number two support roller and track link.
- Measured clearance between bottom of track and top of a string or straight edge between support rollers: Acceptable clearance is 1/4 to 5/16 inch (midway between Nos. 2 and 3 support rollers).

b. CHECK TRACK TENSION (T142 TRACK)

- Directed Driver to a stop so that a track link is centered on the #2 support roller.
- Coordinated with Driver by arm and hand signals so that tank coasted to a stop with track link in proper position.
- Removed dirt and mud from outboard end connectors between first and second support rollers.
- Placed a string with weight on both ends over end connectors.
- Measure the distance between the string and the end connectors at the mid point between the support rollers to insure that the distance is between 7/16 and 1/2 inches.

6. ADJUST TRACK TENSION

- Removed track and adjusting link screw and washer from top of track adjusting link.
- Used track adjusting wrench on track adjusting link and pulled up to increase track tension (right side) or pushed down to decrease track tension (right side). (Reversed directions for left side).
- Track adjusting link was not extended beyond red painted groove.
- Adjusted track tension to 1/4 to 5/16 inch in tolerance.
- Installed lockwasher and lock screw and tightened with wrench. Lockscrew was tightened until fully seated on the shoulder.
7. PREPARE TANK FOR BORESIGHTING

Yes No NA

Placed black thread over witness lines on muzzle end of main gun and secured thread tautly.

Removed firing mechanism from breechblock.

Centered right telescope of binocular M17A1 over firing pin hole.

8. CHECK BORESIGHT ALIGNMENT OF MAIN GUN

On request from Gunner to confirm that muzzle cross threads are on aiming point:

Checked alignment of main gun by sighting through firing pin hole with M17A1 binocular to see if cross threads lay on aiming point.

Reported gun out of alignment and assisted Gunner to align it.

9. BORESIGHT AND ZERO COAX

Removed the solenoid electrical lead from the machinegun backplate assembly by pulling the solenoid plug down.

Pulled the right disconnector ring rearward to disengage disconnector pin from disconnector hole.

Rotated receiver downward and pulled rearward until disengaged from mounting block.

Loosened support setscrews located in the gun mount cover shield collar approximately 1 1/2 turns.

Selected target employed to boresight main gun with a clearly defined right angle at a distance of 1200 meters.

Alined machinegun bore vertically on target while viewing aiming point through right binocular M17A1 so as to adjust machinegun elevation alignment with bore of main gun by loosening or tightening adjusting screws.

Alined the machinegun bore horizontally while viewing aiming point through right binocular M17A1 so as to adjust machinegun azimuth alignment with bore of the main gun by loosening or tightening front end and rear horizontal adjusting screws.

Insured that all lock and jam nuts are tightened securely.

Adjusted support setscrews, in gun mount cover shield collar until they contacted flash suppressor body then backed them off 1/4 to 1/2 turn.

10. STOW MAIN GUN ROUNDS ACCORDING TO AMMUNITION STOWAGE PLAN

Determined, by reference to Ammunition Stowage Plan for current load, how many of each type of round needed.
Called out to assisting crewman how many of a given type of round is wanted.

Insisted that round be handed in through turret nose down.

Round stowed in:

- Ready rack by placing primer end down, swinging hinge of holder up and to left, pulling out spring loaded knob on rod of holder, sliding hinge slot over rod behind knob, and releasing the knob.
- Tubular stowage rack by pushing round in nose first, swinging handle lock over primer end of round, and rotating handle lock securely in place.
- Turret bustle by seating round with nose toward inside of turret, swinging hinge up and to left, pulling up clamp and slotting hinge in place below clamp, and pulling clamp down.

Completed stowage of rounds one type at a time.

11. STOW MACHINEGUN AMMUNITION ACCORDING TO AMMUNITION STOWAGE PLAN

Determined, by reference to Ammunition Stowage Plan and present load, how much of each ammunition is needed.

Called out to assisting crewman how much of a given type ammunition is needed.

Stowed 15 boxes of 7.62 coax ammunition on the turret platform floor. (Use cardboard representation.)

Stowed 600 rounds of 7.62 coax ammunition in the ready-round (banana) ammunition box. (See task 12.)

Stowed 8 boxes of .50 caliber ammunition on the turret platform floor. (Use cardboard representation.)

Stowed 180 rounds of .50 caliber ammunition in the ready-round ammunition box.

12. STOW COAX AMMUNITION IN READY (banana) BOX

Removed ammunition from metal packing box.

Inspected ammunition for serviceability and dirt.

Cleaned ammunition if required.

Linked 600 rounds together in one belt.

Opened ready box cover.

Placed 600 round belt in ready box with projectile end of round toward turret wall.

Fed at least ten rounds of ammunition through ammunition chute in ready box cover.

Closed ready box cover.
13. INSTALL AND OPERATE AN/VRC-12 OR AN/VRC-64 RADIO

NOTE: Scorer conducts test on the type radio Loader has in his tank.

a. Install AN/VRC-12 Radio

. Placed receiver-transmitter (RT-246) on mount (MT-1029/VRC) and tightened clamps to lock receiver-transmitter on mount.
. Connected antenna cable (CG-1773/U) to ANT receptacle on the receiver-transmitter.
. Connected control cable assembly (CX-4722/VRC) to ANT CONT receptacle on receiver-transmitter.
. Placed receiver (R-442) on mount (MT-1898/VRC) and tightened clamp to lock receiver on mount.
. Connected antenna cable (CG-1773/U) to ANT receptacle on receiver.
. Assembled antenna sections and screwed bottom section into antenna base (MX-6707/VRC).

d. Operate AN/VRC-12 Radio

. Told Driver to turn ON Master Battery switch.
. Set amplifier (AM-1780/VRC) MAIN PWR switch to OTHER.
. Set receiver-transmitter (RT-246) POWER switch to LOW or HIGH.
. Set amplifier (AM-1780/VRC) POWER CKT BKR switch to ON.
. Set receiver (R-442) POWER switch to ON.

c. Install AN/VRC-64 Radio

. Placed amplifier-power supply (AM2060/FRC) on mount (MT-1029/VRC) and tightened clamps to lock amplifier-power supply on mount.
. Placed receiver-transmitter (RF-841/PRC-77) on amplifier-power supply (AM-2060/GRC) and tightened clamps to lock receiver-transmitter on amplifier-power supply.
. Connected Cable Assembly Special Purpose (CX-4655/GRC) to amplifier-power supply SET POWER connector and the receiver-transmitter POWER connector.
. Connected Cable Assembly (CG-1773/U) to receiver-transmitter ANT connector.
. Assembled antenna sections and screwed bottom section into antenna base (MX-6707/VRC).

d. Operate AN/VRC-64 Radio

. Told Driver to turn ON Master Battery switch.
. Set amplifier-power supply (AM-2060/GRC) PWR switch to ON.
Yes No NA

Turned receiver-transmitter (RT-841/PRC-77) VOLUME control fully clockwise.
Turned amplifier (AM-1780/VRC) MAIN PWR switch to NORM.
Set POWER CKT BKR switch to ON.

(Loader will perform measures on either the AN/VRC-12 or AN/VRC-64 radio.)

14. OPERATE TANK INTERCOMMUNICATIONS SYSTEM

• Adjusted CVC helmet to head.
• Insured CVC helmet radio-interphone switch was in center position.
• Connected interphone connector to plug at left bottom of control box.
• Connected radio/audio connector to plug at right bottom of control box.
• Placed control box Monitor switch in either the ALL, A, INT ONLY, or B position.
• Transmitted to TC, "Loader Ready."

15. PERFORM MAIN GUN PREPARE-TO-FIRE PROCEDURES

On command "PREPARE TO FIRE":

• Checked recoil oil by feeling replenisher indicator tape for one rough and one smooth edge.
• Added or drained recoil oil (if required).
• Moved breechblock crank stop to the rear.
• Opened breech and looked in chamber for obstruction and cleanliness.
• Tightened coax machinegun mounting bolts.
• Plugged electrical lead into solenoid.
• Inspected turret stowed ammunition for completeness, type and serviceability.

On command "CHECK FIRING SWITCHES":

• Placed main gun safety switch in FIRE POSITION.
• Installed circuit tester between breechblock and face of chamber.
• Observed for lighting of circuit tester bulb each time Gunner or TC announced "ON THE WAY," and announced "NO FIRE" any time bulb failed to light.
• Closed the cover on the coax, charged it, and listened for forward action of barrel and barrel extension when Gunner and TC activated firing switches (recharging coax before each check).
• Removed and stowed circuit tester.
On Gunner's alert, "POWER":

- Checked for obstruction to turret traverse and unlocked turret.
- Inspected hull stowed ammunition for completeness, type, and serviceability; coordinating turret traverse with Gunner in order to expose stowage area.

On command "REPORT":

- Reported "LOADER READY."

16. CHECK OPERATION OF THE M3 HEATER

On Driver's request, "CHECK GAS PARTICULATE UNIT":

- Rotated Air Heater knob to ON and checked for indicator lamp operation.
- Allowed air to warm up for at least five minutes.
- Checked air temperature.
- Adjusted protective mask and attached air hose.
- Removed and stowed air hose and protective mask.
- Rotated air heater knob to OFF and listened for audible click.
- Reported status of M3 Heater to the driver.

SCORING.

To pass, Loader must have:

a. Correctly responded to engine and transmission dip stick readings.
b. Detected that track tension was loose and adjusted it.
c. Reported that main gun was not aligned with boresight target and correctly assisted the Gunner to align it.
d. Checked M3 heater operation.
e. Aligned coax with boresight target.
f. Stowed dummy rounds according to Ammunition Stowage Plan.
g. Been checked "yes" or "NA" on all performance measures.
h. If ammunition is not available for Loader to actually stow ammunition he will indicate, according to the Unit Ammunition Stowage Plan where various types of ammunition is stowed.
(Task 10 and 11)

COMMENTS. (Recommended remedial training, etc.)
LOADER'S READINESS TEST

PART E. COMBAT LOADING (W)

CONDITIONS. The Loader is in a classroom and is administered TEC pre-tests 020-5346-F through 020-171-5348-F.

INSTRUCTIONS TO LOADER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of three parts: 105MM Main Gun: Loading (TEC Lesson 020-171-5346-F), 105MM Main Gun: Mislire Procedures (TEC Lesson 020-171-5347-F), and 105MM Main Gun: Unloading (TEC Lesson 020-171-5348-F). Do not write in the test booklet, indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain Loader's action upon hearing a main gun fire command.
Explain procedure for loading a main gun round into the chamber.
Explain safety precautions when operating the breech operating handle.
Explain Loader's main gun misfire procedures after Gunner has tried all firing circuits.
Explain Loader's misfire procedures for a cool gun and a hot gun after all firing actions have failed.
Explain procedure to follow when unable to remove a misfired round from a hot gun.
Indicate position of Loader's Safety switch before unloading a misfired round.
Explain procedure for removing a round partially stuck in the chamber.
Explain procedure for removing a projectile stuck in the tube.
Explain how to close the breech manually.
Explain procedure for testing the firing circuit.

NOTES.

a. See Module L-5 for remedial training of deficiencies.
b. Estimated time, 1/2 hour.
LOADER'S READINESS TEST

PART E: COMBAT LOADING

The Test Proctor will administer the following TEC Lesson pre-tests and the Loader will answer only those questions so indicated:

. 105mm Main Gun: Loading (020-171-5346-F)
   - Loader will answer all questions.

. 105mm Main Gun: Misfire Procedures (020-171-5347-F)
   - Loader will answer questions 4, 5, and 6.

. 105mm Main Gun: Unloading (020-171-5348-F)
   - Loader will answer questions 1, 2, 3, 5, and 6.
LOADER'S READINESS TEST

PART E: COMBAT LOADING


ANSWER SHEET

Name__________________________________
SSN______________________ Tank No.______________________
Scorer______________________ Test Date______________________

020-171-5346-F
1. a.
   b.
   c.
   d.
   e.
   f.
   g.
   h.

2.
3.

020-171-5347-F
4. a.
   b.
   c.
   d.
   e.
5.a. (cool gun) (1)
   (2)
   (3)

b. (hot gun) (1)
   (2)
   (3)

6.a.
   b.
   c.
   d.

020-171-5348-F
d.
e.
f.

COMMENT. (recommended remedial training, etc.)

PASS  FAIL
LOADER'S READINESS TEST

PART E: COMBAT LOADING

PRE-TEST ANSWER KEY

105MM MAIN GUN: LOADING
(020-171-5346-F)

1. The correct actions and sequence for loading the main gun follow:
   a. Make sure the loader's safety switch is in the SAFE position.
   b. Open the breech if it is closed.
   c. Inspect the chamber for obstructions.
   d. Select the ammunition called for. (SABOT)
   e. Place the round two-thirds of the way into the chamber and push it the rest of the way in with the heel of the fist.
   f. Stand clear of the recoil path and make sure the recoil path is clear.
   g. Place the loader's safety switch in the FIRE position.
   h. Announce UP.

2. B. The loader has his fingers extended rather than having them forced into a fist.

3. The operating handle will fly up with enough force to cause serious injury if it strikes the loader.

105MM MAIN GUN: MISFIRE PROCEDURES
(020-171-5347-F)

4. FOURTH MISFIRE.
   a. Loader puts loader's safety switch on SAFE.
   b. Loader waits two minutes.
c. Loader opens breech.
d. Loader rotates round one-half turn.
e. Loader reloads the round.
f. Loader puts loader's safety switch on FIRE.
g. Loader announces UP.

5. FIFTH MISFIRE.

a. Cool gun
   (1) Loader makes sure loader's safety switch is on SAFE.
   (2) Loader waits two minutes to allow for a possible hangfire.
   (3) Loader removes round from breech.

b. Hot gun
   (1) Loader makes sure loader's safety switch is on SAFE.
   (2) Loader waits two minutes to allow for a possible hangfire.
   (3) Loader removes round from the breech, within one additional minute.

6. The following steps are taken when the loader is unable to remove a misfired round from a hot gun within one additional minute after he has waited two minutes to allow for a possible hangfire.

a. The loader closes the breech.
b. The loader makes sure the loader's safety switch is in the SAFE position.
c. The tank commander orders the crew to evacuate the tank for two hours.
d. At the end of two hours, the loader, assisted by other crewmen and safety personnel, removes the round.

105MM MAIN GUN: UNLOADING
(020-171-5348-F)

1.a. Loader's safety switch. Wrong.
b. Gunner's main gun switch. Wrong.
2.a. One crewman holds the breech operating handle down.
    b. Another crewman pries the round out of the chamber with the ramming and extracting tool.

3.a. Fill the chamber with rags to cushion the base of the projectile.
    b. Close the breech manually.
    c. Push the rammer down the tube until the bell of the rammer is resting on the projectile, then apply steady pressure until the projectile is freed from the tube and pushed into the cushion of rags in the chamber. (Any shorter version of this answer is satisfactory as long as the rammer, steady pressure, and freed from the tube are included.)
    d. Open the breech.
    e. Remove the projectile.

5. Trip the extractors with a wooden block.

6.a. Make sure the main gun is not loaded.
    b. Close the breech manually.
    c. Insert the circuit tester between the breech block and the breech ring.
    d. Turn the master battery, turret power, and main gun switches ON. Place the loader's safety in the FIRE position.
    e. Press the firing triggers on the power control handle, the manual elevating handle, and the tank commander's override.
    f. Observe the lamp on the circuit tester. If it lights, the circuit is OK.

SCORING KEY.

Award 5 points for each correct response (215 possible points)

PASSING SCORE = 195 points.
LOADERS READINESS TEST

PART F. COMBAT LOADING (HO)

CONDITIONS. M60A1 tank complete with BLI, situated on level ground. Replenisher tape mock-up positioned forward of the Loader. The tape can be set at any one of four positions: one rough edge and one smooth edge, two rough edges, two smooth edges, or two long notches. The ready rack contains eight dummy rounds; 3 APDS, 3 HEAT, and 2 HEP stowed according to the unit's ammunition stowage plan. Dummy links of 7.62 and .50 caliber ammunition are also available.

INSTRUCTIONS TO LOADER. "At the start of the test I will give you some different settings on the replenisher mock-up and you are to tell me what actions you would take for each setting—before, during, and after firing. I will set the tape and you will go to the mock-up, feel the tape, and immediately report what action is called for. Next you will perform the duties of the Loader under simulated combat conditions. We will carry APDS ammunition in the tube for battlesight engagements, so begin by loading an APDS round. Listen to fire commands and react accordingly. Since you will be working with dummy rounds you will have to unload the rounds between firing. But wait until I give the command to unload. During the fire commands sequence a main gun MISFIRE and a coax STOPPAGE will be announced by the Gunner (TC scorer). In addition you will get into the TC's position and load, clear, and apply immediate action to the M85. OK... Take up your position in the Loader's station and load a round of APDS."

TASKS.
* Determine corrective action required by replenisher tape readings.
* Load main gun in response to fire commands.
* Rotate round in main gun misfire procedure.
* Unload misfired main gun round.
* Load coax.
  Ready coax in response to fire command.
* Clear and unload coax.
* Apply immediate action to reduce coax stoppage.
* Change coax barrel.
* Load M85.
* Clear and unload M85.
* Apply immediate action to reduce M85 stoppage.
NOTES.

a. Loader should not be given this test until he has passed Loader Readiness Test, Parts A through E.

b. TC should present each of the four replenisher tape settings in a series of eight settings in random order to the Loader.

c. Remedial training for tasks failed should be provided on the spot but after the Loader has completed all of Part F. See Module L-6 for remedial training.

d. It is necessary to perform the tasks and the steps within each task in the order given.

e. For Performance Measures 2 and 5, TC-Scorer gives a series of fire commands, at about 15 second intervals, that requires loading the available type of dummy rounds interspersed with two or three coax commands. A suggested sequence is:

   (1) Battlesight (SABOT) HEP, HEAT, COAX, HEP MISFIRE.

   (2) (Reload for battlesight) SABOT, (No CEASE FIRE) SABOT, HEAT, COAX, STOPPAGE.

f. The MISFIRE command provides a break in the sequence. After TC-Scorer goes through MISFIRE checks, tells the Loader to rotate the round, and round still fails to fire; he then waits two minutes for a hang fire, tells Loader to unload the round, and assists him in doing so.

g. Loading should be timed with a stop watch. Timing should begin with the announcement of the ammunition element and end with the Loader's announcement UP. Time should be cumulated for each series of fire commands.

h. Cross training tasks are indicated by a β symbol.

i. Estimated time, 1 1/4 hours.
PERFORMANCE MEASURES.

1. DETERMINED CORRECTIVE ACTION REQUIRED BY REPLENISHER TAPE READINGS

<table>
<thead>
<tr>
<th>Action</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Took no action if felt one rough edge and one smooth edge.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Added oil to replenisher (afterannouncing CEASE FIRE if during firing) if felt rough edges on both sides of the tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continued to check tape frequently during firing if felt smooth edges on both sides of tape, but drained oil from replenisher at first opportunity.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drained oil from replenisher (after announcing CEASE FIRE, if during firing) if felt two long notches on tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Took correct action upon feeling rough edges on both sides of replenisher tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Took corrective action upon feeling smooth edges on both sides of replenisher tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Took no action upon feeling one rough edge and one smooth edge on replenisher tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Took corrective action upon feeling two long notches on replenisher tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. LOADS MAIN GUN IN RESPONSE TO FIRE COMMANDS


<table>
<thead>
<tr>
<th>Action</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stood clear of path of recoil.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed firing safety switch in FIRE.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announced UP.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared to load a second round in case no CEASE FIRE was given.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Main Gun Not Loaded.

<table>
<thead>
<tr>
<th>Action</th>
<th>Yes</th>
<th>No</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placed firing safety switch in SAFE position.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checked replenisher tape.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opened breech.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selected announced ammunition.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlocked ammunition ready rack.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inserted appropriate round into chamber by placing round 2/3rds into chamber and pushing it rest of the way with heel of fist, swinging arm up and away from closing breech.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stood clear of path of recoil.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placed firing safety switch in FIRE position.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Announced UP.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared to load a second round in case no CEASE FIRE was given.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
c. SABOT Loaded, Different Ammunition Element Given.

- Placed firing safety switch in SAFE position.
- Checked replenisher tape.
- Unloaded SABOT round.
- Placed and locked SABOT round in ready rack.
- Selected announced ammunition.
- Unlocked ammunition ready rack.
- Inserted appropriate round into chamber by placing round 2/3rds into chamber, and pushing it rest of way with heel of fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in FIRE position.
- Announced UP.
- Prepared to load a second round in case no CEASE FIRE is given.

3. ROTATED ROUND IN MAIN GUN MISFIRE PROCEDURE

On Gunner's command ROTATE ROUND:

- Placed firing safety switch in SAFE position.
- Opened breech slowly enough to extract round about 1/2 way.
- Rotated round 1/2 turn.
- Pushed round into chamber with heel of the fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in FIRE position.
- Announced UP.

4. UNLOAD MISFIRED MAIN GUN ROUND

- Told Gunner to turn main gun and turret power switches OFF.
- Placed firing safety switch in SAFE position.
- Opened breech.
- Held breech operating handle down while TC (Gunner) pried round out of chamber.
- Returned breech operating handle to latched position.

5. LOAD COAX

- Pushed forward on rear of left cover latch rod assembly and raised cover.
- Raised feed tray.
- Placed machinegun safety in FIRE position.
- Charged (cocked) machinegun by pulling charger handle to rear.
- Inspected chamber for obstructions by looking and feeling in chamber.
1. Placed safety in SAFE position.
2. Lowered feed tray.
3. Fed ammunition belt through chute of ammunition box.
4. Placed first round of ammunition belt in feed tray slot with open side of ammunition link loops facing down.
5. Closed machinegun cover assuring that lock rod is engaged.

6. READY COAX IN RESPONSE TO FIRE COMMANDS
   - Placed coax safety in FIRE position.
   - Announced UP.

7. CLEAR AND UNLOAD COAX
   - Placed safety in the SAFE (S) position.
   - Pushed forward on rear of left rod assembly and opened cover assembly.
   - Removed ammunition belt from machinegun.
   - Lifted feed tray group, look and feel that receiver and chamber are clear of ammunition.
   - Placed safety to FIRE (F) position.
   - Pulled charger handle rearward, depress manual firing trigger and allowed barrel extension to close slowly.
   - Placed safety in SAFE (S) position.
   - Closed cover assembly.

8. APPLY IMMEDIATE ACTION TO REDUCE COAX STOPPAGE
   On Command STOPPAGE:
   - Waited 5 seconds to allow for a hangfire.
   - Charged machinegun, locking recoiling parts to rear.
   - Checked to see if ammunition is feeding into weapon.
   - Pulled barrel extension to rear.
   - Placed safety in SAFE.
   - Raised cover and removed ammunition.
   - Removed "misfired" round from chamber.
   - Placed safety in FIRE (F) and hand functioned weapon one cycle.
   - Reloaded weapon.
   - Announced UP.

9. CHANGE COAX BARREL
   - Opened cover assembly and removed belted ammunition.
   - Charged weapon to sear position and placed safety in SAFE.
Yes  No  NA

1. Removed live ammunition or spent cartridge from weapon chamber and links from immediate area.
2. Ensured weapon is clear by looking into and feeling receiver and chamber.
3. Pulled disconnector ring to rear to allow receiver assembly to rotate downward.
4. Removed barrel assembly from jacket assembly.
5. Installed new barrel assembly in jacket assembly.
6. Rotated receiver assembly upward and allowed disconnector to engage into jacket assembly mounting block.
7. Placed safety in FIRE and hand functioned weapon one cycle.
8. Loaded weapon and attempted to fire.

(WARNING: Use asbestos gloves when removing a hot barrel.)

10. LOAD M85

9. Unlatched and raised cover.
10. Visually checked and felt in chamber for round.

(NOTE: If bolt is in forward position place safety in FIRE (F) position and pull charger handle rearward until bolt assembly is in rear position. Check and feel in chamber for round.)

11. With safety in FIRE (F) position pulled charger handle fully rearward and while keeping tension on handle pulled trigger extension handle depressing trigger to allow bolt assembly to close slowly.
12. Placed .50 caliber ammunition in ammunition box and fed belt until three or four rounds were in flexible chute.
13. Pulled rounds into feed tray assembly.
14. Placed leading round of belt on tray with gun side of links down so it is held by belt retaining pawls.
15. Closed cover assembly.
11. CLEAR AND UNLOAD M85

. Placed cupola firing safety switch in OFF position.
. Held cupola electrical power control switch in OFF position momentarily.
. Assured safety is in SAFE (S) position.
. Unlatched and opened cover assembly.
. If bolt assembly is in forward position placed safety in FIRE (F) position and pulled charger handle until bolt assembly was fully rearward.
. Keeping tension on charger handle pulled trigger extension handle to depress trigger and allowing bolt assembly to close slowly.
. Placed safety in SAFE (S) position.

12. APPLY IMMEDIATE ACTION TO REDUCE STOPPAGE OF M85

. Waits 5 seconds to allow for hangfire.
. Charged the machinegun locking recoiling parts to rear.
. Checked to see if ammunition is feeding into machinegun.
. Attempted to fire weapon.
. Charged the machinegun to sear position.
. Rotated safety to SAFE (S).
. Raised cover and removed ammunition.
. Removed "misfired" round from chamber.
. Rotated safety to FIRE (F) and hand functioned the weapon one cycle.
. Reloaded the weapon.
. Attempted to fire weapon.

SCORING.

To pass, the Loader must have:

a. Stated the correct action for each of the eight test trials for during-firing and before-firing conditions.

b. Responded in each trial without hesitation, immediately after feeling the tape.

c. Executed the first five fire commands in a total time of 35 seconds, and the second four commands (five loading reactions) in 1 minute 35 seconds.

d. Responded to MISFIRE, including unloading the misfired round, within 2 1/2 minutes.

e. Responded to STOPPAGE by removing misfired round within 10 seconds of command, and completed procedure within 15 seconds.
f. Selected the correct round in response to each fire command.
g. Checked replenisher tape at least once during the test.
h. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)

PASS  FAIL
LOADER’S READINESS TEST

PART G. TARGET ACQUISITION (W)

CONDITIONS. The Loader is in a classroom and is administered TEC pre-tests 020-171-1611-F, 020-171-1612-F, 020-171-1614-F, and 935-171-0203-F.

INSTRUCTIONS TO LOADER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of four parts: Target Range Estimation (TEC Lesson 020-171-1611-F), Locating and Reporting Targets (TEC Lesson 020-171-1612-F), Target Acquisition Scanning Techniques (TEC Lesson 020-171-1614-F), and Armor Vehicle Recognition (TEC Lesson 935-171-0203-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain the range estimation method in which you estimate the range half the distance to the target.
Explain the range estimation method in which a target at a known range appears half as big as a like target at an unknown range.
Explain the range estimation method in which a target at a known range appears twice as big as a like target at an unknown range.
Explain location of targets by the clock system.
Explain reporting of targets by the clock system.
Explain the technique of quick search scanning of an area.
Explain ways to adapt your eyes to the darkness.
Explain how to preserve night vision.
Explain how to scan an area at night.
Identify U.S. and Foreign Armor Vehicles.

NOTES.

a. See Module L-7 for remedial training of deficiencies.
b. Estimated time, 1 hour.
LOADER'S READINESS TEST

PART G: TARGET ACQUISITION

The Test Proctor will administer the following TEC lesson pre-tests and the Loader will answer only those questions so indicated:

  - Loader will answer questions 2, 4, and 5.

. Locating and Reporting Targets (020-171-1612-F).
  - Loader will answer question 1.

  - Loader will answer questions 1, 3, 4, and 6.

  - Loader will identify all vehicles shown on TEC tape, vehicle 1 through vehicle 17.
LOADER'S READINESS TEST

PART G: TARGET ACQUISITION


ANSWER SHEET

Name ________________________________

SSN ________________________________ Tank No. ________________________________

Scorer ________________________________ Test Date ________________________________

020-171-1611-F

2. Step a.

Step b.

Step c.

4.

5.

020-171-1612-F

1.a. Target

b. Posture

c. Direction

d. Range

020-171-1614-F

1.

3.
4.

6.a.

b.

935-171-0203-F

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COMMENT. (Recommended remedial training, etc.)

PASS FAIL
LOADER'S READINESS TEST

PART G: TARGET ACQUISITION

PRE-TEST ANSWER KEY

ANSWER KEY

TARGET RANGE ESTIMATION
(020-171-1611-F)

2. The Loader's diagram or description must include three steps:
   Step a. Divide the distance to the target in half.
   Step b. Estimate the distance to the halfway point in 100 meter increments.
   Step c. Double the range for estimated range to target.

4. 1000 meters.
5. 600 meters.

LOCATING AND REPORTING TARGETS
(020-171-1612-F)

1.a. Target  TANK
   b. Posture  MOVING LEFT
   c. Direction ONE O'CLOCK (12:00 or 2:00 is acceptable).
   d. Range  ONE FIVE HUNDRED

TARGET ACQUISITION SCANNING TECHNIQUES
(020-171-1614-F)

1. A, C
3. B, C
4. A

6.a. Short, jerky movements.
   b. Pause a few seconds at each point.

ARMOR VEHICLE RECOGNITION
(935-171-0203-F)

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<tr>
<td>1. AMX-30</td>
<td>French</td>
<td>10. AMX-13</td>
<td>French</td>
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<td>3. CHIEFTON</td>
<td>British</td>
<td>12. JAG-PANZER</td>
<td>German</td>
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<td>4. ASU-57</td>
<td>Soviet</td>
<td>13. PT-76</td>
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<td>6. T-10</td>
<td>Soviet</td>
<td>15. LEOPARD</td>
<td>German</td>
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<td>7. CENTURIAN</td>
<td>British</td>
<td>16. ASU-85</td>
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<td>9. T-55</td>
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SCORING KEY.
Award 5 points for each correct response (165 points possible).

PASSING SCORE = 150 points.
CONDITIONS. Fully operational M60A1 tank located at an observation point on a target acquisition course. The course includes silhouette, tank and truck targets located at ranges from 400 meters to 1500 meters. The loader will observe from the open hatch position. (The tank will be positioned so the Loader's target area of responsibility (9:30 o'clock counterclockwise to 5:30 o'clock) overlaps the right and left boundaries of the target acquisition course.)

INSTRUCTIONS TO LOADER. "This is a test of your target acquisition ability. You will be required to scan the area, estimate range to various targets, and report target locations. React to my instructions."

TASKS.
Conduct a quick search scan of the area.
*Locate and identify targets in the area.
Estimate range to targets in the area.
Report location of targets in the area.

NOTES.

a. Loader should not be given this test until he has passed Loader's Readiness Test, Part G.

b. Tasks should be performed in order given.

c. See example layout of target acquisition course.

d. See Module L-8 for remedial training of deficiencies.

e. Estimated time, 3/4 hour.

PERFORMANCE MEASURES.

1. CONDUCT A QUICK SEARCH SCAN OF THE AREA

   Given the special command SCAN YOUR TARGET AREA OF RESPONSIBILITY:

   * Scanned area directly in front, going close in to far out.
   * Scanned area to left (or right) of initial area, overlapping initial area, going from close in to far out.
2. LOCATE AND IDENTIFY TARGETS IN THE AREA

Given the special command LOCATE AND IDENTIFY TARGETS IN THE AREA the Loader will have five minutes to locate and identify all targets.

- Located and identified target 1 (TROOPS).
- Located and identified target 2 (TANK).
- Located and identified target 3 (TANK).
- Located and identified target 4 (TRUCK).
- Located and identified target 5 (TROOPS).
- Located and identified target 6 (TRUCK).
- Located and identified target 7 (TANK).
- Located and identified target 8 (TROOPS).

3. ESTIMATE RANGE TO TARGETS IN THE AREA

Given the range of 1000 meters to target 2 and the special command DETERMINE RANGE TO ALL TARGETS IN THE AREA the Loader will determine the range to all targets to within ± 100 meters.

- Determine range to target 1 as 400 meters.
- Determined range to target 3 as 500 meters.
- Determined range to target 4 as 1200 meters.
- Determined range to target 5 as 1000 meters.
- Determined range to target 6 as 1200 meters.
- Determined range to target 7 as 1500 meters.
- Determined range to target 8 as 900 meters.

4. REPORT LOCATION OF TARGETS IN THE AREA

Given a designated target and the special command REPORT LOCATION OF TARGET NO. ____, the Loader will report the type, posture (moving or stationary), location (by clock system, within one hour deviation), and range to the target (within ± 100 meters).

- Target 1. TROOPS, STATIONARY, FIVE O'CLOCK, FOUR HUNDRED.
- Target 3. TANK, STATIONARY, NINE O'CLOCK, FIVE HUNDRED.
- Target 4. TRUCK MOVING LEFT TO RIGHT, SIX O'CLOCK, TWELVE HUNDRED.
. Target 5. TROOPS, STATIONARY, NINE O'CLOCK, ONE THOUSAND.
. Target 6. TRUCK, STATIONARY, EIGHT O'CLOCK, ONE TWO HUNDRED.
. Target 7. TANK, STATIONARY, SEVEN O'CLOCK, ONE FIVE HUNDRED.
. Target 8. TROOPS, STATIONARY, NINE O'CLOCK, NINE HUNDRED.

SCORING.

To pass, Loader must have:

a. Located and identified all targets in area within five minutes.

b. Estimated range to all targets within ± 100 meters.

c. Given location of all targets within one hour deviation.

d. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)
TARGET ACQUISITION COURSE

Example. (Loader's target area of responsibility is from 5:30 o'clock to 9:30 o'clock.)

1600 meters

Left Limit

1/2" = 100 meters

Right Limit

800 meters

(No marker)

Loader's Left Boundary 5:30 o'clock

Loader's Right Boundary 9:30 o'clock

Observation Point 104

1/2" = 100 meters
APPENDIX C

GUNNER'S READINESS TEST
GUNNER'S READINESS TEST

REQUIRED TIME. 11 hours

CROSS TRAINING. Tank Crew Gunnery Skills Test (TCGST) tasks, FM 17-12-2 are indicated by an *. Cross training tasks are indicated by a # symbol.

PART A. WEAPONS MAINTENANCE (W)

Type: Written pre-tests for TEC Lessons:
- 020-171-1132-F (Cleaning, Inspection, and Lubrication Coax)
- 020-171-1133-F (Troubleshooting Coax)
- 020-171-5229-F (Troubleshooting M85 Machinegun)

Time: 1/2 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART B. WEAPONS MAINTENANCE (HO)

Type: Hands-On
Time: 1 hour
Location: Company Area or UTS
Support: Tank with dummy rounds and TC Scorer
Scoring: 100% correct

PART C. BEFORE OPERATIONS PROCEDURES (HO)

Type: Hands-On
Time: 3/4 hour
Location: Company Area or UTS
Support: Tank and TC Scorer
Scoring: 100% correct
PART D. WEAPON SYSTEMS PREPARATION (W)

**Type:** Written pre-tests for TEC Lessons:

- 020-171-5351-F (Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1 [Exclusive of RF] Part I)
- 020-171-5355-F (Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1 [Exclusive of RF] Part II)
- 020-171-5342-F (Preparing Periscope/Telescope for Operation)
- 020-171-5337-F (Auxiliary Fire Control Instruments, Part II [Exclusive of Azimuth Indicator])
- 020-171-5354-F (Boresighting the Xenon Searchlight, M60/M60A1 Tank)
- 020-171-5353-F (Zeroing the Main Gun and Machineguns and Setting Battlesight)
- 020-171-5341-F (Preparing the Ballistic Computer for Operation)
- 020-171-5352-F (Boresighting the Machineguns [Exclusive of M85 Machinegun])

**Time:** 1 1/4 hour

**Location:** Company Area or UTS

**Support:** Test Administrator/Scorer

**Scoring:** 90% correct

PART E. WEAPON SYSTEMS PREPARATION (HO)

**Type:** Hands-On

**Time:** 1 1/4 hour

**Location:** Company Area or UTS

**Support:** Tank and TC Scorer

**Scoring:** 100% correct

PART F. COMBAT LOADING (W)

**Type:** Written pre-tests for TEC Lessons:

- 020-171-5331-F (Tank Ammo: Selecting Ammunition)
- 020-171-5332-F (Tank Ammo: Handling, Main Gun)
- 020-171-5346-F (105MM Gun: Loading)
- 020-171-5347-F (105MM Gun: Misfire Procedures)
- 020-171-5348-F (105MM Gun: Unloading)
PART G. COMBAT LOADING (HO)

Type: Hands-On
Time: 1 1/4 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 100% correct

PART H. TARGET ACQUISITION (W)

Type: Written pre-tests for TEC Lessons:
- 020-171-1611-F (Target Range Determination)
- 020-171-1612-F (Locating and Reporting Targets)
- 020-171-1614-F (Target Acquisition Scanning Techniques)
- 935-171-0203-F (Armor Vehicle Recognition)
Time: 1 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART I. LOCATING AND REPORTING TARGETS (HO)

Type: Hands-On
Time: 3/4 hour
Location: UTS
Support: Tank and TC Scorer
Scoring: 100% correct
PART J. TACTICAL OPERATIONS (W)

Type: Written pre-tests for TEC Lesson:

020-171-5364-F (Machinegun Engagements)

Time: 1/2 hour

Location: Company Area or UTS

Support: Test Administrator/Scorer

Scoring: 90% correct

PART K. TACTICAL OPERATIONS (HO)

Type: Hands-On

Time: 2 hours

Location: UTS

Support: Tank and TC Scorer

Scoring: 100% correct
GUNNER'S READINESS TEST

PART A. WEAPONS MAINTENANCE (W)

CONDITIONS. Gunner is in a classroom and is administered TEC pre-tests 020-171-1132-F, 020-171-1133-F, and 020-171-5229-F.

INSTRUCTIONS TO GUNNER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number and today's date on the answer sheet. The test consists of three parts: Cleaning, Inspection, and Lubrication of Coax (TEC Lesson 020-171-1132-F), Troubleshooting Coax (TEC Lesson 020-171-1133-F), and Troubleshooting M85 Machinegun (TEC Lesson 020-171-5229-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain correct method of cleaning coax backplate assembly.
Identify various compounds for cleaning coax barrel.
Identify coax unserviceable parts.
Identify various lubricants to use on coax.
Identify coax parts that should be free of lubricants.
Identify coax parts that are lubricated just prior to firing.
Explain "Gunner's" action (in Loader's position) upon hearing STOPPAGE announced first time and second time with a hot and a cold coax.
Explain "Gunner's" action (in Loader's position) upon hearing STOPPAGE announced second time, with a hot coax, and coax cannot be cleared quickly.
Explain "Gunner's" action (in Loader's position) if coax has a ruptured cartridge and the stoppage must be corrected quickly.
Explain "Gunner's" action (in TC's position) upon initial stoppage of M85.
Explain "Gunner's" action (in TC's position) when hot M85 fails to fire and immediate action has failed and a round remains in the chamber.
Explain "Gunner's" action (in TC's position) when a cold M85 fails to fire after two attempts.
Explain "Gunner's" action (in TC's position) if M85 has a ruptured cartridge and there is no spare barrel.
Explain "Gunner's" action (in TC's position) after M85 extractor has been driven through the ruptured cartridge.
NOTES.

a. See Module G-1 for remedial training of deficiencies.

b. Estimated time, 1/2 hour.
GUNNER'S READINESS TEST

PART A: WEAPONS MAINTENANCE

The Test Proctor will administer the following TEC Lesson pre-tests and the Gunner will answer only those questions so indicated:

. Cleaning, Inspection, and Lubrication Coax (020-171-1132-F)
   - Gunner will answer all questions.

. Troubleshooting Coax (020-171-1133-F)
   - Gunner will answer all questions.

. Troubleshooting M85 Machinegun (020-171-5229-Y)
   - Gunner will answer all questions.
GUNNER'S READYNESS TEST

PART A: WEAPONS MAINTENANCE


ANSWER SHEET

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<th>Name</th>
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COMMENTS. (Recommended remedial training, etc.)

PASS FAIL

113
GUNNER'S READINESS TEST

PART A: WEAPONS MAINTENANCE

PRETEST ANSWER KEY

ANSWER KEY

H73/M219 MACHINEGUN: CLEANING, INSPECTION AND LUBRICATION (020-171-1132-F)

1. Wipe it off with a clean, dry cloth.

2. a. Solvent (SD)
   b. RBC
   c. RBC

3. a. (Barrel cracked)
   b. (Camway burned)
   c. (Guide rod is bent)

4. c. (LSA)

5. e. (LAW)

6. b. (PL Special)

7. a. (The barrel)

8. Both

TROUBLESHOOTING THE COAX (020-171-1133-F)

1. A

2. B

3. A

4. C

5. Change the barrel
TROUBLESHOOTING THE M85 MACHINEGUN
(020-171-5229-F)

1. Wait five seconds, charge gun, attempt to fire (or equivalent answer).
2. Wait five minutes (or equivalent answer).
3. Wait five seconds, clear gun, hand function, reload and attempt to fire (or equivalent answer).
4.c. Insert extractor into bolt, fire manually.
5.b. Pull the charger handle back so that the extractor and cartridge are just clear of the chamber.

SCORING KEY.

Award 5 points for each correct response (110 points possible).

PASSING SCORE = 100 points.
GUNNER'S READINESS TEST

PART B. WEAPONS MAINTENANCE (HO)

CONDITIONS. An M60A1 tank with coax and .50 caliber machineguns mounted, and a complete gun-tool roll stowed according to unit loading plan.

INSTRUCTIONS TO GUNNER. "This test is in three parts. In the first part you are to remove the coax from the tank, disassemble and assemble it, and remount the coax in the tank. In the second part you will do the same for the M85. In the third part you will remove, disassemble, assemble, and install the breechblock. You will have 3 minutes for disassembling and 3 minutes for assembly of each machinegun, and 6 minutes for removal and disassembly of the breechblock, and 6 minutes for assembly and installation of the breechblock. I will alert you before I start timing on each of these tasks. I will not assist you during the test . . . Do you have any questions? Work quickly, but carefully . . . Ready? . . . Begin . . . ."

TASKS.

- Remove the coax from a tank.
- *Disassemble the coax.
- Inspect the coax.
- **Assemble the coax.
- Check operation of the coax.
- Mount the coax in a tank.
- Remove the M85 from a tank.
- *Disassemble the M85.
- Inspect the M85.
- **Assemble the M85.
- Check operation of the M85.
- Mount the M85 in a tank.
- *Disassemble the main gun breechblock.
- **Assemble the main gun breechblock.

NOTES.

a. Gunner should not be given this task until he has passed Gunner's Readiness Test, Part A.

b. Remedial training of tasks failed should be provided on the spot, but after the Gunner has completed all of Part B. See Module G-2 for remedial training.

c. All performance measures and steps within each task must be performed in the order given.
d. Cross training tasks are indicated by a # symbol.

e. Estimated time, 1 hour.

PERFORMANCE MEASURES.

1. REMOVE THE COAX FROM A TANK
   Yes No NA
   
   . Disconnected electrical lead from solenoid.
   . Loosened three support set screws in collar on gun mount cover shield.
   . Removed machinegun retainer.
   . Removed machinegun.
   . Removed spent cartridge bag.
   . Removed case ejection shield.

2. DISASSEMBLE THE COAX (3 minutes)
   Yes No NA
   
   . Removed barrel and jacket assembly from receiver.
   . Separated barrel from jacket assembly.
   . Removed cover assembly.
   . Removed feed tray.
   . Removed guide rod springs while holding barrel extension forward.
   . Separated guide rods from guide rod springs.
   . Removed backplate assembly.
   . Retracted barrel assembly.
   . Depressed buffer support lever and removed barrel extension.
   . Removed breechblock from barrel extension assembly.
   . Removed retainer clip and charger assembly from projecting stud.

3. INSPECT THE COAX
   Yes No NA
   
   . Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust and foreign matter.
   . Checked all moving parts for looseness, binding, wear, or damage.

4. ASSEMBLE THE COAX
   Yes No NA
   
   . Installed charger assembly.
   . Placed breechblock assembly in barrel extension.
   . Installed barrel extension.
   . Installed backplate assembly.
   . Joined guide rods and guided rod springs.
   . Installed feed tray.
   . Installed cover assembly.
   . Joined barrel to jacket assembly.
   . Joined barrel and jacket assembly with receiver.
5. **CHECK OPERATION OF THE COAX**

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- Placed safety in FIRE position.
- Charged weapon to lock moving parts to rear.
- Allowed barrel extension to ease forward by keeping tension on charging handle and depressing manual firing trigger.

6. **MOUNT THE COAX IN A TANK**

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- Physically examined gun mount cover shield to see that three support set screws were backed off flush with collar of gun port.
- If set screws were not flush with collar of gun port, unscrewed set screws so that flash suppressor of machinegun did not hit set screws when inserted through machinegun port.
- Had the Gunner, if necessary, depress the gun tube so that it was horizontal or slightly below.
- Placed the shell ejection shield on the shield support and fastened six snap fasteners which hold it in place.
- Installed spent cartridge bag on empty cartridge bag support by fastening eight snap fasteners which hold it in place.
- Slid machinegun into machinegun port until rearmost portion of jacket assembly (disconnector holes) were flush with machinegun bracket assembly.
- Placed machinegun retainer over rearmost position of jacket assembly, alining it with machinegun bracket assembly.
- Inserted two cap screws and lock washers in their respective holes and tightened them down.
- Plugged in machinegun electrical lead to solenoid on machinegun's backplate assembly.

7. **REMOVE THE M85 FROM A TANK**

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- Cleared the weapon and left safety in SAFE (S).
- Removed the M36 periscope.
- Disconnected the solenoid lead connector from the backplate assembly.
- Opened cradle access doors and removed barrel.
- Manually elevated cradle 20°.
- Removed rear mounting pin and slid machinegun out of cradle.
- Passed machinegun out of turret through cupola hatch.
- Replaced rear mounting pin in cradle.
- Replaced M36 periscope.
8. DISASSEMBLE M85 (3 minutes)

. Cleared weapon.
. Removed barrel.
. Removed backplate group.
. Disengaged retainer lug of guide rod.
. Removed bolt buffer group.
. Separated helical spring, buffer sleeve and spring and guide rod.
. Removed feed and ejector assembly.
. Removed sear assembly.
. Removed barrel extension and bolt assembly.
. Separated bolt assembly from barrel extension.
. Removed hand charger assembly.
. Removed accelerator quick release pin.
. Removed cover assembly and feed tray assembly.
. Separated cover assembly from feed tray assembly.
. Removed accelerator assembly.

9. INSPECT THE M85

. Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust and foreign matter.
. Checked all moving parts for looseness, binding, wear or damage.

10. ASSEMBLE M85 (3 minutes)

. Installed accelerator assembly.
. Replaced cover assembly on feed tray assembly.
. Installed cover assembly and feed tray assembly.
. Installed accelerator quick release pin.
. Installed hand charger assembly.
. Assembled bolt assembly and barrel extension.
. Replaced sear assembly.
. Replaced feed and ejector assembly.
. Assembled helical spring, buffer sleeve and spring, and guide rod.
. Installed bolt buffer group.
. Engaged retainer lug or guide rod.
. Replaced the backplate group.
. Installed the barrel.

11. CHECK OPERATION OF THE M85.

. Placed safety in FIRE (F).
. Charged weapon to lock moving parts to the rear.
. Kept tension on charger handle and pulled trigger extension handle, depressing trigger to allow bolt assembly to close slowly.
12. MOUNT THE M85 IN A TANK

- Removed machinegun barrel from the receiver.
- Removed M36 periscope body.
- Removed machinegun rear mounting pin.
- Manually elevated cradle 20°.
- Lowered machinegun receiver into turret through cupola hatch.
- Positioned machinegun into cradle and secured rear mounting pin.
- Opened cradle access doors and installed barrel.
- Connected solenoid lead to backplate assembly.
- Manually depressed cradle to horizontal position.
- Replaced M36 periscope body in mount.

13. DISASSEMBLE THE MAIN GUN BREECHBLOCK (6 minutes)

a. Removal

- Insured that main gun safety switch was in SAFE position.
- Insured that breechblock crank stop was in REAR position.
- Opened breech.
- Insured chamber was empty.
- Closed breech manually by tripping extractors with an empty cartridge case or a wooden block.
- Removed firing pin spring by depressing plunger, moving plunger to right, twisting firing pin spring retainer counterclockwise until lug aligned with the groove in breechblock, and removing retainer and spring.
- Removed firing pin and retractor guide with firing pin retractor by inserting screwdriver blade into retractor guide slot and prying outward.
- Screwed eye bolt into top of breechblock.
- Suspended chain hoist from hook on turret ceiling and connected chain hoist to eye bolt.
- Took up slack with chain hoist to support breechblock.
- Applied tension on closing spring by turning adjuster clockwise with spanner wrench.
- Removed tension from closing spring by depressing plunger from its notch with a screwdriver and allowing adjuster to turn counterclockwise under control of spanner wrench.
- Inserted small screwdriver into hole in breechblock crank stop and slid stop forward.
- Started breechblock downward by rotating operating handle rearward and down, and with chain hoist let breechblock begin descending.
- Returned operating handle to latched position.
b. Disassembly

- Depressed firing contact plate plunger and turned firing contact plate counterclockwise until arrows on plate and breechblock were aligned with each other.
- Removed firing contact plate, firing contact plate plunger, and spring.
- Removed plastic washer, firing contact, and firing contact sleeve.
- Removed retractor pivot pin and firing pin retractor from retractor guide.
- Removed screw, washers, and clamp securing retractor driver to bottom of breechblock. (Used Allen wrench.
- Removed retractor driver, retractor driver shaft, and spring.

14. ASSEMBLE MAIN GUN BREECHBLOCK (6 minutes)

a. Assembly

- Installed retractor driver spring, shaft, and retractor driver into bottom of breechblock.
- Affixed retractor group to bottom of breechblock by installing securing clamp, washers, and screw with Allen wrench.
- Inserted firing contact sleeve, firing contact, plastic washer, spring, and firing contact plate plunger into breechblock.
- Installed firing pin retractor into retractor guide and secured it with retractor pivot pin.
- Replaced firing contact plate by aligning arrow and depressing and rotating plate clockwise until firing contact plate plunger engaged locking notch in plate.

b. Installation

- Installed right and left extractors into extractor pivots in the breech ring.
- Inserted chain hoist into eye bolt on breechblock.
Raised breechblock and guided it into breech ring until breechblock came in contact with extractor plungers.

Depressed plungers and moved breechblock upward.

Installed breechblock crank pivots in breechblock crank.

Inserted pivot in breechblock T-slot.

Tripped extractors with the screwdriver and raised the breechblock to the CLOSED position.

Inserted small screwdriver or rod into the hole in breechblock crank stop and slid stop to REAR position.

Jiggled crank stop back and forth to assure that plunger was seated in its recess.

Released tension on the chain hoist.

Turned adjuster clockwise until plunger entered first recess.

Removed chain hoist and eye bolt.

Installed retractor guide with firing pin retractor and firing pin in its well by pushing guide forward until it was flush with inner surface of well.

Installed firing pin spring and firing pin spring retainer.

Depressed plunger, and twisted retainer clockwise until plunger was seated in its recess.

Opened and closed breech several times to test for binding or shock.

Adjusted tension on the closing spring to contact any binding or shock in breech operation.

---

**SCORING.**

To pass, Gunner must have:

a. Checked operation of the coax and M85 machinegun (without being told) after assembling them.

b. Completed disassembly and assembly of the coax and M85 machinegun within time specified.

c. Been checked "Yes" on all performance measures.

**COMMENTS. (Recommended remedial training, etc.)**

PASS FAIL
GUNNER'S READINESS TEST

PART C. BEFORE-OPERATIONS PROCEDURES (HO)

CONDITIONS. Fully operational M60A1 situated on level ground.

INSTRUCTIONS TO GUNNER. "Prepare the tank for a tactical mission in a nuclear environment. You will be scored on what you do as well as how you do it. I will observe your performance and serve as other crew members as needed."

TASKS.

- Operate tank intercommunications system.
- Charge the manual elevation system.
- Place the turret into power operation.
- Perform main gun prepare-to-fire procedures.
- Check operation of the M3 heater.

NOTES.

a. Remedial training of tasks failed should be provided on the spot, but after Gunner has completed all of Part C. See Module G-3 for remedial training.

b. The Gunner should not boresight the periscope and telescope or apply established zero.

c. All performance measures and steps within each task must be performed in the order given.

d. Estimated time, 3/4 hour.

PERFORMANCE MEASURES.

1. OPERATE TANK INTERCOMMUNICATIONS SYSTEM.

   Yes No NA

   Adjusted CVC helmet to head.
   Insured CVC helmet radio-interphone switch was in center position.
   Connected interphone connector to plug at left bottom of control box.
   Connected radio audio connector plug at right bottom of control box.
   Placed control box monitor switch in either the ALL, A, INT ONLY, or B position.
   Transmitted to TC, "GUNNER READY."
2. CHARGE MANUAL ELEVATION SYSTEM

   Rotated manual elevation handle to depress main gun
   until handle could no longer be rotated with one
   hand.

3. PLACE TURRET INTO POWER OPERATION

   Performed zero pressure check to insure accumulator
   charge of 450-500 psi.
   Checked hydraulic power pack oil level.
   Insured the tank and surrounding area are clear of
   obstruction.
   Insured crew is in safe position and Driver has
   lowered his seat and has his head down.
   Instructed Loader to release gun tube from travel
   lock.
   Unlocked turret lock.
   Announced POWER to alert the crew.
   Checked that engine is running and set at 800 to
   900 rpm.
   Insured manual traversing handle locking lever is
   in detent position.
   Turned turret power switch ON.
   Insured that hydraulic pressure was between 1225
   and 1275 psi before operation controls.
   Squeezed magnetic brake switch and rotated Gunner's
   control handle to traverse turret.
   Rotated handles rearward and forward to elevate and
   depress gun.
   Checked magnetic brake.
   Rechecked oil in turret control system.

4. PERFORM MAIN GUN PREPARE-TO-FIRE PROCEDURES

On command PREPARE-TO-FIRE from TC:

   Observed Loader's action in checking replenisher tape.
   Cleaned and inspected direct fire sights (interior).
   Checked operation of ballistic shield.
   Checked instrument lights.

On command CHECK FIRING SWITCHES:

   Turned main gun switch ON.
   Checked firing trigger on power control handle and
   trigger on manual elevating control handle.
   Checked main gun manual firing device.
   (NOTE: Announced ON THE WAY each time a trigger is
   checked for main gun or manual firing device
   is actuated.)
• Turned main gun switch OFF.
• Turned coaxial machinegun switch ON.
• Checked firing trigger on manual elevating control handle.
• Turned coaxial machinegun switch OFF.

On command CHECK FIRING CONTROLS:

• Set range correct knob of ballistic computer at ZERO.
• Checked manual operation of computer for bind in computer or linkage.
• Pushed reset button on computer.
• Observed that pointers on computer synchronized at various indexed ranges.
• Observed that superelevation counter indicated correct superelevation for various ammunition and ranges.
• Turned range correction knob of ballistic computer to proper setting.
• Reported GUNNER READY on command REPORT.

5. CHECK OPERATION OF M3 HEATER

On Driver's request, "CHECK GAS PARTICULATE UNIT":

• Rotated air heater knob to ON and checked for indicator lamp operation.
• Checked air flow through hose.
• Allowed air to warm up for at least five minutes.
• Checked air temperature.
• Adjusted protective mask and attached air hose.
• Removed and stowed air hose and protective mask.
• Rotated air heater switch to OFF and listened for audible click.
• Reported status of M3 heater to Driver.

SCORING.

To pass, Gunner must have:

a. Placed turret into power operation without cueing by scorer.

b. Checked M3 heater operation.

c. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)
PART D. WEAPON SYSTEMS PREPARATION (W)

CONDITIONS. The Gunner is in a classroom and is administered TEC pre-tests 020-171-5337-F, 020-171-5341-F, 020-171-5342-F, and 020-171-5351-F through 020-171-5355-F.

INSTRUCTIONS TO GUNNER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number and today's date on the answer sheet. The test consists of eight parts: Boresighting the Main Gun, Rangefinder, Tele/Peri M60/M60A1 (TEC Lesson 020-171-5351-F) Boresighting the Main Gun, Rangefinder, Tele/Peri M60/M60A1 (TEC Lesson 020-171-5355-F), Preparing Periscope/Telescope for Operation (TEC Lesson 020-171-5342-F), Auxiliary Fire Control Instruments, Part 2 (Exclusive of the Azimuth Indicator) (TEC Lesson 020-171-5337-F), Boresighting the Xenon Searchlight, M60/M60A1 Tank (TEC Lesson 020-171-5354-F), Boresighting the Machineguns M60/M60A1 Tank (TEC Lesson 020-171-5352-F), Zeroing the Main Gun and Machineguns and Setting Battlesight (TEC Lesson 020-171-5353-F), and Preparing the Ballistic Computer for Operation (TEC Lesson 020-171-5341-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish, turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain procedure for placing cross threads over end of muzzle for boresighting.
Explain characteristics of a good boresight main gun target.
Explain procedure for removing firing pin components from main gun.
Identify illustration which shows boresight cross correctly aligned with target aiming point.
Identify the point on the HEP/SABOT telescope sight, reticle that is used to align the reticle on the boresight target.
Explain procedure for aligning the HEP/SABOT telescope reticle on boresight target.
Identify correct deflection and elevation slip scale settings for the gunner's telescope and periscope.
Explain procedure for aligning periscope reticle on boresight target.
Explain procedure for aligning periscope IR reticle on boresight target.
Explain procedure for placing periscope into operation.
Explain procedure for placing telescope into operation.
Explain procedure for zeroing the elevation quadrant.
Explain primary method procedure for boresighting the searchlight.
Explain alternate method procedure for boresighting the searchlight.
Explain procedure for zeroing the main gun.
Explain procedure for zeroing the coax.
Explain procedure for setting boresight.
Explain procedure for placing the ballistic computer into operation.
List three characteristics of a good coax boresighting target.
Indicate correct actions to take before removing coax receiver.
Explain action to be taken on solenoid wire and protective shield prior to removing the coax receiver.
Explain reason for aligning the main gun with boresight target prior to boresighting the coax.
Explain steps to align the coax and infinity sight with main gun alignment on boresight panel.

NOTES.

a. See Module G-4 for remedial training of deficiencies.

b. Estimated time, 1 1/4 hours.
GUNNER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION

The Test Proctor will administer the following TEC Lesson pre-tests and the Gunner will answer only those questions so indicated:

- Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1 (020-171-5351-F) Part I
  - Gunner will answer all questions.

- Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1 (020-171-5355) Part II
  - Gunner will answer questions 3, 4, 5, 6, and 7.

- Preparing Periscope/Telescope for Operation (020-171-5342-F)
  - Gunner will answer questions 1, 2, 3, 5, 6, 6, 9, 10, and 11.

- Auxiliary Fire Control Instruments [Exclusive of Azimuth Indicator] Part II (020-171-5337-F)
  - Gunner will answer questions 1 and 2.

- Boresighting the Xenon Searchlight, M60/M60A1 Tank (020-171-5354-F)
  - Gunner will answer all questions.

- Zeroing the Main Gun and Machineguns and Setting Battlesight (020-171-5353-F)
  - Gunner will answer questions 1, 5, 6, 7, 8, 13, 14, 15 and 17.

- Preparing the Ballistic Computer for Operation (020-171-5341-F)
  - Gunner will answer questions 1 through 10.

- Boresighting the Machinegun [Exclusive of M85 Machinegun] (020-171-5352-F)
  - Gunner will answer questions 1, 2, 3, 4, and 5.
GUNNER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION


ANSWER SHEET

Name

SSN

Tank No.

Scorer

Test Date

020-171-5351-F

1.

2.a.

b.

3.

4.a.

b.

c.

d.

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020-171-5341-F
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020-171-5353-F
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7.a.
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11.

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COMMENT. (Recommended remedial training, etc.)
GUNNER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION

PRETEST ANSWER KEY

TEC Lessons 020-171-5351-F,
020-171-5355-F, 020-171-5342-F,
020-171-5337-F,
020-171-5354-F, 020-171-5355-F,
020-171-5341-F,
and 020-171-5352-F

ANSWER KEY

BORESIGHTING THE MAIN GUN, RANGEFINDER, TELE/PERI,
M60/M60A1 [EXCLUSIVE OF RANGEFINDER]
(020-171-5351-F)

1. A

2. a. B--The strings are too loose.
   b. C--The vertical string is not properly positioned over witness mark.

3. B

4. a. A--B--C--D
   b. 

5. A

BORESIGHTING THE MAIN GUN, RANGEFINDER, TELE/PERI,
M60/M60A1
(020-171-5355-F)

3. A

4. a. Unlock the boresight knobs, using the locking levers.
   b. Aline the boresight cross of the reticle with the target aiming point, using the boresight knobs.
   c. Lock the boresight knobs, using the locking levers.
   d. Set the slip scales.
5. \[
\begin{array}{c|c}
\text{RANGEFINDER} & 3/2 \\
\text{TELESCOPE} & 3/3 \\
\text{PERISCOPE} & 4/4 \\
\end{array}
\]

6.a. Disengage the boresight knobs.

b. Aline the reticle with the target aiming point, using the boresight knobs. Release the boresight knobs.

c. Set the slip scales.

7.a. DAYLIGHT--The gunner's periscope sight must be covered with an opaque card containing a dime-sized hole.

b. DUSK--The target must be illuminated by white light.

PREPARING PERISCOPE/TELESCOPE FOR OPERATION
(020-171-5342-F)

PREPARING THE PERISCOPIES AND TELESCOPES FOR OPERATION

PRE-TEST
1. C Gunner
2. 2 A
   1 B
   3 C
3. Adjust diopter for clear, sharp view.
5. IR power to 24V
   Adjust diopter for sharp view of grain
   Record diopter setting
   Ballistic shield closed
6. on the grain rather than on the target (or) terrain
7.a. Ballistic shield position: open
   b. Illuminate target with IR light
   c. Adjust focus using focus ring
9. D.
AUXILIARY FIRE CONTROL INSTRUMENTS
(EXCLUSIVE OF AZIMUTH INDICATOR)
(020-171-5337-F)

1. MINUS 146
2. B

BORESIGHTING THE XENON SEARCHLIGHT M60/M60A1 TANK
(020-171-5354-F)

BORESIGHTING THE XENON SEARCHLIGHT, M60/M60A1 TANK

1. 1200 meters
2. Zero (00)
3. Plus 5
4. Manual elevating control handle
5. Visible focus
6. Aline the searchlight's beam on the target aiming point.
7.a. A and D
   b. B and C
8.a. 7 feet
    b. 16 1/2 inches
9. B
10. B
11. Realine the searchlight's beam so that the bottom of the beam's brightest spot touches the reference mark.
ZEROING THE MAIN GUN AND MACHINEGUNS AND SETTING BATTLE SIGHTS  
(020-171-5353-F)  

1. a. Known range (as close to 1200 meters as possible)  
   b. Right angles  
   c. Permanent  

5.  

6. 1200 meter range line  

7. a. Gunner's periscope IR reticle  
   b. Rangefinder main gun laying reticle  
   c. Rangefinder auxiliary gun laying reticle  

8. Record the slip scale settings  

13.  

14.  

15. a. Fire a 20-30 round burst  
   b. Adjust the machinegun as necessary to move the strike zone onto the target aiming point.  

17. a. Index 1600 meters into the rangefinder  
   b. Index HEAT ammunition into the computer  
   c. Put the main gun on SAFE  
   d. Load HEAT ammunition into the main gun  

PREPARING THE BALLISTIC COMPUTER FOR OPERATION  
(020-171-5341-F)  

1. C--Turn computer ON  
   A--Check to make sure it's on  
   B--Adjust illumination of the computer dials  

2. a. A  
   b. Rotate it
3.a. The inner pointer will show the same range as the rangefinder range scale.

   b. The outer pointer will align itself with the inner pointer

   c. The shafts will rotate

4. B

5.a. Turn the handle clockwise until it stops

   b. Push the handle in or pull it out to select ammunition

   c. Release the handle slowly

6. C

7.a. Push in on the handcrank

   b. Check the reset light to make sure it’s on

   c. Rotate the handcrank (either clockwise or counterclockwise)

   d. Check the mil counter for a change in mil reading

   e. Pull the handcrank out

   f. Press the reset button

8.a. Manual mode

   b. Electrical mode

9. Press the reset button

10. The reset light will go out

BORESIGHTING THE MACHINEGUNS [EXCLUSIVE OF M85]
    (020-171-5352-F)

1.a. Known range (as close to 1200 meters as possible)

   b. Right angles

   c. Permanent

2.a. Safe

   b. Unloaded

   c. Forward
3.a. A--Solenoid wire being removed
   B--Protective shield being removed

b. B, then A

4. Aline the main gun on the target aiming point

5.a. Loosen the vertical mounting screws and vertically aline the coax gun bore on the target aiming point, using the vertical adjusting setscrews. Retighten vertical mounting screws.

b. Loosen the horizontal bracket mounting screws and horizontally aline the coax gun bore on the target aiming point, using the horizontal adjusting setscrews. Retighten the horizontal bracket mounting screws.

c. Adjust the infinity sight reticle with the infinity sight boresight knobs, so that the reticle encircles the target aiming point.

SCORING KEY.

Award 5 points for each correct response (560 possible points).

PASSING SCORE = 500 points.
GUNNER'S READINESS TEST

PART E. WEAPON SYSTEMS PREPARATION (HO)

CONDITIONS. Fully operational M60A1 situated on level ground with BII and coax mounted. Boresight and zero panels are at 800 meters for coax, and 1200 meters for main gun.

INSTRUCTIONS TO GUNNER. "Prepare the weapon systems on your tank for a tactical operation. Your activities should include preparing the azimuth indicator for operation and operating the elevation quadrant. If necessary, I will give you the information for your shot groups during zeroing. You will be scored on what you do as well as how you do it. I will observe your performance and serve as the TC and Loader as needed."

TASKS.

Prepare the tank for boresighting.
Prepare the Gunner's telescope for operation.
Prepare the Gunner's periscope for daylight operation.
*Operate the azimuth indicator.
*Operate the elevation quadrant.
*Boresight the Gunner's telescope and apply established zero.
*Boresight the daylight sight of the Gunner's Periscope and apply established zero.
*Boresight the IR sight of Gunner's periscope, during daylight, and apply established zero.
#Boresight tank searchlight using primary method.
#Boresight tank searchlight using alternate method.
##Boresight coax.
*Zero tank main gun.
*Zero coax.
*Index announced ammunition into computer and conduct computer check.

NOTES.

a. Gunner should not be given this test until he has passed Gunner's Readiness Test, Part A and completed the written TEC Lesson pre-tests for Gunner's Readiness Test, Part B and any remedial training necessary on TEC Lessons failed.

b. Remedial training of tasks failed should be provided on the spot but after Gunner has completed Part D. See Module G-5 for remedial training.

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c. Task 9 (Boresight tank searchlight using primary method) must be performed at night. This task should be performed concurrently with TC Task E-5.

d. Task 10 (Boresight tank searchlight using alternative method) must be performed at a location where a wall is available to reflect the beam.

e. If live fire cannot be used to zero the weapons, the test administrator must arrange for simulated firing and simulated shot groups. The simulated shot group can be accomplished by having panels to represent target hits.

f. In the Performance Measures section which follows, the role of scorer as TC or Loader is indicated by "TC" or "Loader". For example, Performance E-1., "Prepare Tank for Boresighting" begins with the statement, "After 'Loader' placed black thread over..." The scorer, acting as Loader, should remove the firing mechanism.

g. All performance measures and steps within each task should be performed in the order given.

h. Cross training tasks are indicated by a # symbol.

i. Estimated time, 1 1/4 hours.

PERFORMANCE MEASURES.

1. PREPARE TANK FOR BORESIGHTING

   (Gunner as TC)

   . Directed Driver to position tank on level ground.        

   (Gunner as Loader)

   . Placed black thread over witness lines on muzzle end of main gun and secured thread tautly. 

   . Removed firing mechanism from breechblock. 

   . Centered right telescope of binocular over firing pin hole. 

   . Checked alinement of main gun by sighting through firing pin hole with binocular to see if cross threads lay on aiming point. 

   . Reported gun out of alinement (or reported gun correctly alined).
(Gunner as Gunner)

After "Loader" removed firing mechanism from breechblock:

1. Aligned axis of main gun bore on right angle of aiming point by operating manual traversing and elevating handles.

2. PREPARE GUNNER'S TELESCOPE FOR OPERATION

   • Inspected eyepiece hanger and screws for presence and tightness.
   • Inspected hanger assembly and quick-disconnect pin for presence, proper fit, and swivel movement.
   • Inspected holder assembly to ensure that pin on telescope and slot on holder assembly are seated.
   • Adjusted headrest by loosening adjusting nut and sliding headrest to desired position and tightening nut.
   • Cleaned lenses.
   • Focused eyepiece by rotating diopter to maximum plus reading and then rotating back until view through eyepiece appears with maximum sharpness.
   • Set reticle illumination by rotating the rheostat knob on instrument light M50.
   • Removed filters from filter box.
   • Cleaned if required, and inspected for cracks.
   • Selected proper filter if conditions warrant use of filters.
   • Attached filter to telescope eyepiece.
   • Viewed through eyepiece and moved reticle selector to each position checking to see that both reticles are visible.

3. PREPARE GUNNER'S PERISCOPE FOR DAYLIGHT OPERATION

   • Inspected M138 mount for general condition.
   • Reported any damage to mount to vehicle commander.
   • Adjusted daylight and IR headrest for proper fit.
   • Opened ballistic shield.
   • Adjusted diopter on daylight sight by rotating diopter to maximum-plus reading and then back until image seen through eyepiece appeared with maximum sharpness.
   • Set reticle illumination by rotating light source control knob until reticle appeared with desired brightness.
4. OPERATE THE AZIMUTH INDICATOR

- Rotated rheostat knob until desired brightness was obtained.
- Placed aiming cross of periscope on reference point.
- Performed accuracy test by manually traversing turret 360 degrees to return to original reference point.
- Set micrometer and azimuth pointers on zero.
- Performed slippage test by traversing the turret rapidly in power and stopping suddenly.
- Repeated this operation two or more times in same direction.
- Traversed turret manually in opposite direction to return to original reference point.
- Insured that both micrometer and azimuth pointers were on zero.

5. OPERATE ELEVATION QUADRANT

- Placed aiming point on center of target and established a line of sight.
- Measured position of gun tube by rotating micrometer knob until bubble is centered in level vial.
- Read elevation from elevation and micrometer scales.

6. BORESIGHT GUNNER'S TELESCOPE AND APPLY ESTABLISHED ZERO

- Set superelevation counter on the ballistic computer to ZERO.
- Moved reticle selector switch until reticle corresponding to type of ammunition that will be used to zero can be seen through eyepiece.
- Unlocked telescope mount elevation and deflection boresight knobs.
- Rotated boresight knobs until the boresight aiming point was in same position as muzzle cross threads.
- Moved elevation and deflection knob locking levers to LOCK position.
- Rotated slip scales on the elevation and deflection knobs to read 3 and 3.
- Told Loader to confirm that muzzle cross threads are on aiming point.
- Obtained established zero from DA Form 2404.
- Unlocked telescope mount elevation and deflection boresight knobs.
- Rotated boresight knobs until established zero was indicated on the slip scales.
- Locked telescope mount elevation and deflection boresight knobs.
7. BORESIGHT DAYLIGHT SIGHT OF GUNNER'S PERISCOPE AND APPLY ESTABLISHED ZERO

- Sighted through eyepiece, disengaged elevation and deflection boresight knobs, and rotated knobs until aiming cross was on same aiming point as muzzle cross threads.
- Rotated slip scale on the elevation and deflection boresight knobs to read 4 and 4.
- Checked to assure that daylight sight reticle was on aiming point.
- Told Loader to confirm that muzzle cross threads were on aiming point.
- Obtained established zero from DA Form 2404.
- Unlocked periscope mount elevation and deflection boresight knobs.
- Rotated boresight knobs until established zero was indicated on the slip scales.
- Locked periscope mount elevation and deflection boresight knobs.

8. BORESIGHT IR SIGHT OF GUNNER'S PERISCOPE DURING DAYLIGHT AND APPLY ESTABLISHED ZERO

- Opened the ballistic shield.
- Placed opaque material over periscope head assembly with a 3/4 inch hole in line with IR body.
- Placed IR switch in the 1.5 volt position.
- Viewed through IR eyepiece and rotated IR diopter to maximum plus reading then back until grain on converter tube surface as seen through eyepiece appeared clear and sharp.
- Rotated light source control until reticle illumination had the desired brightness.
- Sighted through eyepiece and rotated focusing ring until target appeared with maximum sharpness.
- Disengaged and rotated elevation and deflection boresight knobs until aiming cross of reticle was aligned on same aiming point as muzzle cross threads.
- Rotated slip scale on the elevation and deflection boresight knobs to read 4 and 4.
- Checked to insure that aiming cross on reticle of daylight scope was on aiming point.
- Told Loader to confirm that the muzzle cross threads were on aiming point.
- Obtained established zero from DA Form 2404.
- Disengaged and rotated elevation and deflection boresight knobs until established zero was indicated on the slip scale.
- Engaged elevation and deflection boresight knobs.
9. BORESIGHT TANK SEARCHLIGHT USING PRIMARY METHOD

(Gunner as TC)

- Selected a target as near to 1200 meters as possible.
- Told Driver to idle engine at 1000-1200 rpm.
- Turned searchlight main power switch to the ON position and turned searchlight control to VIS FOCUS mode.

(Gunner as Gunner)

After "TC" turned searchlight ON and control to VIS FOCUS mode:

- Removed all superelevation from the fire control system using computer's superelevation handcrank.
- Laid aiming cross of primary sight on center of the boresight panel or target chosen.
- Centered bubble on elevation quadrant using micrometer knob.
- Applied plus 5 mils on elevation quadrant using micrometer knob.
- Manually elevated gun until bubble was centered.

10. BORESIGHT TANK SEARCHLIGHT USING ALTERNATE METHOD

(Gunner as TC)

- Directed Driver to position tank so the searchlight was approximately 10 meters from a wall.
- Drew a cross on the wall approximately 7 feet from the ground.
- Drew a second cross 16 1/2 inches directly above the first cross and vertically in line with the first cross.
- Told Driver to insure that the tank engine was run at a fast idle speed.
- Turned searchlight main power switch to ON position and turned searchlight control to VIS FOCUS mode.
- Adjusted horizontal and vertical adjustment screws until the searchlight beam was centered on the upper cross.
- Told Loader to draw reference mark at the bottom edge of the searchlight beam.
- Adjusted vertical and horizontal adjustment screws until the bottom of the searchlight beam was above and just touching the reference mark.
(Gunner as Gunner)

After "TC" laid the bottom of the searchlight beam above and just touching the reference mark:

- Removed superelevation from fire control system using computer's handcrank.
- Boresighted main gun on lower cross.
- Centered bubble on elevation quadrant using micrometer knob.
- Applied plus 5 mils to elevation quadrant using micrometer knob.
- Manually elevated gun until bubble was centered

11. BORESIGHT THE COAX

(Gunner as Loader)

- Removed solenoid electrical lead from machinegun backplate assembly by pulling solenoid plug down.
- Pulled right disconnector ring rearward to disengage disconnector pin from disconnector hole.
- Rotated receiver downward and pulled rearward until disengaged from mounting block.
- Loosened support setscrews located in gun mount cover shield collar approximately 1 1/2 turns.
- Selected target employed to boresight main gun with a clearly defined right angle at a distance of 1200 meters.
- Aligned machinegun bore vertically on target while viewing aiming point through right binocular of M17A1 so as to adjust machinegun elevation alignment with bore of main gun by loosening or tightening adjusting screws.
- Aligned machinegun bore horizontally while viewing aiming point through right binocular of M17A1 so as to adjust machinegun azimuth alignment with bore of main gun by loosening or tightening front end and rear horizontal adjusting screws.
- Insured that all lock and jam nuts are tightened securely.
- Adjusted support setscrews, in gun mount cover shield collar until they contacted flash suppressor body then backed them off 1/4 to 1/2 turn.
(Gunner as Gunner)

After "Loader" tightened both horizontal adjustment screws:

• Rotated either to left or right, rheostat knob on infinity sight M44C for periscope M31 or rheostat knob of light source control for periscope M32 in order to adjust brightness of reticle.
• Rotated both elevation and deflection boresight knobs on infinity sight so as to align center reticle on aiming point of target.

12. ZERO MAIN GUN

(Gunner as TC)

• Turned computer switch ON.
• Indexed range into rangefinder.

(Gunner as Gunner)

After "TC" turned computer ON:

• Assured range correction knob of ballistic computer is indexed correctly.
• Indexed ammunition element into ballistic computer.
• Laid sight reticle on center of mass of target by operating manual elevation and traversing handles.

After "Loader" announced UP:

• Fired a three-round shot group.
• Unlocked boresight knobs and moved sight reticle to center of shot group, without disturbing lay of gun (with gun loaded).
• Relaid main gun back to center of mass by operating manual elevation and traversing handles.
• Fired a check round.
• Relaid main gun back to center of mass by operating manual elevation and traversing handles.
• Unlocked boresight knobs of Gunner's sight not used to zero and rotated knobs until proper portion of reticle was laid on target aiming point.
• Recorded elevation and deflection readings on all sights on DA Form 2404.
13. ZERO COAX

(Gunner as TC)

. Rotated the range knob of the rangefinder to range to the target.

(Gunner as Gunner)

. Selected a target with a clearly defined aiming point at a known range as near 800 meters as possible.
. Indexed lowest velocity tank main gun ammunition in ballistic computer.
. Sighted through unity power window of Gunner’s periscope and laid target in center of aiming circle by operating manual elevation and traversing handles.

After "Loader" announced UP:

. Placed electrical machinegun switch on Gunner's panel in ON position.
. Depressed electrical firing trigger and fired a 20-25 round burst.
. Observed strike of rounds in relation to target.
. Rotated infinity sight boresight knobs to move sight reticle so that strike area is in center of field of view.
. Fired additional 20-25 round burst to check accuracy of adjustment.
. Rotated infinity sight boresight knobs, if necessary, to readjust the field of view in relation to strike of rounds.

14. INDEX ANNOUNCEDammunition INTO COMPUTER AND CONDUCT COMPUTER CHECK

. Rotated ammunition selector handle 30 degrees clockwise, pushed handle in or pulled handle out to select ammunition to be fired as indicated on the ammunition indicator.

(Computer check)

. With range correction knob at zero, rotated range knob on rangefinder and determined whether inner (range) pointer indicated same range on computer range dial as was indexed on range scale of rangefinder.
. Indexed ranges of 1,000, 1,200, or 2,000 meters on range scale of rangefinder.
Indexed a type of ammunition into the computer.

Turned the computer ON and determined whether super-elevation actuator shaft rotated.

Determined whether outer (superelevation) pointer moved to match inner (range) pointer.

Determined whether correct superelevation for range and ammunition selected was indicated on the superelevation mil counter (used firing tables).

<table>
<thead>
<tr>
<th>SCORING.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To pass:</strong></td>
</tr>
<tr>
<td>a. The Gunner must be checked &quot;Yes&quot; on each performance measure.</td>
</tr>
<tr>
<td>b. The TC (scorer) must verify that optics and weapons are boresighted by confirming that reticle aiming crosses are on same aiming point as muzzle cross threads.</td>
</tr>
<tr>
<td>c. Range read to target on range scale (Task 14) must be ± 50 meters of actual range.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMMENTS. (Recommended remedial training, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASS FAIL</td>
</tr>
</tbody>
</table>

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GUNNER'S READINESS TEST

PART F. COMBAT LOADING (W)

CONDITIONS. The Gunner is in a classroom and is administered TEC pre-tests 020-171-5331-F, 020-171-5332-F, 020-171-5346-F through 020-171-5348-F.

INSTRUCTIONS TO GUNNER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number and today's date on the answer sheet. The test is in five parts:
- Tank Ammo: Selecting Ammunition (TEC Lesson 020-171-5331-F),
- Tank Ammo: Handling, Main Gun (TEC Lesson 020-171-5332-F),
- 105MM Gun: Loading (TEC Lesson 020-171-5346-F),
- 105MM Gun: Misfire Procedures (TEC Lesson 020-171-5347-F),

Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and the answer sheet to the Test Proctor."

TASKS.

- Identify various types of main gun ammunition.
- Identify various types of machinegun ammunition.
- Identify correct method of linking machinegun ammunition.
- Match various types of main gun ammunition with various types of targets.
- Explain "Loader's" action upon hearing a main gun fire command.
- Explain procedure for loading a main gun round into the chamber.
- Explain safety precautions when operating the breech operating handle.
- Explain "Loader's" main gun misfire procedures after Gunner has tried all firing circuits.
- Explain "Loader's" misfire procedures for a cool gun and a hot gun after all firing actions have failed.
- Explain procedure to follow when unable to remove a misfired round from a hot gun.
- Explain position of "Loader's" safety switch before unloading a misfired round.
- Explain procedure for removing a round partially stuck in the chamber.
- Explain procedure for removing a projectile stuck in the tube.
- Explain how to close the breech manually.
- Explain procedure for testing the firing circuit.

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NOTES.

a. See Module G-6 for remedial training of deficiencies.

b. Estimated time, 3/4 hour.
GUNNER'S READINESS TEST

PART F: COMBAT LOADING

The Test Proctor will administer the following TEC Lesson pre-tests and the Gunner will answer only those questions indicated:

. Tank Ammo: Selecting Ammunition (020-171-5331-F)
  - Gunner will answer all questions.

. Tank Ammo: Handling, Main Gun (020-171-5332-F)
  - Gunner will answer questions 3, 4, and 6.

. 105MM Gun: Loading (020-171-5346-F)
  - Gunner will answer all questions.

. 105MM Gun: Misfire Procedures (020-171-5347-F)
  - Gunner will answer all questions.

. 105MM Gun: Unloading (020-171-5348-F)
  - Gunner will answer questions 1, 2, 3, 5, and 6.
GUNNER’S READINESS TEST

PART F: COMBAT LOADING


ANSWER SHEET

Name __________________________________________

SSN ___________________________ Tank No. ___________________________

Scorer ___________________________ Test Date ___________________________

020-171-5331-F

1. a. ______
   b. ______
   c. ______
   d. ______
   e. ______
   f. ______

2. ______

3. a. ______TRACE
   b. ______ AP (armor piercing)
   c. ______ BALL
   d. ______ APIT (armor piercing-incendiary tracer)
   e. ______ API (armor piercing incendiary)

4. ______

5. ______

6. ______
020-171-5347-F

1. FIRST MISFIRE - Gunner:
   a.
   b.
   c.
   d.

2. SECOND MISFIRE - Gunner:
   a.
   b.
   c.
   d.

3. THIRD MISFIRE - Gunner:
   a.
   b.
   c.
   d.
   e.

4. FOURTH MISFIRE - Gunner:
   a. Gunner
   b. Loader
   c. Loader
   d. Loader
   e. Loader
   f. Loader
   g. Loader
h. Loader
i. Gunner
j. Gunner
k. Gunner
l. Gunner

5. FIFTH MISFIRE

   (1) Gunner -
   (2) Loader -
   (3) Loader -
   (4) Loader -

b. Hot Gun.
   (1) Gunner -
   (2) Loader -
   (3) Loader -
   (4) Loader -

6. a. Loader -
    b. Loader -
    c. TC -
    d. Loader -

020-171-5348-F

1. a. 
    b. 

2. a. 
    b.
3. a.
b. 
c. 
d. 
e. 
5.
6. a.
b. 
c. 
d. 
e. 
f. 

COMMENT. (Recommended remedial training, etc) 

PASS FAIL
GUNNER'S READINESS TEST

PART F: COMBAT LOADING

PRETEST ANSWER KEY

ANSWER KEY

TANK AMMO: SELECTING AMMUNITION
(020-171-5331-F)

1. a. SABOT
   b. HEAT
   c. HEAT
   d. HEP
   e. SMOKE
   f. BEEHIVE

2. A

3. a. C TRACE
   b. B AP
   c. A BALL
   d. E APIT
   e. D API

4. A

5. C

6. D

7. C

8. E
9. D
10. C
11. B

**TANK AMMO: HANDLING, MAIN GUN**
*(020-171-5332-F)*

3.
4.
6.a.
   b.
   c.

**105MM GUN: LOADING**
*(020-171-5346-F)*

1. The correct actions and sequence for loading the main gun follow:
   a. Make sure the Loader's safety switch is in the SAFE position.
   b. Open the breech if it is closed.
   c. Inspect the chamber for obstructions.
   d. Select the ammunition called for. (SABOT)
   e. Place the round two-thirds of the way into the chamber and push it the rest of the way in with the heel of the fist.
   f. Stand clear of the recoil path and make sure the recoil path is clear.
   g. Place the loader's safety switch in the FIRE position.
   h. Announce UP.

2. B
   The Loader has his fingers extended rather than having them formed into a fist.

3. The operating handle will fly up with enough force to cause serious injury if it strikes the Loader.
1. **FIRST MISFIRE.** The gunner:
   a. Announces **MISFIRE.**
   b. Announces **ON THE WAY.**
   c. Waits one second.
   d. Presses **other** (or right) trigger on the power control handle.

2. **SECOND MISFIRE.** The gunner:
   a. Announces **MISFIRE.**
   b. Announces **ON THE WAY.**
   c. Waits one second.
   d. Presses the trigger on the manual elevating handle.

3. **THIRD MISFIRE.** The gunner:
   a. Announces **MISFIRE.**
   b. Turns main gun switch on Gunner's switch box to **OFF.**
   c. Announces **ON THE WAY.**
   d. Waits one second.
   e. Rotates the emergency firing device clockwise.

4. **FOURTH MISFIRE.** Actions of the Loader and Gunner follow:

<table>
<thead>
<tr>
<th>WHO</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Gunner</td>
<td>Announces <strong>MISFIRE.</strong></td>
</tr>
<tr>
<td>b. Loader</td>
<td>Puts Loader's safety switch on <strong>SAFE.</strong></td>
</tr>
<tr>
<td>c. Loader</td>
<td>Waits two minutes.</td>
</tr>
<tr>
<td>d. Loader</td>
<td>Opens breech.</td>
</tr>
<tr>
<td>e. Loader</td>
<td>Rotates round one-half turn.</td>
</tr>
<tr>
<td>f. Loader</td>
<td>Reloads the round.</td>
</tr>
</tbody>
</table>
g. Loader Puts Loader's safety switch on FIRE.
h. Loader Announces UP.
i. Gunner Puts main gun switch on FIRE.
j. Gunner Announces ON THE WAY.
k. Gunner Waits one second.
l. Gunner Presses any electrical firing trigger.

5. FIFTH MISFIRE.

a. Cool Gun

(1) Gunner announces, MISFIRE.

(2) Loader makes sure Loader's safety switch is on SAFE.

(3) Loader waits two minutes to allow for a possible hangfire.

(4) Loader removes round from breech.

b. Hot Gun

(1) Gunner announces, MISFIRE.

(2) Loader makes sure Loader's safety switch is on SAFE.

(3) Loader waits two minutes to allow for a possible hangfire.

(4) Loader removes round from the breech, within one additional minute.

6. The following steps are taken when the Loader is unable to remove a misfired round from a hot gun within one additional minute after he has waited two minutes to allow for a possible hangfire.

a. The Loader closes the breech.

b. The Loader makes sure the Loader's safety switch is in the SAFE position.

c. The Tank Commander orders the crew to evacuate the tank for two hours.

d. At the end of two hours, the Loader, assisted by other crewmen and safety personnel, removes the round.
**105MM GUN: UNLOADING**

(020-171-5348-F)

1. **a.** Loader's safety switch. Wrong.
   **b.** Gunner's main gun switch. Wrong.

2. **a.** One crewman holds the breech operating handle down.
   **b.** Another crewman pries the round out of the chamber with the ramming and extracting tool.

3. **a.** Fill the chamber with rags to cushion the base of the projectile.
   **b.** Close the breech manually.
   **c.** Push the rammer down the tube until the bell of the rammer is resting on the projectile, then apply steady pressure until the projectile is freed from the tube and pushed into the cushion of rags in the chamber. (Any shorter version of this answer is satisfactory as long as the rammer, steady pressure, and freed from the tube are included.)
   **d.** Open the breech.
   **e.** Remove the projectile.

5. **Trip the extractors with a wooden block.**

6. **a.** Make sure the main gun is not loaded.
   **b.** Close the breech manually.
   **c.** Insert the circuit tester between the breech block and the breech ring.
   **d.** Turn the master battery, turret power, and main gun switches ON. Place the Loader's safety in the FIRE position.
   **e.** Press the firing triggers on the power control handle, the manual elevating handle, and the Tank Commander's override.
   **f.** Observe the lamp on the circuit tester. If it lights, the circuit is OK.

**SCORING KEY.**

Award 5 points for each correct response (440 possible points).

**PASSING SCORE = 400 points.**
GUNNER'S READINESS TEST

PART G: COMBAT LOADING (HO)

CONDITIONS. M60A1 tank with BII, situated on level ground. An Ammunition Stowage Plan and dummy rounds (3-ADPS, 3-HEAT, 2-HEP, 1 belt empty 7.62 machinegun and 1 belt empty .50 caliber machinegun) are located next to the tank. All main gun ammunition stowage areas are blocked off with the exception of eight slots in the ready rack; empty slots should correspond to the stowage plan and type of dummy rounds. Two dimensional cardboard representatives of 7.62mm and .50 caliber machinegun ammunition boxes are used for stowage of machinegun ammunition. Replenisher tape mock-up positioned forward of "Loader." The tape can be set at any one of four positions: one rough edge and one smooth edge, two rough edges, two smooth edges, or two long notches.

INSTRUCTIONS TO THE GUNNER. "During this test you will act as the Loader and TC. In the first part of the test assume we are preparing the tank for a combat mission. First you will stow ammunition aboard the tank in accordance with the units Ammunition Stowage Plan. Next I will give you some different settings on the replenisher mock-up and you are to tell me what actions you will take for each setting--before, during, and after firing. I will set the tape and you will go to the mock-up, feel the tape, and immediately report what action is called for. The last part of the test will be performing the duties of the Loader and TC under simulated combat conditions. We will carry ADPS ammunition in the tube for battlesight engagements, so begin by loading an ADPS round. Listen to fire commands and react accordingly. Since you will be working with dummy rounds you will have to unload the rounds between firing, but wait until I give the command to unload. During the fire commands sequence MISFIRE and a coax stoppage will be announced by the Gunner (TC Scorer). In addition you will get into the TC's position and load, clear, and apply immediate action to the .50 caliber machinegun. OK. . . First stow ammunition on the tank according to the units stowage plan."

TASKS.

# Stow main gun rounds according to Ammunition Stowage Plan.
# Stow machinegun ammunition according to Ammunition Stowage Plan.
# Stow coax ammunition in the ready (banana) box.
# Determine corrective action required by replenisher tape readings.
# Load main gun in response to fire commands.
# Rotate round in main gun misfire procedure.
# Unload main gun misfired round.
# Load coax.
# Ready coax in response to fire command.
# Clear and unload coax.
# Apply immediate action to reduce coax stoppage.
#*Change coax barrel.
#*Load M85.
#*Clear and unload M85.
#*Apply immediate action to reduce M85 stoppage.

NOTES.

a. Gunner should not be given this test until he has passed Gunner's Readiness Test, Parts B, C, and F.

b. TC should present each of the four replenisher tape settings in a series of eight settings in random order to the Loader.

c. Remedial training for tasks failed should be provided on the spot but after the Loader has completed all of Part G. See Module G-7 for remedial training.

d. It is necessary to perform the tasks and the steps within each task in the order given.

e. For Performance Measures 5 and 9, TC-Scorer gives a series of fire commands, at about 15 second intervals, that requires loading the available type of dummy rounds interspersed with two or three coax commands. A suggested sequence is:

   (1) Battlesight (SABOT) HEP, HEAT, COAX, HEP MISFIRE

   (2) (Reload for battlesight) SABOT, (No "CEASE FIRE"), SABOT, HEAT, COAX, STOPPAGE.

f. The MISFIRE command provides a break in the sequence. After TC-Scorer goes through MISFIRE checks, tells the "Loader to rotate the round," and round still fails to fire; he then waits two minutes for a hangfire, tells "Loader to unload the round," and assists him in doing so.

g. Loading should be timed with a stopwatch. Timing should begin with the announcement of the ammunition element and end with the Loader's announcement UP. Time should be cumulated for each series of fire commands.

h. Estimated time, 1 1/4 hours.
PERFORMANCE MEASURES.

1. STOW MAIN GUN ROUNDS ACCORDING TO AMMUNITION STOWAGE PLAN

- Determined, by reference to Ammunition Stowage Plan and present load, how many of each type of round was needed.
- Called out to assisting crewman how many of a given type of round was wanted.
- Insisted that round be handed in through turret nose down.
- Round stowed in:
  - Ready rack by placing primer end down, swinging hinge of holder up and to the left, pulling out spring loaded knob on rod of holder, sliding hinge slot over rod behind knob, and releasing the knob.
  - Tubular stowage rack by pushing round in nose first, swinging handle lock over primer end of round, and rotating handle lock securely in place.
  - Turret bustle by seating round with nose toward inside of turret, swinging hinge up and to the left, pulling up clamp and slotting hinge in place below clamp, and pulling clamp down.
- Completed stowage of rounds one type at a time.

2. STOW MACHINEGUN AMMUNITION ACCORDING TO AMMUNITION STOWAGE PLAN

- Determined by reference to Ammunition Stowage Plan and present load, how much of each ammunition was needed.
- Called out to assisting crewman how much of a given type ammunition was needed.
- Stowed 15 boxes of 7.62 coax ammunition on the turret platform floor (used cardboard representations).
- Stowed 600 rounds of 7.62 coax ammunition in the ready round (banana) ammunition box. (See Task 13)
- Stowed 8 boxes of .50 cal ammunition on the turret platform floor (used cardboard representations).
- Stowed 180 rounds of .50 cal ammunition in the ready round ammunition box.
3. STOW COAX AMMUNITION IN READY (BANANA) BOX
   - Removed ammunition from metal packing box.
   - Inspected ammunition for serviceability and dirt.
   - Cleaned ammunition if required.
   - Linked 600 rounds together in one belt.
   - Opened ready box cover.
   - Placed 600 round belt in ready box with projectile end of round toward turret wall.
   - Fed at least ten rounds of ammunition through ammunition chute in ready box cover.
   - Closed ready box cover.

4. DETERMINE CORRECTIVE ACTION REQUIRED BY REPLENISHER TAPE READINGS
   - Took no action if felt one rough edge and one smooth edge.
   - Added oil to replenisher (after announcing CEASE FIRE, if during firing) if felt rough edges on both sides of the tape.
   - Continued to check tape frequently during firing if felt smooth edges on both sides of tape, but drained oil from replenisher at first opportunity.
   - Drained oil from replenisher (after announcing CEASE FIRE, if during firing) if felt two long notches on tape.
   - Took correct action upon feeling rough edges on both sides of replenisher tape.
   - Took correct action upon feeling smooth edges on both sides of replenisher tape.
   - Took no action upon feeling one rough edge and one smooth edge on replenisher tape.
   - Took corrective action upon feeling two long notches on replenisher tape.

5. LOAD MAIN GUN IN RESPONSE TO FIRE COMMANDS
   a. Battlesight, SABOT loaded.
      - Stood clear of path of recoil.
      - Placed firing safety switch in FIRE.
      - Announced UP.
      - Prepared to load a second round in case no CEASE FIRE is given.
b. Main gun not loaded.

- Placed firing safety switch in SAFE position.
- [Checked replenisher tape.]
- Opened breech.
- Selected announced ammunition.
- Unlocked ammunition ready rack.
- Inserted appropriate round into chamber by placing the round 2/3rds into chamber and pushing it rest of way with heel of fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in FIRE position.
- Announced UP.

6. ROTATE ROUND IN MAIN GUN MISFIRE PROCEDURE

On Gunner's command ROTATE ROUND:

- Placed firing safety switch in SAFE position.
- Opened breech slowly enough to extract round about 1/2 way.
- Rotated round 1/2 turn.
- Pushed round into chamber with heel of fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in FIRE position.
- Announced UP.
7. **UNLOAD MISFIRED MAIN GUN ROUND**

   - Told Gunner to turn main gun and turret power switches OFF.
   - Placed firing safety switch in SAFE position.
   - Opened breech.
   - Held breech operating handle down while TC (Gunner) pried round out of chamber.
   - Returned breech operating handle to latched position.

8. **LOAD COAX**

   - Pushed forward on rear of left cover latch rod assembly and raised cover.
   - Raised feed tray.
   - Placed machinegun safety in FIRE position.
   - Charged (cocked) machinegun by pulling charger handle to rear.
   - Inspected chamber for obstructions by looking and feeling in chamber.
   - Placed safety in SAFE position.
   - Lowered feed tray.
   - Fed ammunition belt through chute of ammunition box.
   - Placed first round of ammunition belt in feed tray slot with open side of ammunition link loops facing down.
   - Closed machinegun cover assuring that lock rod is engaged.

9. **READY COAX IN RESPONSE TO FIRE COMMANDS**

   - Placed coax safety in FIRE position.
   - Announced UP.

10. **CLEAR AND UNLOAD COAX**

    - Placed safety in SAFE (S) position.
    - Pushed forward on rear of left rod assembly and opened cover assembly.
    - Removed ammunition belt from machinegun.
    - Lifted feed tray group, looked and felt that receiver and chamber were clear of ammunition.
    - Placed safety in FIRE (F) position.
    - Pulled charger handle rearward, depressed manual firing trigger and allowed barrel extension to close slowly.
    - Placed safety in SAFE (S) position.
    - Closed cover assembly.
11. APPLY IMMEDIATE ACTION TO REDUCE COAX STOPPAGE

On command STOPPAGE:

- Waited 5 seconds to allow for a hangfire.
- Charged the machinegun, locking the recoiling parts to the rear.
- Checked to see if the ammunition was feeding into the weapon.
- Pulled barrel extension to the rear.
- Placed safety in SAFE.
- Raised cover and removed the ammunition.
- Removed misfired round from chamber.
- Placed safety in FIRE (F) and hand functioned the weapon one cycle.
- Reloaded the weapon.
- Announced UP.

12. CHANGE COAX BARREL

- Opened cover assembly and removed belted ammunition.
- Charged weapon to rear position and placed safety in SAFE.
- Removed live ammunition or spent cartridge from weapon chamber and links from immediate area.
- Insured weapon is clear by looking into and feeling receiver and chamber.
- Pulled disconnector ring to rear to allow receiver assembly to rotate downward.
- Removed barrel assembly from jacket assembly.
- Installed new barrel assembly in jacket assembly.
- Rotated receiver assembly upward and allowed disconnector to engage into jacket assembly mounting block.
- Placed safety in FIRE and hand functioned weapon one cycle.
- Loaded weapon and attempted to fire.

(WARNING: Use asbestos gloves when removing a hot barrel.)

13. LOAD M85

- Unlatched and raised cover.
- Visually checked and felt in chamber for round.

(NOTE: If bolt is in forward position place safety in FIRE (F) position and pull charger handle rearward until bolt assembly is in rear position. Check and feel in chamber for round.)
With safety in FIRE (F) position pulled charger handle fully rearward and while keeping tension on handle pulled trigger extension handle, depressing trigger to allow bolt assembly to close slowly.

Placed .50 caliber ammunition in ammunition box and feed belt until three or four rounds are in flexible chute.

Pulled rounds into feed tray assembly.

Placed leading round of belt on tray with open side of links down so it is held by belt retaining pawls.

Closed cover assembly.

Charged machinegun.

14. CLEAR AND UNLOAD M85

Placed cupola firing safety switch in OFF position.

Held cupola electrical power control switch in OFF position momentarily.

Assured safety is in SAFE (S) position.

Unlatched and opened cover assembly.

If bolt assembly was in forward position placed safety in FIRE (F) position and pulled charger handle until bolt assembly was fully rearward, keeping tension on charger handle pulled trigger extension handle to depress trigger and allowed bolt assembly to close slowly.

Placed safety in SAFE (S) position.

15. APPLY IMMEDIATE ACTION TO REDUCE STOPPAGE OF M85

Waited 5 seconds to allow for hangfire.

Charged the machinegun locking recoiling parts to rear.

Checked to see if ammunition was feeding into machinegun.

Attempted to fire weapon.

Charged the machinegun to sear position.

Rotated safety to SAFE (S).

Raised cover and removed ammunition.

Removed misfired round from chamber.

Rotated safety to FIRE (F) position and hand functioned the weapon one cycle.

Reloaded the weapon.

Attempted to fire weapon.

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SCORING.

To pass, the Gunner must have:

a. Stated the correct action for each of the right test trials for during-firing and before-firing conditions.

b. Responded in each trial without hesitation, immediately after feeling the tape.

c. Executed the first five fire commands in a total time of 35 seconds, and the second four commands (five loading reactions) in 1 minute 35 seconds.

d. Responded to MISFIRE, including unloading the misfired round, within 2 1/2 minutes.

e. Responded to STOPPAGE by removing misfired round within 10 seconds of command, and completed procedure within 15 seconds.

f. Selected the correct round in response to each fire command.

g. Checked replenisher tape at least once during the test.

h. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
PART H. TARGET ACQUISITION (W)

CONDITIONS. The Gunner is in a classroom and is administered TEC pre-tests 020-171-1611-F, 020-171-1612-F, 020-171-1614-F, and 935-171-0203-F.

INSTRUCTIONS TO GUNNER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of four parts: Target Range Estimation (TEC Lesson 020-171-1611-F), Locating and Reporting Targets (TEC Lesson 020-171-1612-F), Target Acquisition and Scanning Techniques (TEC Lesson 020-171-1614-F), and Armor Vehicle Recognition (TEC Lesson 935-171-0203-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

- Explain the range estimation method in which you estimate the range half the distance to the target.
- Explain the range estimation method in which a target at a known range appears half as big as a like target at an unknown range.
- Explain the range estimation method in which a target at a known range appears twice as big as a like target at an unknown range.
- Explain location of targets by the clock system.
- Explain reporting of targets by the clock system.
- Explain the technique of quick search scanning of an area.
- Explain ways to adapt your eyes to the darkness.
- Explain how to preserve night vision.
- Explain how to scan an area at night.
- Identify US and Foreign Armor Vehicles.

NOTES.

a. See Module G-8 for remedial training of deficiencies.

b. Estimated time, 1 hour.
PART H: TARGET ACQUISITION

The Test Proctor will administer the following TEC Lesson pre-tests and the Gunner will answer only those questions so indicated:

. Target Range Estimation (020-171-1611-F)
  - Gunner will answer questions 2, 4, and 5.

. Locating and Reporting Targets (020-171-1612-F)
  - Gunner will answer question 1.

. Target Acquisition Scanning Techniques (020-171-1614-F)
  - Gunner will answer questions 1, 3, 4, and 6.

. Armor Vehicle Recognition (935-171-0203-F)
  - Gunner will identify all vehicles shown on TEC tapes, vehicle 1 through vehicle 17.
GUNNER'S READINESS TEST

PART H: TARGET ACQUISITION


ANSWER SHEET

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<tr>
<th>Name</th>
<th>SSN</th>
<th>Tank No.</th>
<th>Scorer</th>
<th>Test Date</th>
</tr>
</thead>
</table>

020-171-1611-F
2. Step a.
   Step b.
   Step c.

4.
5.

020-171-1612-F
1.a. Target:
   b. Posture:
   c. Direction:
   d. Range:

020-171-1614-F
1.
3.
935-171-0203-F

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COMMENT. (Recommended remedial training, etc.) PASS FAIL
GUNNER'S READINESS TEST

PART H: TARGET ACQUISITION


ANSWER KEY

TARGET RANGE ESTIMATION
(020-171-1611-F)

2. The Gunner's diagram or description must include three steps:
   Step a. Divide the distance to the target in half.
   Step b. Estimate the distance to the halfway point in 100 meter increments.
   Step c. Double the range for estimated range to target.

4. 1000 meters.
5. 600 meters.

LOCATING AND REPORTING TARGETS
(020-171-1612-F)

1.a. Target: TANK
    b. Posture: MOVING LEFT
    c. Direction: ONE O'CLOCK (12:00 or 2:00 is acceptable)
    d. Range: ONE FIVE HUNDRED
TARGET ACQUISITION SCANNING TECHNIQUES
(020-171-1614-F)

1. A, C
3. B, C
4. A
6.a. Short, jerky movements.
   b. Pause a few seconds at each point.

ARMOR VEHICLE RECOGNITION
(935-171-0203-F)

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SCORING KEY.

Award 5 points for each correct response (165 points possible).

PASSING SCORE = 150 points.
GUNNER'S READINESS TEST

PART I. LOCATING AND REPORTING TARGETS (HO)

CONDITIONS. Fully operational M60A1 tank located at an observation point on a target acquisition course. The course includes silhouettes, tank and truck targets located at ranges from 400 meters to 1500 meters. The Gunner will observe from the infinity sight. (The tank will be positioned so the Gunner's target area of responsibility (10:00 o'clock clockwise to 2:00 o'clock) overlaps the right and left boundaries of the target acquisition course.)

INSTRUCTIONS TO GUNNER. "This is a test of your target acquisition ability. You will be required to scan the area, estimate range to various targets, and report target locations. React to my instructions."

TASKS.

1. Conduct a quick search scan of the area.
2. Locate and identify targets in the area.
3. Estimate range to targets in the area.
4. Report location of targets in the area.

NOTES.

a. Gunner should not be given this test until he has passed Gunner's Readiness Test, Part H.
b. Tasks should be performed in order given.
c. See example layout of Target Acquisition Course.
d. See Module G-9 for remedial training of deficiencies.
e. Estimated time, 3/4 hour.

PERFORMANCE MEASURES.

1. CONDUCT A QUICK SEARCH SCAN OF THE AREA

Given the special command SCAN YOUR TARGET AREA OF RESPONSIBILITY:

Scanned area directly in front, going close in to far out.
2. LOCATE AND IDENTIFY TARGETS IN THE AREA

Given the special command LOCATE AND IDENTIFY TARGETS IN THE AREA, the Gunner will have five minutes to locate and identify all targets.

- Located and identified target 1 (TROOPS).
- Located and identified target 2 (TANK).
- Located and identified target 3 (TANK).
- Located and identified target 4 (TRUCK).
- Located and identified target 5 (TROOPS).
- Located and identified target 6 (TRUCK).
- Located and identified target 7 (TANK).
- Located and identified target 8 (TROOPS).

3. ESTIMATE RANGE TO TARGETS IN THE AREA

Given the range of 1000 meters to target 2 and the special command DETERMINE RANGE TO ALL TARGETS IN THE AREA, the Gunner will determine the range to all targets within ± 100 meters.

- Determined range to target 1 as 400 meters.
- Determined range to target 3 as 500 meters.
- Determined range to target 4 as 1200 meters.
- Determined range to target 5 as 1000 meters.
- Determined range to target 6 as 1200 meters.
- Determined range to target 7 as 1500 meters.
- Determined range to target 8 as 900 meters.

4. REPORT LOCATION OF TARGETS IN THE AREA

Given a designated target and the special command REPORT LOCATION OF TARGET NO. ____, the Gunner will report the type, posture (moving or stationary), location (by clock system, within one hour deviation), and range to the target (within ± 100 meters).

- Target 1. TROOPS, STATIONARY, TEN O'CLOCK, FOUR HUNDRED.
- Target 3. TANK, STATIONARY, ONE O'CLOCK, FIVE HUNDRED.
Target 4. TRUCK, MOVING LEFT TO RIGHT, ELEVEN O'CLOCK, ONE TWO HUNDRED.

Target 5. TROOPS, STATIONARY, ONE O'CLOCK, ONE THOUSAND.

Target 6. TRUCK, STATIONARY, TWELVE O'CLOCK, ONE TWO HUNDRED.

Target 7. TANK, STATIONARY, TWELVE O'CLOCK, ONE FIVE HUNDRED.

Target 8. TROOPS, STATIONARY, TWO O'CLOCK, NINE HUNDRED.

SCORING.

To pass, Gunner must have:

a. Located and identified all targets in the area within five minutes.

b. Estimated range to all targets within ± 100 meters.

c. Given location of all targets within one hour deviation.

d. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
TARGET ACQUISITION COURSE

Example. (Gunner's target area of responsibility is from 10:00 o'clock to 2:00 o'clock.)

1600 meters

Left Limit ------------------------- Right Limit
(No marker)

800 meters

Left Limit

Observation Point

1/2" = 100 meters
GUNNER'S READINESS TEST

PART J. TACTICAL OPERATIONS (W)

CONDITIONS. The Gunner is in a classroom and is administered TEC pre-test 020-171-5364-F.

INSTRUCTIONS TO GUNNER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number and today's date on the answer sheet. The test is in one part: Machinegun Engagements (TEC Lesson 020-171-5364-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish, turn in the test booklet and the answer sheet to the Test Proctor."

TASKS.

Explain ammunition setting on ballistic computer when using the coax.
List correct range settings for coax targets at various ranges. Identify correct sight pictures for engaging various targets with the coax.

NOTES.

a. See Module GN-10 for remedial training of deficiencies.

b. Estimated time, 1/2 hour.
PART J. TACTICAL OPERATIONS

The Test Proctor will administer the following TEC Lesson pre-test, and the Gunner will answer only the questions so indicated:

- Machinegun Engagements (020-171-5364-F)

- Gunner will answer questions 1 through 8.
GUNNER'S READINESS TEST

PART J: TACTICAL OPERATIONS

TEC Lesson 020-171-5364-F

ANSWER SHEET

Name _____________________________________________
SSN_________________________ Tank No._________________________
Scorer_______________________ Test Date_________________________

020-171-5364-F
1. 5.
2. 6.
3. 7.
4. 8.

COMMENTS. (Recommended remedial training, etc.)         PASS FAIL

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GUNNER'S READINESS TEST

PART J. TACTICAL OPERATIONS

PRE-TEST ANSWER KEY

MACHINEGUN ENGAGEMENTS
(020-171-5364-F)

1. HEP
2. A
3. 850 meters
4. 500 meters
5. B
6. Near
7. Near
8. Far

SCORING KEY.

Award 5 points for each correct response (40 possible points).

PASSING SCORE = 35 points.
GUNNER'S READINESS TEST

PART K. TACTICAL OPERATIONS (HO)

CONDITIONS. Fully operational M60A1 tank with B11, skilled driver, tank course including suitable areas for defilade and simulated targets (moving and stationary main gun, coax and M85.)

INSTRUCTIONS TO GUNNER. "This is a test of your ability to fight your tank. We are going on a simulated combat mission. Your tank has a basic load of ammunition and we expect to encounter enemy vehicles and troops. You will be scored on what you do as well as how you do it. Do you have any questions? ... Ready? ... We are pre-loading SABOT. ... Begin. ..."

TASKS.

Acquire targets.
*Preset SABOT battlesight information.
Main gun battlesight engagement, moving to a halt, one stationary target, SABOT (1 Tank).
Main gun battlesight engagement, moving to a halt, two moving targets, SABOT, Gunner masked (2 Tanks).
Coax and .50 caliber engagement, moving to a halt, one stationary target and one moving target (1 Infantry Squad and 1 moving BRDM; TC engages BRDM with .50 caliber).
Main gun precision engagement, moving to a halt, three stationary targets, SABOT (2 Tanks and 1 BRDM; TC engages BRDM with .50 caliber).
*Preset HEAT battlesight information.
Main gun battlesight engagement, moving to a halt, three stationary targets, HEAT (3 Tanks).
Coax and .50 caliber engagement, moving to a halt, three stationary targets (1 RPG Tm, 1 ATGM Tm, and 1 Infantry Squad; TC engages infantry squad with .50 caliber).
Main gun RCLDF engagement, at the halt, three stationary targets, HEAT, Gunner masked (2 Tanks and 1 Infantry Squad; TC engages infantry squad with .50 caliber).
Coax and .50 caliber engagement, at the halt, two stationary targets, Gunner masked (1 Infantry Squad and 1 BRDM; TC engages BRDM with .50 caliber).
Main gun battlesight engagement, at the halt, one stationary target and one moving target, SABOT (2 Tanks).
*Apply immediate action in case of main gun failure to fire.
*Apply burst-on-target (BOT) adjustment.
*Apply target-form (TF) adjustment.
*Apply standard adjustment.
*Lay telescope reticle on target properly.
**NOTES.**

a. Gunner should complete Gunner's Readiness Test Parts A through J before taking this part.

b. In the Performance Measures section which follows, the role of the scorer as TC or Loader is indicated by "TC" or "LOADER." For example, Performance Measure 3, MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT, SINGLE STATIONARY TARGET, SABOT begins with the statement "After "TC" announces GUNNER." The scorer, acting as TC, should announce GUNNER.

c. TC (scorer) must announce "MISFIRE" during one main gun engagement.

d. TC (scorer) will indicate a miss on a battlesight engagement, he will tell the Gunner where the point of impact was, and the Gunner will apply BOT.

e. TC (scorer) will indicate a miss on a battlesight engagement, he will tell the Gunner where the point of impact was, and the Gunner will apply target form.

f. TC (scorer) will indicate a miss on a precision engagement, he will tell the Gunner where the point of impact was, and the Gunner will apply standard adjustment.

g. TC (scorer) will verify sight picture each time the Gunner announces ON THE WAY.

h. The order in which the target appears is not important.

i. See examples of layout for "dry" TCQC course and second round adjustment targets.

j. See Module G-11 for remedial training of deficiencies.

k. Estimated time, 2 hours.

**PERFORMANCE MEASURES.**

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<tbody>
<tr>
<td>1. ACQUIRE TARGETS</td>
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<tr>
<td>. Detected all targets in assigned sector.</td>
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<tr>
<td>2. PRESET SABOT BATTLESIGHT INFORMATION</td>
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<tr>
<td>. Indexed SABOT into ballistic computer.</td>
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<tr>
<td>. Selected ADPS reticle in Gunner's telescope.</td>
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</table>
3. MAIN GUN BATTLE SIGHT ENGAGEMENT, MOVING TO A HALT,
ONE STATIONARY TARGET, SABOT (1 TANK)

After "TC" announced, GUNNER, BATTLE SIGHT:

- Turned main gun switch ON.
- Indexed SABOT into ballistic computer.

After "TC" announced target description:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid crosshair at center of base of target.
- Made final precise lay.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of fire command.

4. MAIN GUN BATTLE SIGHT ENGAGEMENT, MOVING TO A HALT,
TWO MOVING TARGETS, SABOT, GUNNER MASKED (2 TANKS)

After "TC" announced GUNNER, BATTLE SIGHT:

- Turned main gun switch ON.
- Indexed SABOT into ballistic computer.

After "TC" announced target description:

- Identified target and announced IDENTIFIED within 3 seconds.
- Applied one half lead (2 1/2 mils) in direction of target apparent motion.
- Laid leadline at center of base of target.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of fire command.
- Continued to track target.
After "TC" announced TARGET, RIGHT (LEFT) TANK:

- Announced IDENTIFIED within 3 seconds of beginning of second fire command.
- Applied one half lead (2 1/2 mils) in direction of target apparent motion.
- Laid leadline at center of base of target.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of fire command.
- Continued to track target.

After "TC" announced TARGET, RIGHT (LEFT) TANK:

- Announced IDENTIFIED within 3 seconds of beginning of fire command.
- Applied one half lead (2 1/2 mils) in direction of target apparent motion.
- Laid leadline at center of base of target.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of second fire command.
- Continued to track target.

5. COAX ENGAGEMENT, MOVING TO A HALT, ONE STATIONARY TARGET, COAX (1 INFANTRY SQUAD)

After "TC" announced GUNNER, COAX:

- Turned COAX switch ON.

After "TC" announced target description:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid infinity sight circle on near edge of target.
After "TC" announced FIRE AND ADJUST, CALIBER FIFTY:  

Yes No NA

- Announced ON THE WAY.  
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

- Fired coax within 7 seconds of beginning of fire command.
- Traverse and elevate coax for area coverage.
- Announced TARGET, CEASE FIRE.

6. MAIN GUN PRECISION ENGAGEMENT, MOVING TO A HALT, TWO STATIONARY TARGETS, SABOT (2 TANKS)

After "TC" announced GUNNER, SABOT:

- Turned main gun switch ON.
- Indexed SABOT into ballistic computer.

After "TC" announced target description:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid crosshair at center of mass of target.
- Made final precise lay.

After "TC" announced FIRE AND ADJUST, CALIBER FIFTY:

- Announced ON THE WAY.  
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

- Fired main gun within 7 seconds of beginning of fire command.
- Announced TARGET.
- Laid main gun on second target within 3 seconds of announcing TARGET.
- Laid crosshair at center of mass of target.
- Made final precise lay.
- Announced ON THE WAY.  
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

- Fired main gun within 7 seconds of announcing TARGET.
- Announced TARGET, CEASE FIRE.

7. PRESET HEAT BATTLESIGHT INFORMATION

- Indexed HEAT into ballistic computer.
- Selected HEAT reticle in Gunner's telescope.
8. **MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT, THREE STATIONARY TARGETS, HEAT (3 TANKS)**

After "TC" announced GUNNER, BATTLESIGHT:

- Turned main gun switch ON.
- Indexed HEAT into ballistic computer.

After "TC" announced THREE TANKS, LEFT (RIGHT) TANK FIRST:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid crosshair at center of base of target.
- Made final precise lay.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of fire command.

After "TC" announced TARGET, CENTER TANK:

- Identified target and announced IDENTIFIED within 3 seconds of TC announcing TARGET, CENTER TANK.
- Laid crosshair at center of base of target.
- Made final precise lay.

After "TC" announced FIRE:

- Announced ON THE WAY:
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of TC announcing TARGET, CENTER TANK.

After "TC" announced TARGET, RIGHT (LEFT) TANK:

- Identified target and announced IDENTIFIED within 3 seconds of TC announcing TARGET, RIGHT (LEFT) TANK.
- Laid crosshair at center of base of target.
- Made final precise lay.
After "TC" announced FIRE:

. Announced ON THE WAY.
   (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired main gun within 7 seconds of TC announcing
   TARGET, RIGHT (LEFT) TANK.

9. COAX ENGAGEMENT, MOVING TO A HALT, TWO STATIONARY
   TARGETS, COAX (1 RPG TM, 1 ATGM TM)

After "TC" announced GUNNER COAX:

. Turned coax switch ON.

After "TC" announced target description:

. Identified target and announced IDENTIFIED within
   3 seconds.
. Laid infinity sight circle at center of mass of
   target.

After "TC" announced FIRE AND ADJUST, CALIBER FIFTY:

. Announced ON THE WAY.
   (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired coax within 7 seconds of beginning of fire
   command.
. Announced TARGET, CEASE FIRE.
. Identified second target within 3 seconds of
   announcing TARGET, CEASE FIRE.
. Laid infinity sight circle at center of mass of
   target.
. Announced ON THE WAY.
   (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired coax within 7 seconds of announcing TARGET,
   CEASE FIRE.
. Announced TARGET, CEASE FIRE.

10. MAIN GUN RCLDF ENGAGEMENT, AT THE HALT, TWO STATIONARY
    TARGETS, HEAT, GUNNER MASKED, PASSIVE/IR (2 TANKS)

After "TC" announced GUNNER, DIRECT FIRE, INDEX HEP, FIRE
    HEAT, TANK, DEFLECTION SEVEN ZERO LEFT, ELEVEN HUNDRED,
    QUADRANT PLUS SIX, FIRE AND ADJUST, CALIBER FIFTY:

. Indexed deflection reading on azimuth indicator.
. Traversed turret to indexed deflection.
. Read back, DEFLECTION, SEVEN ZERO LEFT.
Indexed elevation reading on elevation quadrant.  
Elevated or depressed main gun to indexed elevation  
(levels bubble in elevation quadrant).  
Read back ONE SIX HUNDRED, QUADRANT PLUS SIX.  
Indexed HEAT into ballistic computer.  
Announced HEAT INDEXED.  
(NOTE: At the start of the RCLDF engagement a  
round of HEP is in the chamber and HEP is  
indexed in the ballistic computer).  

(Note: Target is illuminated).  
Placed IR switch in 24V position.  
Rotated light source control for desired reticle  
brightness.  
Rotated focusing ring until target appears sharp.  
Identified target and announced IDENTIFIED within  
14 seconds of beginning of fire command.  
Laid crosshair at center of base of target.  
Made final precise lay.  
Announced ON THE WAY.  
(Note: "TC" (scorer) VERIFIES SIGHT PICTURE.)  

Fired main gun within 17 seconds of beginning of  
fire command.  
Announced TARGET, CEASE FIRE.  
Identified second targets within 3 seconds of  
announcing TARGET, CEASE FIRE.  
Laid crosshair at center of base of target.  
Made final precise lay.  
Announced ON THE WAY.  
(Note: "TC" (scorer) VERIFIES SIGHT PICTURE.)  

Fired main gun within 6 seconds of announcing TARGET,  
CEASE FIRE.  
Announced TARGET, CEASE FIRE.  

11. COAX ENGAGEMENT, AT THE HALT, ONE STATIONARY TARGET,  
COAX, GUNNER MASKED, PASSIVE/IR (1 INFANTRY SQUAD)  

After "TC" announced GUNNER, COAX:  
Turned coax switch ON.  

After "TC" announced target description:  
Identified target and announced IDENTIFIED within  
3 seconds.  
Laid infinity sight circle on near edge of target.  

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After "TC" announced FIRE AND ADJUST, CALIBER FIFTY:

. Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired coax within 10 seconds of beginning of fire command.

. Traversed and elevated coax for area coverage.

. Announced TARGET, CEASE FIRE.

12. MAIN GUN BATTLESIGHT ENGAGEMENT, AT THE HALT, ONE STATIONARY TARGET AND ONE MOVING TARGET, SABOT, FLARE (2 TANKS)

After "TC" announces GUNNER, BATTLESIGHT:

. Turned main gun switch ON.

. Indexed SABOT into ballistic computer.

After "TC" announced target description:

. Identified target and announced IDENTIFIED within 3 seconds.

. Laid crosshair at center of base of target.

After "TC" announced FIRE:

. Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired main gun within 7 seconds of beginning of fire command.

After "TC" announced TARGET, MOVING TANK:

. Identified target and announced IDENTIFIED within 3 seconds of second fire command.

. Applied one half lead (2 1/2 mils) in direction of target apparent motion.

. Laid leadline at center of target base.

After "TC" announced FIRE:

. Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

. Fired main gun within 7 seconds of beginning of second fire command.

. Continued to track target.
13. APPLY IMMEDIATE ACTION IN CASE OF MAIN GUN FAILURE TO FIRE

After "TC" tells Gunner that round failed to fire:

- Announced MISFIRE.
- Announced ON THE WAY and attempted to fire by
depressing a firing trigger on the Gunner's
power control handle that was not used to fire
the round initially.
(NOTE: "TC" tells Gunner that round failed to fire.)

- Announced MISFIRE if gun again fails to fire.
- Announced ON THE WAY and attempted to fire by
depressing the firing trigger on the Gunner's
manual control handle.
(NOTE: "TC" tells Gunner that round failed to fire.)

- Announced MISFIRE if gun again fails to fire.
- Turned main gun switch OFF.
- Announced ON THE WAY and attempted to fire with
the EMERGENCY FIRING DEVICE.
(NOTE: "TC" tells Gunner that round failed to fire.)

- Announced MISFIRE if gun again fails to fire.
- Waited two minutes and directed Loader to rotate
the round 1/2 turn.

After "Leader" announced UP:

- Turned main gun switch ON.
- Announced ON THE WAY and attempted to fire by
depressing one of the electrical firing triggers.
(NOTE: "TC" tells Gunner that round failed to fire.)

14. MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT,
ONE STATIONARY TARGET (1 TANK) APPLY BOT

After Gunner has fired:

- Relays to maintain correct initial sight picture.
  (Notes point of sight reticle where tracer
appears in relation to target.)
- Announces OVER-RIGHT-BOT (or other appropriate
  sensing).
- Moves imaged tracer point on reticle, by gun con-
trols, to center of mass of target.
- Announces ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
15. MAIN GUN BATTLESIGHT ENGAGEMENT MOVING TO A HALT, ONE STATIONARY TANK TARGET (1 TANK) APPLY TARGET FORM

After Gunner has fired, and "TC" has announced "OVER-DROP ONE HALF FORM-FIRE:

- Moves sight reticle down by gun controls half the distance of the visible height of the target vehicle.
- Announces ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

16. MAIN GUN PRECISION ENGAGEMENT MOVING TO A HALT, ONE STATIONARY TARGET (1 TANK) APPLY STANDARD ADJUSTMENT

After Gunner has fired and announced OVER:

- Moves sight reticle down 1 mil by gun controls.
- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)

17. LAY TELESCOPE RETICLE ON TARGET PROPERLY

(NOTE: "TC" informs Gunner that the Gunner's primary sight is inoperative.)

After "TC" announced GUNNER, HEAT:

- Turned main gun switch ON.
- Checked that HEAT reticle was positioned in Gunner's telescope.

After "TC" announced TANK, ONE EIGHT HUNDRED:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid 1800 meter range line of telescope at center of mass of target.
- Made final precise lay.

After "TC" announced FIRE:

- Announced ON THE WAY.
  (NOTE: "TC" (scorer) VERIFIES SIGHT PICTURE.)
- Fired main gun within 7 seconds of beginning of fire command.
SCORING.

To pass, Gunner must have:

a. Detected and reported all targets that
   Delay in detection is not cause for failure.

b. Responded without hesitation to each applicable element of
   each fire command.

c. Taken up correct sight picture for each target as indicated
   by fire command.

d. Continued to monitor sight picture after firing.

e. Met all time requirements.

f. Been checked "Yes" or "NA" on all performance measures.

COMMENTS. (Recommended remedial training, etc.)

PASS  FAIL
"DRY" TANK CREW QUALIFICATION COURSE  
(Gunner and TC Dry TCQC)

1" = 400 meters
SECOND ROUND ADJUSTMENT TARGETS
(BOT, TF and Standard Adjustment)

BOT TARGET

Initial Sight Picture (Battlesight)  
Subsequent Sight Picture (Battlesight)  

TF TARGET

Initial Sight Picture (Battlesight)  
Subsequent Sight Picture (Battlesight)  

STANDARD ADJUSTMENT

Initial Sight Picture (Precision)  
Subsequent Sight Picture (Precision)  

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APPENDIX D

TANK COMMANDER'S READINESS TEST
TANK COMMANDER'S READINESS TEST

REQUIRED TIME: 11 hours

CROSS TRAINING: Tank Crew Gunnery Skills Test (TCGST), FM 17-12-2 are indicated by an *. Cross training tasks are indicated by a # symbol.

PART A. WEAPONS MAINTENANCE (W)

Type: Written pre-tests for TEC Lessons:

020-171-1132-F (Cleaning, Inspection, and Lubrication Coax)
020-171-1133-F (Troubleshooting Coax)
020-171-5229-F (Troubleshooting M85 Machinegun)

Time: 1/2 hour
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART B. WEAPONS MAINTENANCE (HO)

Type: Hands-On
Time: 1 hour
Location: Company Area or UTS
Support: Tank with dummy rounds and TC Scorer
Scoring: 100% correct

PART C. BEFORE-OPERATIONS PROCEDURES (HO)

Type: Hands-On
Time: 3/4 hour
Location: Company Area or UTS
Support: Tank and TC Scorer
Scoring: 100% correct

PART D. WEAPON SYSTEMS PREPARATION (W)

Type: Written pre-tests for TEC Lessons:
020-171-5340-F (Rangefinder, Part 1)
020-171-5343-F (Operation of Xenon Searchlight, M60/M60A1)
020-171-5352-F (Boresighting the Machinegun, M60/M60A1)
020-171-5353-F (Zeroing the Main Gun and Machineguns and Setting Battlesights)
020-171-5354-F (Boresighting the Xenon Searchlight, M60/M60A1)
020-171-5355-F (Boresighting the Main Gun, RF, Telescope/Peri, Part 2)
020-171-5341-F (Preparing the Ballistic Computer for Operation)
020-171-5351-F (Boresighting the Main Gun, RF, Telescope/Peri, Part 1)
020-171-5337-F (Auxiliary Fire Control Instruments, Part 2)

Time: 1 1/4 hours
Location: Company Area or UTS
Support: Test Administrator/Scorer
Scoring: 90% correct

PART E. WEAPON SYSTEMS PREPARATION (HO)

Type: Hands-On
Time: 1 1/4 hours
Location: Company Area or UTS
Support: Tank and TC Scorer
Scoring: 100% correct
PART F. COMBAT LOADING (W)

Type: Written pre-tests for TEC Lessons:

020-171-5331-F (Tank Ammo: Selecting Ammunition)
020-171-5332-F (Tank Ammo: Handling, Main Gun)
020-171-5346-F (105MM Gun: Loading)
020-171-5347-F (105MM Gun: Misfire Procedures)
020-171-5348-F (105MM Gun: Unloading)

Time: 3/4 hour

Location: Company Area or UTS

Support: Test Administrator/Scorer

Scoring: 90% correct

PART G. COMBAT LOADING (HO)

Type: Hands-On

Time: 1 1/4 hours

Location: Company Area or UTS

Support: Test Administrator/Scorer

Scoring: 100% correct

PART H. TARGET ACQUISITION (W)

Type: Written pre-tests for TEC Lessons:

020-171-1611-F (Target Range Determination)
020-171-1612-F (Locating and Reporting Targets)
020-171-1614-F (Target Acquisition Scoring Techniques)
935-171-0203-F (Armor Vehicle Recognition)

Time: 1 hour

Location: Company Area or UTS

Support: Test Administrator/Scorer

Scoring: 90% correct
PART I. LOCATING AND REPORTING TARGETS (HO)

**Type:** Hands-On

**Time:** 3/4 hour

**Location:** UTS

**Support:** Tank and TC Scorer

**Scoring:** 100% correct

PART J. TACTICAL OPERATIONS (W)

**Type:** Written pre-tests for TEC Lessons:

- 020-171-5361-F (Initial Fire Commands, M60/M60A1/M60A3 Tank)
- 020-171-5364-F (Machinegun Engagements, M60/M60A1/M60A3 Tank)

**Time:** 1/2 hour

**Location:** Company Area or UTS

**Support:** Test Administrator/Scorer

**Scoring:** 90% correct

PART K. TACTICAL OPERATIONS (HO)

**Type:** Hands-On

**Time:** 2 hours

**Location:** UTS

**Support:** Tank and TC Scorer

**Scoring:** 100% correct
TANK COMMANDER’S READINESS TEST

PART A. WEAPONS MAINTENANCE (W)

CONDITIONS. Tank Commander is in a classroom and is administered pre-tests 020-171-1132-F, 020-171-1133-F, and 020-171-5229-F.

INSTRUCTIONS TO TANK COMMANDER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of three parts: Cleaning, Inspection, and Lubrication Coax (020-171-1132-F), Troubleshooting Coax (020-171-1133-F), and Troubleshooting M85 Machinegun (020-171-5229-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain correct method of cleaning coax backplate assembly.
Identify various compounds for cleaning coax barrel.
Identify coax unserviceable parts.
Identify various lubricants to use on coax.
Identify coax parts that should be free of lubricants.
Identify coax parts that are lubricated just prior to firing.
Explain "TC's" action (in Loader's position) upon hearing STOPPAGE announced first time and second time with a hot and cold coax.
Explain "TC's" action (in Loader's position) upon hearing STOPPAGE announced second time with a hot coax, and coax cannot be cleared quickly.
Explain "TC's" action (in Loader's position) if coax has a ruptured cartridge and the stoppage must be corrected quickly.
Explain "TC's" action upon initial stoppage of M85.
Explain "TC's" action when hot M85 fails to fire and immediate action has failed and a round remains in the chamber.
Explain "TC's" action when a cold M85 fails to fire after two attempts.
Explain "TC's" action if M85 has a ruptured cartridge and there is a spare barrel.
Explain "TC's" action after M85 extractor has been driven through the ruptured cartridge.
NOTES.

a. See Module TC-1 for remedial training of deficiencies.

b. Estimated time, 1/2 hour.
TANK COMMANDER'S READINESS TEST

PART A: WEAPONS MAINTENANCE

The Test Proctor will administer the following TEC Lesson pre-tests and the Tank Commander will answer only those questions so indicated:

- Cleaning, Inspection, and Lubrication Coax (020-171-1132-F)
  - Tank Commander will answer all questions.

- Troubleshooting Coax (020-171-1133-F)
  - Tank Commander will answer all questions.

- Troubleshooting M85 Machinegun (020-171-5229-F)
  - Tank Commander will answer all questions.
TANK COMMANDER'S READINESS TEST

PART A: WEAPONS MAINTENANCE

TEC Lessons 020-171-1132-F,
020-171-1133-F, and
020-171-5229-F

ANSWER SHEET

Name________________________________________

SSN_________________ Tank No.____________________

Scorer__________________ Test Date____________________

020-171-1132-F

1.____________________

2.a.____________________

b.____________________

c.____________________

3.a.____________________

b.____________________

c.____________________

4.____________________

5.____________________

6.____________________

7.____________________

8.____________________
020-171-1133-F
1.
2.
3.
4.
5.

020-171-5229-F
1.
2.
3.
4.
5.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
TANK COMMANDER'S READINESS TEST

PART A. WEAPONS MAINTENANCE

PRE-TEST ANSWER KEY

M73/M219 MACHINEGUN: CLEANING, INSPECTION, AND LUBRICATION
(020-171-1132-F)

1. Wipe it off with a clean, dry cloth.
2.a. Solvent (SD)
   b. RBC
   c. RBC
3.a. (Barrel cracked)
   b. (Camway burned)
   c. (Guide rod is bent)
4.c. (LSA)
5.e. (LAW)
6.b. (PL Special)
7.a. (The barrel)
8. Both

TROUBLESHOOTING THE COAX
(020-171-1133-F)

1. A
2. B
3. A
4. C
5. Change the barrel.
TROUBLESHOOTING THE M85 MACHINEGUN
(020-171-5229-F)

1. Wait five seconds, charge gun, attempt to fire (or equivalent answer).
2. Wait five minutes (or equivalent answer).
3. Wait five seconds, clear gun, hand function, reload and attempt to fire (or equivalent answer).
4.c. Insert extractor into bolt, fire manually.
5.b. Pull the charger handle back so that the extractor and cartridge are just clear of the chamber.

SCORING KEY.
Award 5 points for each correct response (110 points possible).

PASSING SCORE = 100 points.
TANK COMMANDER'S READINESS TEST

PART B. WEAPONS MAINTENANCE (HO)

CONDITIONS. An M60A1 tank with coax and .50 caliber machinegun mounted and a complete gun-tool roll stowed according to unit loading plan.

INSTRUCTIONS TO TANK COMMANDER. "This test is in three parts. In the first part you are to remove the coax from the tank, disassemble and assemble it, and remount the coax in the tank. In the second part you will do the same for the M85. In the third part you will remove, disassemble, assemble, and install the breechblock. You will have 3 minutes for disassembly and 3 minutes for assembly of each machinegun, and 6 minutes for removal and disassembly of the breechblock and 6 minutes for assembly and installation of the breechblock. I will alert you before I start timing on each of these tasks. I will not assist you during the test. Do you have any questions? Work quickly, but carefully. Ready? Begin."

TASKS.

- Remove the coax from a tank.
- Disassemble the coax.
- Inspect the coax.
- Assemble the coax.
- Check operation of the coax.
- Mount the coax in a tank.
- Remove the M85 from a tank.
- Disassemble the M85.
- Inspect the M85.
- Assemble the M85.
- Check operation of the M85.
- Mount the M85 in a tank.
- Disassemble the main gun breechblock.
- Assemble the main gun breechblock.

NOTES.

a. Tank Commander should not be given this task until he has passed Tank Commander's Readiness Test, Part A.

b. Remedial training of tasks failed should be provided on the spot, but after the Tank Commander has completed all of Part B. See Module TC-2 for remedial training.
c. All performance measures and steps within each task must be performed in the order given.

d. Cross training tasks are indicated by a * symbol.

e. Estimated time, 1 hour.

**PERFORMANCE MEASURES.**

1. **REMOVE THE COAX FROM A TANK**
   
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<th>Yes</th>
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   - Disconnected electrical lead from solenoid.
   - Loosened three support set screws in collar on gun mount cover shield.
   - Removed machinegun retainer.
   - Removed machinegun.
   - Removed spent cartridge bag.
   - Removed case ejection shield.

2. **DISASSEMBLE THE COAX (3 minutes)**
   
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<th>No</th>
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   - Removed barrel and jacket assembly from receiver.
   - Separated barrel from jacket assembly.
   - Removed cover assembly.
   - Removed feed tray.
   - Removed guide rod springs while holding barrel extension forward.
   - Separated guide rods from guide rod springs.
   - Removed backplate assembly.
   - Retracted barrel assembly.
   - Depressed buffer support lever and removed barrel extension.
   - Removed breechblock from barrel extension assembly.
   - Removed retainer clip and charger assembly from projecting stud.

3. **INSPECT THE COAX**
   
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   - Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust, and foreign matter.
   - Checked all moving parts for looseness, binding wear, or damage.

4. **ASSEMBLE THE COAX (3 minutes)**
   
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   - Installed charger assembly.
   - Placed breechblock assembly in barrel extension.
   - Installed barrel extension.
   - Installed backplate assembly.
451x683

- Joined guide rods and guide rod springs.
- Installed feed tray.
- Installed cover assembly.
- Joined barrel to jacket assembly.
- Joined barrel and jacket assembly with receiver.

5. CHECK OPERATION OF THE COAX

- Placed safety in FIRE position.
- Charged weapon to lock moving parts to rear.
- Allowed barrel extension to ease forward by keeping tension on charging handle and depressing manual firing trigger.

6. MOUNT THE COAX IN A TANK

- Physically examined gun mount cover shield to see that three support set screws were backed off flush with collar of gun port.
- If set screws were not flush with collar of gun port, unscrewed set screws so that flash suppressor of machinegun did not hit set screws when inserted through machinegun port.
- Had the Gunner, if necessary, depress the gun tube so that it was horizontal or slightly below.
- Placed the shell ejection shield on the shield support and fastened six snap fasteners which hold it in place.
- Installed spent cartridge bag on empty cartridge bag support by fastening eight snap fasteners which hold it in place.
- Slid machinegun into machinegun port until rearmost portion of jacket assembly (disconnector holes) were flush with machinegun bracket assembly.
- Placed machinegun retainer over rearmost position of jacket assembly, alining it with machinegun bracket assembly.
- Inserted two cap screws and lock washers in their respective holes and tightened them down.
- Plugged in machinegun electrical lead to solenoid on machinegun's backplate assembly.

7. REMOVE THE M85 FROM A TANK

- Cleared the weapon and left safety in SAFE (S).
- Removed the M36 periscope.
- Disconnected the solenoid lead connector from the backplate assembly.
. Opened cradle access doors and removed barrel.
. Manually elevated cradle 20°.
. Removed rear mounting pin and slid machinegun out of cradle.
. Passed machinegun out of turret through cupola hatch.
. Replaced rear mounting pin in cradle.
. Replaced M36 periscope.

8. DISASSEMBLE THE M85 (3 minutes)

. Cleared weapon.
. Removed barrel.
. Removed backplate group.
. Disengaged retainer lug of guide rod.
. Removed bolt buffer group.
. Separated helical spring, buffer sleeve, and spring and guide rod.
. Removed feed and ejector assembly.
. Removed sear assembly.
. Removed barrel extension and bolt assembly.
. Separated bolt assembly from barrel extension.
. Removed hand charger assembly.
. Removed accelerator quick release pin.
. Removed cover assembly and feed tray assembly.
. Separated cover assembly from feed tray assembly.
. Removed accelerator assembly.

9. INSPECT THE M85

. Checked all metal surfaces for bulges, cracks, burrs, corrosion, rust, and foreign matter.
. Checked all moving parts for looseness, binding, wear, or damage.

10. ASSEMBLE THE M85 (3 minutes)

. Installed accelerator assembly.
. Replaced cover assembly on feed tray assembly.
. Installed cover assembly and feed tray assembly.
. Installed accelerator quick release pin.
. Installed hand charger assembly.
. Assembled bolt assembly and barrel extension.
. Replaced sear assembly.
. Replaced feed and ejector assembly.
. Assembled helical spring, buffer sleeve and spring, and guide rod.
. Installed bolt buffer group.
. Engaged retainer lug or guide rod.
. Installed the barrel.
11. CHECK OPERATION OF THE M485
   
   Placed safety in FIRE (F).
   Charged weapon to lock moving parts to the rear.
   Kept tension on charger handle and pulled trigger extension handle, depressing trigger to allow bolt assembly to close slowly.

12. MOUNT THE M85 IN A TANK
   
   Removed machinegun barrel from the receiver.
   Removed M36 periscope body.
   Removed machinegun rear mounting pin.
   Manually elevated cradle 20°.
   Lowered machinegun receiver into turret through cupola hatch.
   Positioned machinegun into cradle and secured rear mounting pin.
   Opened cradle access doors and installed barrel.
   Connected solenoid lead to backplate assembly.
   Normally depressed cradle to horizontal position.
   Replaced M36 periscope body in mount.

13. DISASSEMBLE THE MAIN GUN BREECHBLOCK (6 minutes)
   
   a. Removal
      
      Insured that main gun safety switch was in SAFE position.
      Insured that breechblock crank stop was in rear position.
      Opened breech.
      Insured chamber was empty.
      Closed breech manually by tripping extractors with an empty cartridge case or a wooden block.
      Removed firing pin spring by depressing plunger, moving plunger to right, twisting firing pin spring retainer counterclockwise until lug aligned with groove in breechblock, and removing retainer and spring.
      Removed firing pin and retractor guide with firing pin retractor by inserting screwdriver blade into retractor guide slot and prying outward.
      Screwed eye bolt into top of breechblock.
      Suspended chain hoist from hook on turret ceiling and connected chain hoist to eye bolt.
      Took up slack with chain hoist to support breechblock.
      Applied tension on closing spring by turning adjuster clockwise with spanner wrench.
. Removed tension from closing spring by depressing plunger from its notch with a screwdriver and allowing adjuster to turn counterclockwise under control of spanner wrench.

. Inserted small screwdriver into hole in breech-block crank stop and slid stop forward.

. Started breechblock downward by rotating operating handle rearward and down, and with chain hoist let breechblock begin descending.

. Returned operating handle to latched position.

. Lowered breechblock until breechblock crank pivot was free of the T-slot, and removed pivot.

. Lowered breechblock until breechblock was on turret floor.

. Released chain hoist from eye bolt.

. Removed right and left extractors from breech ring.

b. Disassembly

. Depressed firing contact plate plunger and turned firing contact plate counterclockwise until arrows on plate and breechblock were alined with each other.

. Removed firing contact plate, firing contact plate plunger, and spring.

. Removed plastic washer, firing contact, and firing contact sleeve.

. Removed retractor pivot pin and firing pin retractor from retractor guide.

. Removed screw, washers, and clamp securing retractor driver to bottom of breechblock. (Used Allen wrench to remove screws.)

. Removed retractor driver, retractor driver shaft, and spring.

14. ASSEMBLE MAIN GUN BREECHBLOCK (6 minutes)

a. Assembly

. Installed retractor driver spring, shaft, and retractor driver into bottom of the breechblock.

. Affixed retractor group to bottom of breechblock by installing securing clamp, washers, and screw with Allen wrench.

. Inserted firing contact sleeve, firing contact, plastic washer, spring, and firing contact plate plunger into breechblock.
b. Installation

- Installed firing pin retractor into retractor guide and secured it with retractor pivot pin.
- Replaced firing contact plate by aligning arrow and depressing and rotating plate clockwise until firing contact plate plunger engaged locking notch in plate.

- Installed right and left extractors into extractor pivots in the breech ring.
- Inserted chain hoist into eye bolt on breechblock.
- Raised breechblock and guided it into breech ring until breechblock came in contact with extractor plungers.
- Depressed plungers and moved breechblock upward.
- Installed breechblock crank pivots in breechblock crank.
- Inserted pivot in breechblock T-slot.
- Tripped extractors with the screwdriver and raised the breechblock to the closed position.
- Inserted small screwdriver or rod into the hole in breechblock crank stop and slid stop to rear position.
- Jiggled crank stop back and forth to assure that plunger was seated in its recess.
- Released tension on the chain hoist.
- Turned adjuster clockwise until plunger entered first recess.
- Removed chain hoist and eye bolt.
- Installed retractor guide with firing pin retractor and firing pin in its well by pushing guide forward until it was flush with inner surface of well.
- Installed firing pin spring and firing pin spring retainer.
- Depressed plunger, and twisted retainer clockwise until plunger was seated in its recess.
- Opened and closed breech several times to test for binding or shock.
- Adjusted tension on the closing spring to contact any binding or shock in breech operation.
SCORING.

To pass, Tank Commander must have:

a. Checked operation of the coax and M85 machinegun (without being told) after assembling them.

b. Completed disassembly and assembly of the coax and M85 machinegun and the breechblock within time specified.

c. Been checked "Yes" on all performance measures.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
TANK COMMANDER'S READINESS TEST

PART C. BEFORE-OPERATIONS PROCEDURES (HO)

CONDITIONS. Fully operational M60A1 with BII.

INSTRUCTIONS TO TANK COMMANDER. "Your unit is going on a tactical mission in an NBC environment. In one hour your vehicle will move to the firing range to boresight and zero. You will be scored on what you do during this hour as well as how well you do it. Do only those tasks which involve you actively. You do not have to supervise the members of your crew. I will observe your performance and serve as the other crew members as needed. When the hour is over, proceed to the firing range."

TASKS.

- Operate tank intercommunications system.
- Place the turret into power operation.
- Perform main gun prepare-to-fire procedures.
- Check operation of M3 heater.

NOTES.

a. The scorer must not give the TC any more information than he would have on the job. One goal of the Tank Commander's Readiness Test is to determine whether the TC can ready himself and his crew for a combat mission with a minimum of supervision.

b. Remedial training on tasks failed should be provided on the spot, but after TC has completed all of Part C. See Module TC-3 for remedial training.

c. In the Performance Measures section which follows, the role of the scorer as Gunner or Loader is indicated by "Gunner" or "Loader" The scorer, acting as either, should perform as indicated.

d. The role of the TC as supervisor of the crew is not addressed in this test. To do so, add to the instructions that no before-operations checks have been performed by any crew member and that you will perform as the other crew members as directed. Delete remarks concerning supervision.

e. All performance measures and steps within each task must be performed in the order given.

f. Cross training tasks are indicated by a # symbol.

g. Estimated time, 3/4 hour.
PERFORMANCE MEASURES.

1. OPERATE TANK INTERCOMMUNICATIONS SYSTEM.

   • Adjusted CVC helmet to head.
   • Insured CVC helmet radio-interphone switch was in center position.
   • Connected interphone connector to plug at left bottom of control box.
   • Connected radio audio connector plug at right bottom of control box.
   • Placed control box monitor switch in either the ALL, A, INT ONLY, or B position.
   • Transmitted to TC (Scorer) TANK COMMANDER READY.

2. PLACE TURRET INTO POWER OPERATION

   (TC as Gunner)

   • Performed zero pressure check to insure accumulator charge of 450–500 psi.
   • Checked hydraulic power pack oil level.
   • Insured the tank and surrounding area are clear of obstruction.
   • Insured crew is in safe position and Driver has lowered his seat and has his head down.
   • Instructed Loader to release gun tube from travel lock.
   • Unlocked turret lock.
   • Announced POWER to alert the crew.
   • Checked that engine is running and set at 800 to 900 rpm.
   • Insured manual traversing handle locking lever is in the detent position.
   • Turned turret power switch ON.
   • Insured that hydraulic pressure was between 1225 and 1275 psi before-operation controls.
   • Squeezed magnetic brake switch and rotated Gunner's control handle to traverse turret.
   • Rotated handles rearward and forward to elevate and depress gun.
   • Checked magnetic brake.
   • Rechecked oil in turret control system.

   (TC as TC)

   (Note: After TC as Gunner has completed the above steps, the TC completes the following steps.)

   • Squeezed Commander's override and magnetic brake actuator to assume control from Gunner.

   • Rotated Commander's power control handle to traverse turret.
3. PERFORM MAIN GUN PREPARE-TO-FIRE PROCEDURES

. Rotated Commander's power control handle rearward and forward to elevate and depress gun.

. Commanded PREPARE TO FIRE after "Gunner" placed turret into power operation.
. Disconnected breakaway plug.
. Cleared exterior lens and vision devices on turret.
. Checked operation of shield on periscope.
. Checked instrument lights.
. Commanded CHECK FIRING SWITCHES.
. Checked firing trigger on power control handle when main gun switch is ON.
. Checked firing trigger on power control handle when coaxial machinegun switch is ON.
. Commanded CHECK GUN CONTROLS.
. Checked Commander's power control handle for power elevation and power traverse.
. Commanded CHECK FIRING CONTROLS.
. Turned cupola power switch ON.
. Checked operation of .50 caliber machinegun mount and controls.
. Checked for binding on rangefinder.
. Turned ballistic computer on.
. Indexed various ranges on rangefinder.
. Told "Gunner" to ensure they are indexed on ballistic computer.
. Commanded REPORT.

4. CHECK OPERATION OF M3 HEATER

On Driver's request, CHECK GAS PARTICULATE UNIT:

. Rotated air heater knob to ON and checked for indicator lamp operation.
. Checked air flow through hose.
. Allowed air to warm up for at least five minutes.
. Checked air temperature.
. Adjusted protective mask and attached air hose.
. Removed and stored air hose and protective mask.
. Rotated air heater switch to OFF and listened for audible click.
. Reported deficiencies to Driver for entry on DA Form 2404 if required.
SCORING.

To pass, the Tank Commander must have:

a. Been checked "Yes" or "NA" on all performance measures.

b. Initiated performance on all tasks without cueing by scorer.

c. If a task step does not apply to this situation, i.e., no deficiencies to report on M3 heater, score the step "NA."

COMMENTS. (Recommended remedial training, etc.)

PASS  FAIL
TANK COMMANDER'S READINESS TEST

PART D. WEAPON SYSTEMS PREPARATION (W)


INSTRUCTIONS TO TANK COMMANDER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of nine parts: Rangefinder Familiarization, Part 1 (020-171-5340-F); Preparing the Ballistic Computer for Operation (020-171-5341-F); Operation of the Xenon Searchlight, M60/M60A1, (020-171-5343-F); Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1, Part 1 (020-171-5351-F); Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1, Part 2 (020-171-5355-F); Boresighting the Machinegun, M60/M60A1 (020-171-5352-F); Boresighting the Xenon Searchlight, M60/M60A1 (020-171-5354-F); and Zeroing the Main Gun and Machinegun and Setting Battlesights (020-171-5337-F); and Auxiliary Fire Control Instruments [Exclusive of Azimuth Indicator], Part 2 (020-171-5337). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.
Identify various rangefinder controls.
Explain use of various rangefinder controls.
Explain procedure for placing the ballistic computer into operation.
Explain safety precautions for operating Xenon searchlight.
Explain procedure for operating the Xenon searchlight in various modes.
Explain use of OVERDRIVE mode.
Explain procedure for placing cross threads over end of muzzle for boresighting.
Explain three characteristics of a good main gun boresight target.
Explain procedure for removing firing pin components from main gun.
Explain procedure for alining the black main gun-laying reticle of the rangefinder onto the boresight target.
Explain procedure for alining auxiliary gun-laying reticle with the main gun-laying reticle.
Identify the point on the HEP/SABOT telescope sight reticle that is used to aline the reticle on the boresight target.
Explain the procedure for alining the HEP/SABOT telescope reticle on the boresight panel.
Identify correct deflection and elevation slip scale settings for the Gunner's telescope and periscope.
List three characteristics of a good coax boresight target.
Indicate correct actions to take before removing coax receiver.
Explain action to be taken on solenoid wire and protective shield prior to removing the coax receiver.
Explain reason for alining the main gun with boresight target prior to boresighting the coax.
Explain steps to aline the coax and infinity sight with main gun alinement on boresight panel.
List M85 machinegun parts that must be removed prior to boresighting.
Indicate sequence for removing M85 machinegun parts prior to boresighting.
Identify M85 machinegun parts.
Explain procedure for boresighting the M85 machinegun.
Indicate tank to target range for boresighting the M85 machinegun.
Indicate tank to target range for boresighting the Xenon searchlight.
Explain primary method of boresighting the Xenon searchlight.
Explain alternate method of boresighting the Xenon searchlight.
Identify adjusting screws for horizontal and vertical adjustments.
Explain procedure for zeroing the main gun.
Explain procedure for zeroing the coax.
Explain procedure for setting battlesights.
Explain procedure for zeroing the elevation quadrant.

NOTES.

a. See Module TC-4 for remedial training of deficiencies.

b. Estimated time, 1 1/4 hours.
TANK COMMANDER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION

The Test Proctor will administer the following TEC Lesson pre-tests, and the Tank Commander will answer only those questions so indicated:

. Rangefinder Familiarization, Part 1 (020-171-5340-F)
   - Tank Commander will answer all questions.

. Preparing the Ballistic Computer for Operation (020-171-5341-F)
   - Tank Commander will answer questions 1 through 10.

. Operation of the Xenon Searchlight, M60/M60A1 (020-171-5343-F)
   - Tank Commander will answer all questions.

. Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1, Part 1 (020-171-5351-F)
   - Tank Commander will answer all questions.

. Boresighting the Main Gun, Rangefinder, Tele/Peri, M60/M60A1, Part 2 (020-171-5355-F)
   - Tank Commander will answer all questions.

. Boresighting the Machinegun, M60/M60A1 (020-171-5352-F)
   - Tank Commander will answer all questions.

. Boresighting the Xenon Searchlight, M60/M60A1 (020-171-5354-F)
   - Tank Commander will answer all questions.

. Zeroing the Main Gun and Machineguns and Setting Battlesights (020-171-5353-F)
   - Tank Commander will answer questions 1, 5, 6, 7, 8, 9, 12, 13, 14, 15, and 17.

. Auxiliary Fire Control Instruments [Exclusive of Azimuth Indicator], Part II (020-171-5337-F)
   - Tank Commander will answer questions 1 and 2.
TANK COMMANDER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION


ANSWER SHEET

Name________________________________________

SSN__________________________ Tank No.__________________________

Scorer__________________________ Test Date__________________________

020-171-5340-F

1.a.

b.

c.

2.a.

b.

3.

4.

5.

6.

7.

8.

020-171-5341-F

1.a.

b.

c.
020-171-5351-F

1.

2.a.
   b.

3.

4.a.
   b.
   c.
   d.

5.

020-171-5355-F

1.a.
   b.
   c.
   d.

2.a.
   b.
   c.
   d.

3.

4.a.
   b.
   c.
   d.
5. DEFL/ELE
   RANGEFINDER
   TELESCOPE
   PERISCOPE

6.a.
   b.
   c.

7.a. DAYLIGHT --
   b. DUSK --

020-171-5352-F

1.a.
   b.
   c.

2.a.
   b.
   c.

3.a.
   b.

4.

5.a.
   b.
   c.

6.

7.
8.a.
b.
c.
d.
9.a.
b.
c.
10.a.
b.
11.
020-171-5354-F
1.
2.
3.
4.
5.
6.
7.a.
b.
8.a.
b.
9.
10.
11.
020-171-5353-F

1.a.

b.

c.

5.

6.

7.a.

b.

c.

8.

9.

12.

13.

14.

15.a.

b.

17.a.

b.

c.

d.

020-171-5337-F

1.

2.

COMMENT. (Recommended remedial training, etc.)

PASS  FAIL
TANK COMMANDER'S READINESS TEST

PART D: WEAPON SYSTEMS PREPARATION

PRE-TEST ANSWER KEY


ANSWER KEY

RANGEFINDER FAMILIARIZATION, PART 1
(020-171-5340-F)

1. a. reticle switch
   b. vertical adjustment knob
   c. horizontal adjustment knob

2. a. number 3, called the occluder knob
   b. number 1, called the diopter knob

3. C

4. LETTER B NAME range knob

5. coincidence

6. range scale

7. R

8. real image and the ghost image

PREPARING THE BALLISTIC COMPUTER FOR OPERATION
(020-171-5341-F)

1. a. C--Turn computer ON.
   b. A--Check to make sure it's ON.
   c. B--Adjust illumination of the computer dials.
2. a. A
   b. Rotate it.
3. a. The inner pointer will show the same range as the rangefinder range scale.
   b. The outer pointer will aline itself with the inner pointer.
   c. The shafts will rotate.
4. B
5. a. Turn the handle clockwise until it stops.
   b. Push the handle in or pull it out to select ammunition.
   c. Release the handle slowly.
6. C
7. a. Push in on the handcrank.
   b. Check the reset light to make sure it's ON.
   c. Rotate the handcrank (either clockwise or counterclockwise).
   d. Check the mil counter for a change in mil reading.
   e. Pull the handcrank out.
   f. Press the reset button.
8. a. Manual mode
   b. Electrical mode
9. Press the reset button.
10. The reset light will go out.

OPERATION OF THE XENON SEARCHLIGHT, M60/M60A1
(020-171-5343-F)

1. A and C
2. B
3. a. Turn the mode selector switch to BO.
   b. Turn the searchlight power switch to STANDBY (either order).
4. Rotate the mode selector switch to VIS FOCUS.
5. Pull out on the mode selector switch.
6. Turn the searchlight power switch to OFF.
7. Check to make sure the blower motor has stopped.

BORESIGHTING MAIN GUN, RANGEFINDER, TELE/PERI, M60/M60A1
(020-171-5351-F)

1. A
2.a. B—The strings are too loose.
   b. C—The vertical string is not properly positioned over witness mark.
3. B
4.a. C
   b. A
c. D
d. B
5. A

BORESIGHTING MAIN GUN, RANGEFINDER, TELE/PERI, M60/M60A1
(020-171-5355-F)

1.a. Unlock the boresight knobs using the locking levers.
   b. Aline the reticle on the target aiming point using the boresight knobs.
   c. Lock the boresight knobs using the locking levers.
   d. Set the slip scales.
2.a. Unlock the boresight knobs using the locking levers.
   b. Superimpose the auxiliary gun-laying reticle on main gun-laying reticle using the auxiliary boresight knobs.
   c. Lock the boresight knobs using the locking levers.
   d. Set the slip scales.
3. A

4. a. Unlock the boresight knobs using the locking levers.
   b. Aline the boresight cross of the reticle with the target aiming point using the boresight knobs.
   c. Lock the boresight knobs using the locking levers.
   d. Set the slip scales.

5. DEFL/ELE
   RANGEFINDER ___/___
   TELESCOPE  ___/___
   PERISCOPE   ___/___

6. a. Disengage the boresight knobs.
   b. Aline the reticle with the target aiming point using the boresight knobs. Release the boresight knobs.
   c. Set the slip scales.

7. a. DAYLIGHT--The Gunner's periscope sight must be covered with an opaque card containing a dime-sized hole.
   b. DUSK--The target must be illuminated by white light.

BORESIGHTING THE MACHINEGUNS
(020-171-5352-F)

1. a. Known range (as close to 1200 meters as possible)
   b. Right angles
   c. Permanent

2. a. safe
   b. unloaded
   c. forward

3. a. A--Solenoid wire being removed
       B--Protective shield being removed
   b. B, then A
4. Aline the main gun on the target aiming point.

5.a. Loosen the vertical mounting screws and vertically aline the coax gun bore on the target aiming point using the vertical adjusting setscrews. Retighten vertical mounting screws.

   b. Loosen the horizontal bracket mounting screws and horizontally aline the coax gun bore on the target aiming point using the horizontal adjusting setscrews. Retighten the horizontal bracket mounting screws.

   c. Adjust the infinity sight reticle with the infinity sight boresight knobs so that the reticle encircles the target aiming point.

6. C, F, H, J

7. J, H, F, C

8.a. Backplate assembly

   b. Sear assembly

   c. Bolt assembly

   d. Bolt buffer group

9.a. Aline the M85 gun bore on the target aiming point using the manual elevating and traversing control handles. (You also could have added that you would use the azimuth adjustment knob for a precise adjustment.)

   b. Replace M-36 periscope and, without moving the machinegun, aline the boresight cross of both the daylight and the IR reticles onto the target aiming point using the appropriate elevation and deflection boresight knobs.

   c. Set the slip scales.

10.a. The crewman is holding the feed actuator lever to the side.

   b. The lever must be to the side so that the view through the bore will be clear.

11. 500 meters

BORESIGHTING THE XENON SEARCHLIGHT, M60/M60A1
(020-171-5354-F)

1. 1200 meters

2. Zero (00)
3. Plus 5  
4. Manual elevating control handle  
5. Visible focus  
6. Aline the searchlight's beam on the target aiming point.  
7.a. A and D  
    b. B and C  
8.a. 7 feet  
    b. 16 1/2 inches  
9. B  
10. B  
11. Realine the searchlight's beam so that the bottom of the beam's brightest spot touches the reference mark.  

ZEROING THE MAIN GUN MACHINEGUNS AND SETTING BATTLE SIGHTS  
(020-171-5353-F)  
1.a. Known range (as close to 1200 meters as possible)  
    b. Right angles  
    c. Permanent  
5. B  
6. 1200 meter range line  
7.a. Gunner's periscope IR reticle  
    b. Rangefinder main gun-laying reticle  
    c. Rangefinder auxiliary gun-laying reticle  
8. Record the slip scale settings.  
9. 500 meters  
12. 800 meters  
13. B  
14. B
15.a. Fire a 20-30 round burst.
   b. Adjust the machinegun as necessary to move the strike zone onto
      the target aiming point.

17.a. Index 1600 meters into the rangefinder.
   b. Index HEAT ammunition into the computer.
   c. Put the main gun on SAFE.
   d. Load HEAT ammunition into the main gun.
      (Only c and d have to be in order.)

AUXILIARY FIRE CONTROL INSTRUMENTS [EXCLUSIVE OF AZIMUTH INDICATOR]
   (020-171-5337-F)

1. Minus 146
2. B

SCORING KEY.

Award 5 points for each correct response (720 possible points).

PASSING SCORE = 650 points.
TANK COMMANDER'S READINESS TEST

PART E. WEAPON SYSTEMS PREPARATION (HO)

CONDITIONS. Fully operational M60A1 tank situated on level ground with BII and coax and M85 mounted. Boresight and zero panels are at 500 meters for M85, 800 meters for coax, and 1200 meters for main gun.

INSTRUCTIONS TO TANK COMMANDER. "Prepare the weapon systems on your tank for a tactical operation. If necessary, I will give you the information for your shot groups during zeroing. You will be scored on what you do as well as how you do it. I will observe your performance and serve as other crew members as needed."

TASKS.

Prepare the tank for boresighting.

* Boresight the Gunner's telescope and apply established zero.
* Boresight the daylight sight of the Gunner's periscope and apply established zero.
* Boresight the IR sight of the Gunner's periscope, during daylight, and apply established zero.
* Boresight tank searchlight using primary method.
* Boresight tank searchlight using alternate method.
* Boresight the coax.
* Prepare tank rangefinder for operation.
* Boresight the rangefinder.
* Determine range to target with rangefinder.
* Zero tank main gun.
* Zero coax.
* Index announced ammunition into computer and conduct computer test.
* Boresight M85.
* Zero M85.

NOTES.

a. The TC should not be given this test until he has passed Tank Commander's Readiness Test, Part A and completed the written TEC Lesson pre-tests for Gunner's Readiness Test, Part B and any remedial training necessary on TEC Lessons failed.
b. Remedial training of tasks failed should be provided on the spot but after TC has completed Part D. See Module TC-5 for remedial training.

c. Task 5 (Boresight tank searchlight using primary method) must be performed at night. This task should be performed concurrently with Gunner task E-9.

d. Task 6 (Boresight tank searchlight using alternate method) must be performed at a location where a wall is available to reflect the beam.

e. If live fire cannot be used to zero the weapons, the test administrator must arrange for simulated firing and simulated shot groups. The simulated shot group can be accomplished by having an assistant scorer down range to place discs over the zero panels to represent target hits.

f. In the Performance Measures section which follows, the role of the scorer as Gunner, Loader, or Driver is indicated by "Gunner" or "Loader" or "Driver". The scorer, acting as either, should perform as indicated.

g. The scorer must not give the TC any more information than he would have on the job. One goal of the Tank Commander's Readiness Test is to determine whether the TC can ready himself and his crew for a combat mission with a minimum of supervision.

h. All performance measures and steps within each task should be performed in the order given.

i. Cross training tasks are indicated by a symbol.

j. Estimated time, 1 1/4 hours.

PERFORMANCE MEASURES.

1. PREPARE TANK FOR BORESIGHTING

   (TC as Loader)

   . Placed thread over witness lines on muzzle end of main gun and secured thread tautly.
   . Removed firing pin mechanism from breechblock.
   . Centered right telescope of binocular over firing pin hole.
   . Checked alinement of main gun by sighting through firing pin hole with binocular to see if cross threads lay on aiming point.
   . Reported gun out of alinement (or reported gun correctly alined).
(TC as Gunner)

. Alined axis of main gun bore on right angle of aiming point by operating manual traversing and elevating handles.

(TC as TC)

. Directed Driver to position tank on level ground.

2. BORESIGHT THE GUNNER'S TELESCOPE AND APPLY ESTABLISHED ZERO.

(TC as Gunner)

. Set superelevation counter on ballistic computer to zero.

. Moved reticle selector switch until reticle corresponding to type of ammunition that will be used to zero can be seen through eyepiece.

. Unlocked telescope mount elevation and deflection boresight knobs.

. Rotated boresight knobs until the boresight aiming point is in same position as muzzle cross threads.

. Moved elevation and deflection knob locking lines to LOCK position.

. Rotated slip scales on the elevation and deflection knobs to read 3 and 3.

. Told Loader to confirm that muzzle cross threads are on aiming point.

. Obtained established zero from DA Form 2404.

. Unlocked telescope mount elevation and deflection boresight knobs.

. Rotated boresight knobs until established zero was indicated on the slip scales.

. Locked telescope mount elevation and deflection boresight knobs.

3. BORESIGHT THE DAYLIGHT SIGHT OF THE GUNNER'S PERISCOPE AND APPLY ESTABLISHED ZERO

(TC as Gunner)

. Sighted through eyepiece, disengaged elevation and deflection boresight knobs, and rotated knobs until aiming cross is on same aiming point as muzzle cross threads.

. Rotated slip scale on the elevation and deflection boresight knobs to read 4 and 4.
Yes No NA

. Checked to assure that daylight sight reticle is on aiming point.
. Told Loader to confirm that muzzle cross threads were on aiming point.
. Obtained established zero from DA Form 2404.
. Unlocked periscope mount elevation and deflection boresight knobs.
. Rotated boresight knobs until established zero was indicated on the slip scales.
. Locked periscope mount elevation and deflection boresight knobs.

4. BORESIGHT THE IR SIGHT OF THE GUNNER'S PERISCOPE AND APPLY ESTABLISHED ZERO

(TC as Gunner)

. Opened the ballistic shield.
. Placed opaque material over the periscope head assembly with a 3/4 inch hole in line with the IR body.
. Placed the IR switch in 1.5 volt position.
. Viewed through IR eyepiece and rotated IR diopter to maximum plus reading then back until grain on converter tube surface as seen through eyepiece appeared clear and sharp.
. Rotated light source control until reticle illumination had desired brightness.
. Sighted through eyepiece and rotated focusing ring until target appeared with maximum sharpness.
. Disengaged and rotated elevation and deflection boresight knobs until aiming cross of reticle was aligned on same aiming point as muzzle cross threads.
. Rotated slip scale on elevation and deflection boresight knobs to read 4 and 4.
. Checked to insure that aiming cross on reticle of daylight scope was on aiming point.
. Told Loader to confirm that muzzle cross threads were on aiming point.
. Obtained established zero from DA Form 2404.
. Disengaged and rotated elevation and deflection boresight knobs until established zero was on the slip scales.
. Engaged elevation and deflection boresight knobs.
5. BORESIGHT TANK SEARCHLIGHT USING PRIMARY METHOD

(TC as TC)

- Selected target as near to 1200 meters as possible.
- Told Driver to idle engine at 1000-1200 rpm.
- Turned searchlight main power switch to the ON position and turned searchlight control to VIS FOCUS mode.
- Adjust azimuth and elevating adjusting screws until searchlight beam is centered on target cross.
- Told the Gunner to elevate the gun 5 mils.
- Aline the searchlight so that the beam is again centered on the target cross.
- Tighten the clamping nuts.

(TC as Gunner)

After "TC" turned searchlight ON and control to VIS FOCUS mode:

- Removed all superelevation from fire control system using computer's superelevation handcrank.
- Laid aiming cross of primary sight on center of boresight panel or target chosen.
- Centered bubble on elevation quadrant using micrometer knob.
- Applied +5 mils on elevation quadrant using micrometer knob.
- Manually elevated the gun until bubble is centered.

6. BORESIGHT TANK SEARCHLIGHT USING ALTERNATE METHOD

(TC as TC)

- Directed Driver to position tank so searchlight was approximately 10 meters from a wall.
- Drew a cross on wall approximately 7 feet from ground.
- Drew a second cross 16 1/2 inches directly above first cross and vertically in line with first cross.
- Told Driver to insure that the tank engine is run at a fast idle speed.
- Turned searchlight main power switch to ON position and turned searchlight control to VIS FOCUS mode.
- Adjusted horizontal and vertical adjustment screws until searchlight beam was centered on upper cross.
- Told Loader to draw reference mark at bottom edge of searchlight beam.
- Adjusted vertical and horizontal adjustment screws until bottom of searchlight beam was above and just touching reference mark.
(TC as Gunner)

After "TC" laid the bottom of searchlight beam above and just touching reference mark:

- Removed superelevation from fire control system using computer's handcrank.
- Boresighted main gun on lower cross.
- Centered the bubble on elevation quadrant using micrometer knob.
- Applied plus 5 mils to elevation quadrant using micrometer knob.
- Manually elevated gun until bubble is centered.

7. BORESIGHT THE COAX

(TC as Loader)

- Removed solenoid electrical lead from machinegun backplate assembly by pulling solenoid plug down.
- Pulled right disconnector ring rearward to disengage disconnector pin from disconnector hole.
- Rotated receiver downward and pulled rearward until disengaged from mounting block.
- Loosened support setscrews located in gun mount cover shield collar approximately 1 1/2 turns.
- Selected target employed to boresight main gun with a clearly defined right angle at a distance of 1200 meters.
- Aligned machinegun bore vertically on target while viewing aiming point through right binocular M17A1 so as to adjust machinegun elevation alignment with bore of main gun by loosening or tightening adjusting screws.
- Aligned machinegun bore horizontally while viewing aiming point through right binocular M17A1 so as to adjust machinegun azimuth alignment with bore of main gun by loosening or tightening front end and rear horizontal adjusting screws.
- Insured that all lock and jam nuts are tightened securely.
- Adjusted support setscrews in gun mount cover shield collar until they contacted flash suppressor body then backed them off 1/4 to 1/2 turn.
7. BORESIGHT THE COAX

After "Loader" tightened both horizontal adjustment screws:

- Rotated, either to left or right, rheostat knob on infinity sight M44C for periscope M31 or rheostat knob of light source control for periscope M32 in order to adjust brightness of reticle.
- Rotated both elevation and deflection boresight knobs on infinity sight so as to alines center reticle on aiming point of target.

8. PREPARE TANK RANGEFINDER FOR OPERATION

- Adjusted rangefinder headrest to fit the contour of the head.
- Rotated occluder knob to the R position.
- Rotated the diopter scale until the view through the eyepiece appears with the maximum sharpness.
- Moved the filter switch to the left to place the filters into the optical systems if necessary.
- Rotated the range scale rheostat to determine if range scale lamp is illuminated.
- Set rheostat until desired brightness is obtained.
- Rotated the occluder to L position.
- Moved the reticle switch to AUX-GUNSGIGHT position.
- Sighted through the eyepiece and set red illuminated reticle for brightness by rotating reticle rheostat.
- Rotated occluder knob to the center position and moved reticle switch to coincidence position.
- Sighted through the eyepiece and set coincidence reticle brightness by rotating coincidence reticle rheostat.
- Moved reticle switch to OFF position.
- Rotated the occluder knob to R position.
- Rotated the occluder knob to center position.
- Indexed target range on range scale.
- Sighted through eyepiece and rotated horizontal adjustment knob until the ghost image is positioned to the left of the actual image.
- Rotated vertical adjustment knob to bring ghost image into vertical alinement with actual image.
- Rotated the horizontal adjustment knob to bring the ghost image into alinement with the actual image from the left to the right--stop the instant coincidence has been obtained.
• Checked target image coincidence by ranging on a known distance target.
• Moved reticle switch to coincidence position.
• Loosened the wing nut and swung the red ICS knob cover aside.
• Rotated the ICS knob until vertical lines of the upper coincidence reticle were aligned.
• Loosened the wing nut and swung the red halving knob cover aside.
• Rotated halving knob until horizontal lines of the upper right half and the lower left portions of the coincidence reticle were aligned to form a cross.
• Swung the ICS and halving knob covers into place and secured with wing nuts.
• Moved reticle switch to the OFF position.

9. BORESIGHT THE RANGEFINDER

• Checked coincidence reticle for alignment and if necessary, aligned reticle using horizontal and vertical adjustment knobs.
• Indexed known tank to target range (1200 meters) on range scale.
• Placed the occluder knob on the rangefinder in the R position.
• Moved the locking levers of the main elevation and deflection boresight knobs to the unlocked position.
• Sighted through rangefinder eyepiece and aligned the black-etched cross on the sight reticle with the same aiming point as the main gun bore axis.
• Moved the boresight knob locking levers to the locked position.
• Rotated slip scale to read 2 on elevation boresight knob and 3 on deflection boresight knob.
• Placed the occluder knob in the L position.
• Placed the reticle switch on the rangefinder in the AUX-GUNSIGHT position.
• Unlocked auxiliary elevation and deflection knobs.
• Rotated the knobs to align the red illuminated cross on the same aiming point as the main gun bore axis.
• Locked AUX-GUNSIGHT elevation and deflection knobs.
• Rotated slip scale on auxiliary elevation boresight knob to read 2 and the auxiliary deflection boresight knob to read 3.
• Checked main gun bore axis, main gun-laying reticle of the rangefinder, and the AUX-GUNSIGHT to assure that each is aligned on the same aiming point.
10. **DETERMINE RANGE TO TARGET WITH RANGEFINDER**

- Placed occluder knob in center position.
- Ranged to the boresight target.
- Rotated range knob until two target images merge.
- Read range to target on range scale.

11. **ZERO TANK MAIN GUN**

*(TC as TC)*

- Turned computer switch ON.
- Indexed range into rangefinder.

*(TC as Gunner)*

After "TC" turned computer ON:

- Assured range correlation knob of ballistic computer is indexed correctly.
- Indexed ammunition element into ballistic computer.
- Laid sight reticle on center of mass of target by operating manual elevation and traversing handles.

After "Loader" announced UP:

- Fired a three-round shot group.
- Unlocked boresight knobs and moved sight reticle to center of shot group, without disturbing lay of gun (with gun loaded).
- Relaid main gun back to center of mass by operating manual elevation and traversing handles.
- Fired a check round.
- Relaid main gun back to center of mass by operating manual elevation and traversing handles.
- Unlocked boresight knobs of Gunner's sight not used to zero and rotated knobs until proper portion of reticle is laid on target aiming point.
- Recorded elevation and deflection readings on all sights on DA Form 2404.

12. **ZERO COAX**

*(TC as TC)*

- Rotated range knob of rangefinder to range of target.
(TC as Gunner)

- Selected a target with a clearly defined aiming point at a known range as near 800 meters as possible.
- Indexed the lowest velocity tank main gun ammunition in the ballistic computer.
- Sighted through the unity power window of the Gunner's periscope and laid the target in the center of the aiming circle by operating the manual elevation and traversing handles.

After "Loader" announced UP:

- Placed the electrical machinegun switch on the Gunner's panel in the ON position.
- Depressed the electrical firing trigger and fired a 20-25 round burst.
- Observed the strike of the rounds in relation to the target.
- Rotated the infinity sight boresight knobs to move the sight reticle so that the strike area is in the center of the field of view.
- Fired additional 20-25 round burst to check the accuracy of adjustment.
- Rotated the infinity sight boresight knobs, if necessary, to readjust the field of view in relation to the strike of the rounds.

13. INDEX ANNOUNCED AMMUNITION INTO COMPUTER AND CONDUCT COMPUTER CHECK

(TC as Gunner)

- Rotated ammunition selector handle 30 degrees clockwise, pushed handle in or pulled handle out to select ammunition to be fired as indicated on the ammunition indicator.

(Computer Check)

- With range correction knob at zero, rotated range knob on rangefinder and determined whether inner (range) pointer indicated same range on computer range dial as indexed on range scale of rangefinder.
- Indexed ranges of 1100, 1200, or 2000 meters on range scale of rangefinder.
- Indexed a type of ammunition into computer.
- Turned the computer ON and determined whether super-elevation output shaft and superelevation actuator shaft rotate.
14. **BORESIGHT M85**

- Assured safety is in S position.
- Assured ammunition belt is clear of machinegun.
- Assured machinegun is not loaded and bolt assembly is in forward position.
- Disconnected solenoid lead connector.
- Opened cradle cover zipper, access doors, and machinegun cover assembly.
- Depressed lock, raised latch, and lifted backplate assembly from receiver assembly.
- Removed bolt buffer group from receiver assembly.
- Removed sear from receiver assembly.
- Removed bolt assembly from barrel extension assembly and receiver assembly.
- Held feed lever of feed and ejector assembly and sighted through machinegun barrel and aligned axis of gun bore on defined target approximately 500 meters in range.
- Locked azimuth lock.
- Adjusted deflection without moving the gun or cupola.
- Adjusted elevation to align boresight cross on target aiming point.
- Elevated and depressed gun to check for backlash.
- Installed bolt assembly.
- Installed sear assembly.
- Installed bolt buffer group.
- Installed backplate.
- Closed machinegun cover assembly, access doors, and cradle cover zipper.

15. **ZERO M85**

- Selected a target with a clearly defined aiming point at a range of 500 meters.
- Laid the 500 meter aiming point of Tank Commander's weapon sight on aiming point of zeroing targets with elevating and traversing controls.
- Fired a 10-20 round burst.
- Moved the 500 meter reticle to center of strike area without disturbing lay of the gun.
- Fired another 10-20 round burst to verify the zero.
SCORING.

To pass, Tank Commander must have:

a. Initiated performance on all tasks without cueing by scorer.

b. Been checked "Yes" or "NA" on each performance measure.

c. The scorer must verify that optics are boresighted by confirming that aiming crosses are on the same aiming points as muzzle crosstreads.

d. Range read to target on range scale (Task E.10) must be $\pm 50$ meters of actual range.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
TANK COMMANDER'S READINESS TEST

PART F. COMBAT LOADING (W)

CONDITIONS. The Tank Commander is in a classroom and is administered TEC pre-tests 020-171-5331-F, 020-171-5332-F, and 020-171-5346 through 020-171-5348-F.

INSTRUCTIONS TO TANK COMMANDER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test is in five parts: Tank Ammo: Selecting Ammunition (TEC Lesson 020-171-5331-F), Tank Ammo: Handling, Main Gun (TEC Lesson 020-171-5332-F), 105MM Gun: Loading (TEC Lesson 020-171-5346-F), 105MM Gun: Misfire Procedures (TEC Lesson 020-171-5347-F), and 105MM Gun: Unloading (TEC Lesson 020-171-5348-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and the answer sheet to the Test Proctor."

TASKS.

Identify various types of main gun ammunition.
Identify various types of machinegun ammunition.
Identify correct method of linking machinegun ammunition.
Watch various types of main gun ammunition with various types of targets.
Explain "Loader's" action upon hearing a main gun fire command.
Explain procedure for loading a main gun round into the chamber.
Explain safety precautions when operating the breech operating handle.
Explain "Loader's" main gun misfire procedures after Gunner has tried all firing circuits.
Explain "Loader's" misfire procedures for a cool gun and a hot gun after all firing actions have failed.
Explain procedure to follow when unable to remove a misfired round from a hot gun.
Explain position of "Loader's" safety switch before unloading a misfired round.
Explain procedure for removing a round partially stuck in the chamber.
Explain procedure for removing a projectile stuck in the tube.
Explain how to close the breech manually.
Explain procedure for testing the firing circuit.
NOTES.

a. See Module TC-6 for remedial training of deficiencies.

b. Estimated time, 3/4 hour.
TANK COMMANDER'S READINESS TEST

PART F: COMBAT LOADING

The Test Proctor will administer the following TEC Lesson pre-tests and the Tank Commander will answer only those questions indicated:

. Tank Ammo: Selecting Ammunition (020-171-5331-F)
  - Tank Commander will answer all questions.

. Tank Ammo: Handling, Main Gun (020-171-5332-F)
  - Tank Commander will answer questions 3, 4, and 6.

. 105MM Gun: Loading (020-171-5346-F)
  - Tank Commander will answer all questions.

. 105MM Gun: Misfire Procedures (020-171-5347-F)
  - Tank Commander will answer all questions.

. 105MM Gun: Unloading (020-171-5348-F)
  - Tank Commander will answer questions 1, 2, 3, 5, and 6.
TANK COMMANDER’S READINESS TEST

PART F: COMBAT LOADING


ANSWER SHEET

Name__________________________________________

SSN_______________________________ Tank No._______________________________

Scorer_______________________________ Test Date_______________________________

020-171-5331-F

1. a.

2.

3. a. Trace

   b. AP (armor piercing)

   c. Ball

   d. APIT (armor piercing-incendiary trace)

   e. API (armor piercing-incendiary)
11. 020-171-5332-F
3.
4.
6.a.
   b.
   c.
020-171-5346-F
1.a.
   b.
   c.
   d.
   e.
   f.
   g.
   h.
2.
3.
1. FIRST MISFIRE. The Gunner:
   a. 
   b. 
   c. 
   d. 

2. SECOND MISFIRE. The Gunner:
   a. 
   b. 
   c. 
   d. 

3. THIRD MISFIRE. The Gunner:
   a. 
   b. 
   c. 
   d. 
   e. 

4. FOURTH MISFIRE. Actions of the Loader and Gunner follow:
   a. Gunner - 
   b. Loader - 
   c. Loader - 
   d. Loader - 
   e. Loader - 
   f. Loader - 
   g. Loader - 
   h. Loader - 

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5. FIFTH MISFIRE.

a. Cool Gun
   (1) Gunner -
   (2) Loader -
   (3) Loader -
   (4) Loader -

b. Hot Gun
   (1) Gunner -
   (2) Loader -
   (3) Loader -
   (4) Loader -

6. a. Loader -
   b. Loader -
   c. TC -
   d. Loader -

020-171-5348-F
d.
e.

5.

6.a.
   b.
   c.
   d.
   e.
   f.

COMMENTS. (Recommended remedial training, etc.)

PASS FAIL
TANK COMMANDER'S READINESS TEST

PART F: COMBAT LOADING

PRE-TEST ANSWER KEY

TANK AMMO: SELECTING AMMUNITION
(020-171-5331-F)

1.a. SABOT
    b. HEAT
    c. HEAT
    d. HEP
    e. SMOKE
    f. BEEHIVE
2. A
3.a. C Trace
    b. B AP
    c. A Ball
    d. E APIT
    e. D API
4. A
5. C
6. D
7. C
8. E
9. D
10. C
11. B

TANK AMMO: HANDLING, MAIN GUN  
(020-171-5332-F)

3. A

4. A

6.a. Remove round from tank
   b. Place in misfire bunker
   c. Notify supervisory personnel

105MM GUN: LOADING  
(020-171-5346-F)

1. The correct actions and sequence for loading the main gun follow:
   a. Make sure the Loader's safety switch is in the SAFE position.
   b. Open the breech if it is closed.
   c. Inspect the chamber for obstructions.
   d. Select the ammunition called for. (SABOT)
   e. Place the round two-thirds of the way into the chamber and push it the rest of the way in with the heel of the first.
   f. Stand clear of the recoil path and make sure the recoil path is clear.
   g. Place the Loader's safety switch in the FIRE position.
   h. Announce UP.

2. B
   The Loader has his fingers extended rather than having them formed into a fist.

3. The operating handle will fly up with enough force to cause serious injury if it strikes the Loader.
105mm Gun: Misfire Procedures
(020-171-5347-F)

1. First Misfire. The Gunner:
   a. Announces Misfire.
   c. Waits one second.
   d. Presses other (or right) trigger on the power control handle.

2. Second Misfire. The Gunner:
   a. Announces Misfire.
   c. Waits one second.
   d. Presses the trigger on the manual elevating handle.

3. Third Misfire. The Gunner:
   a. Announces Misfire.
   b. Turns main gun switch on Gunner's switch box to OFF.
   d. Waits one second.
   e. Rotates the emergency firing device clockwise.

4. Fourth Misfire. Actions of the Loader and Gunner follow:

<table>
<thead>
<tr>
<th>WHO</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Announces Misfire.</td>
</tr>
<tr>
<td>b.</td>
<td>Puts Loader's safety switch on SAFE.</td>
</tr>
<tr>
<td>c.</td>
<td>Waits two minutes.</td>
</tr>
<tr>
<td>d.</td>
<td>Opens breech.</td>
</tr>
<tr>
<td>e.</td>
<td>Rotates round one-half turn.</td>
</tr>
<tr>
<td>f.</td>
<td>Reloads the round.</td>
</tr>
</tbody>
</table>

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WHO  

ACTION  
g. Loader  
Puts Loader's safety switch on FIRE.  
h. Loader  
Announces UP.  
i. Gunner  
Puts main gun switch on FIRE.  
j. Gunner  
Announces ON THE WAY.  
k. Gunner  
Waits one seconds.  
l. Gunner  
Presses any electrical firing trigger.  

5. FIFTH MISFIRE.  
a. Cool Gun  
(1) Gunner announces MISFIRE.  
(2) Loader makes sure Loader's safety switch is on SAFE.  
(3) Loader waits two minutes to allow for a possible hangfire.  
(4) Loader removes round from breech.  
b. Hot Gun  
(1) Gunner announces MISFIRE.  
(2) Loader makes sure Loader's safety switch is on SAFE.  
(3) Loader waits two minutes to allow for a possible hangfire.  
(4) Loader removes round from the breech within one additional minute.  

6. The following steps are taken when the Loader is unable to remove a misfired round from a hot gun within one additional minute after he has waited two minutes to allow for a possible hangfire.  
a. The Loader closes the breech.  
b. The Loader makes sure the Loader's safety switch is in the SAFE position.  
c. The Tank Commander orders the crew to evacuate the tank for two hours.  
d. At the end of two hours, the Loader, assisted by other crewmen and safety personnel, removes the round.
105MM GUN: UNLOADING
(020-171-5348-F)

1.a. Loader's safety switch. Wrong.
b. Gunner's main gun switch. Wrong.

2.a. One crewman holds the breech operating handle down.
b. Another crewman pries the round out of the chamber with the ramming and extracting tool.

3.a. Fill the chamber with rags to cushion the base of the projectile.
b. Close the breech manually.
c. Push the rammer down the tube until the bell of the rammer is resting on the projectile, then apply steady pressure until the projectile is freed from the tube and pushed into the cushion of rags in the chamber. (Any shorter version of this answer is satisfactory as long as the rammer, steady pressure, and freed from the tube are included.)
d. Open the breech.
e. Remove the projectile.

5. Trip the extractors with a wooden block.

6.a. Make sure the main gun is not loaded.
b. Close the breech manually.
c. Insert the circuit tester between the breechblock and the breech ring.
d. Turn the master battery, turret power, and main gun switches ON. Place the Loader's safety in the FIRE position.
e. Press the firing triggers on the power control handle, the manual elevating handle, and the Tank Commander's override.
f. Observe the lamp on the circuit tester. If it lights, the circuit is OK.

SCORING KEY.

Award 5 points for each correct response (440 possible points).

PASSING SCORE = 400 points.
TANK COMMANDER'S READINESS TEST

PART G. COMBAT LOADING (HO)

CONDITIONS. M60A1 tank with BII, situated on level ground. An Ammunition Stowage Plan and dummy rounds (3-ADPS, 3-HEAT, 2-HEP, 1 belt empty 7.62 machinegun and 1 belt empty .50 caliber machinegun) are located next to the tank. All main gun ammunition stowage areas are blocked off with the exception of eight slots in the ready rack; empty slots should correspond to the stowage plan and type of dummy rounds. Two dimensional cardboard representations of 7.62mm and .50 caliber machinegun ammunition boxes are used for stowage of machinegun ammunition, replenisher tape mock-up positioned forward of "Loader." The tape can be set at any one of four positions: one rough edge and one smooth edge, two rough edges, two smooth edges, or two long notches.

INSTRUCTIONS TO THE TANK COMMANDER. During this test you will act as the Loader and TC. In the first part of the test assume we are preparing the tank for a combat mission. First, you will stow ammunition aboard the tank in accordance with the unit's Ammunition Stowage Plan. Next, I will give you some different settings on the replenisher mock-up and you are to tell me what actions you will take for each setting—before, during, and after firing. I will set the tape and you will go the mock-up, feel the tape, and immediately report what action is called for. The last part of the test will be performing the duties of the Loader and TC under simulated combat conditions. We will carry ADPS ammunition in the tube for battlesight engagements, so begin by loading an ADPS round. Listen to fire commands and react accordingly. Since you will be working with dummy rounds, you will have to unload the rounds between firing. But wait until I give the command to unload. During the fire commands sequence, a main gun MISFIRE and a coax stoppage will be announced by the Gunner (Scorer). In addition, you will get into the TC's position and load, clear, and apply immediate action to the .50 caliber machinegun. OK... First stow ammunition on the tank according to the unit's stowage plan.

TASKS.

* Stow main gun rounds according to Ammunition Stowage Plan.
* Stow machinegun ammunition according to Ammunition Stowage Plan.
* Stow coax ammunition in the ready (banana) box.
* Determine corrective action required by replenisher tape readings.
* Load main gun in response to fire commands.
* Rotate round in main gun misfire procedure.
Load coax.

Ready coax in response to fire command.

Clear and unload coax.

Apply immediate action to reduce coax stoppage.

Change coax barrel.

Load M85.

Clear and unload M85.

Apply immediate action to reduce M85 stoppage.

NOTES.

a. Tank Commander should not be given this test until he has passed Tank Commander's Readiness Test, Parts B, C, and F.

b. Scorer should present each of the four replenisher tape settings in a series of eight settings in random order to the "Loader."

c. Remedial training for tasks failed should be provided on the spot but after the "TCV" has completed all of Part G. See Module TC-7 for remedial training.

d. It is necessary to perform the tasks and the steps within each task in the order given.

e. For Performance Measures 5 and 9, Scorer gives a series of fire commands, at about 15 second intervals, that requires loading the available type of dummy rounds interspersed with two or three coax commands. A suggested sequence is:

(1) Battlesight (SABOT) HEP, HEAT, COAX, HEP, MISFIRE.

(2) (Reload for battlesight) SABOT, (NO "CEASE FIRE"), SABOT, HEAT, COAX, STOPPAGE.

f. The MISFIRE command provides a break in the sequence. After Scorer goes through MISFIRE checks, tells the "Loader" to rotate the round, and round still fails to fire, he then waits two minutes for a hang fire, tells "Loader" to unload the round, and assists him in doing so.

g. Loading should be timed with a stop watch. Timing should begin with the announcement of the ammunition element and with the "Loader's" announcement, UP. Time should be cumu-
lated for each series of fire commands.

h. Cross training tasks are indicated by a # symbol.

i. Estimated time, 1 1/4 hours.
PERFORMANCE MEASURES.

1. STOW MAIN GUN ROUNDS ACCORDING TO AMMUNITION STOWAGE PLAN

- Determined by reference to Ammunition Stowage Plan and present load, how many of each type of round is needed.
- Called out to assisting crewman how many of a given type of round is wanted.
- Insisted that round be handed in through turret nose down.
- Round stowed in:
  - Ready rack by placing primer end down, swinging hinge of holder up and to the left, pulling out spring loaded knob on rod of holder, sliding hinge slot over rod behind knob, and releasing the knob.
  - Tubular stowage rack by pushing round in nose first, swinging handle lock over primer end of round, and rotating handle lock securely in place.
  - Turret bustle by seating round with nose toward inside of turret, swinging hinge up and to the left, pulling up clamp and slotting hinge in place below clamp, and pulling clamp down.
- Completed stowage of rounds one type at a time.

2. STOW MACHINEGUN AMMUNITION ACCORDING TO AMMUNITION STOWAGE PLAN

- Determined, by reference to Ammunition Stowage Plan and present load, how much of each ammunition is needed.
- Called out to assisting crewman how much of a given type ammunition is needed.
- Stowed 15 boxes of 7.62 coax ammunition on the turret platform floor. (Used cardboard representations.)
- Stowed 600 rounds of 7.69 coax ammunition in the ready-round (banana) ammunition box. (See Test 13.)
- Stowed 8 boxes of .50 caliber ammunition on the turret platform floor. (Used cardboard representations.)
- Stowed 180 rounds of .50 caliber ammunition in the ready-round ammunition box.
3. **STOW COAX AMMUNITION IN READY (BANANA) BOX**

- Removed ammunition from metal packing box.
- Inspected ammunition for serviceability and dirt.
- Cleaned ammunition if required.
- Linked 600 rounds together in one belt.
- Opened ready box cover.
- Placed 600 round belt in ready box with projectile end of round toward turret wall.
- Fed at least ten rounds of ammunition through ammunition chute in ready box cover.
- Closed ready box cover.

4. **DETERMINE CORRECTIVE ACTION REQUIRED BY REPLENISHER TAPE READINGS**

- Took no action if felt one rough edge and one smooth edge.
- Added oil to replenisher (after announcing, CEASE FIRE, if during firing) if felt rough edges on both sides of the tape.
- Continued to check tape frequently during firing if felt smooth edges on both sides of tape, but drained oil from replenisher at first opportunity.
- Drained oil from replenisher (after announcing, CEASE FIRE, if during firing) if felt two long notches on tape.
- Took correct action upon feeling rough edges on both sides of replenisher tape.
- Took corrective action upon feeling smooth edges on both sides of replenisher tape.
- Took no action upon feeling one rough edge and one smooth edge on replenisher tape.
- Took corrective action upon feeling two long notches on replenisher tape.

5. **LOAD MAIN GUN IN RESPONSE TO FIRE COMMANDS**


- Stood clear of path of recoil.
- Placed firing safety switch in FIRE.
- Announced UP.
- Prepared to load a second round in case no CEASE FIRE is given.
b. Main Gun Not Loaded.

- Placed firing safety switch in **SAFE** position.
- [Checked replenisher tape.]
- Opened breech.
- Selected announced ammunition.
- Unlocked ammunition ready rack.
- Inserted appropriate round into chamber by placing the round two-thirds into chamber and pushing it rest of way with heel of fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in **FIRE** position.
- Announced **UP**.

Yes  No  NA

---

6. **ROTATE ROUND IN MAIN GUN MISFIRE PROCEDURE**

On Gunner’s command, **ROTATE ROUND**:

- Placed firing safety switch in **SAFE** position.
- Opened breech slowly enough to extract round about 1/2 way.
- Rotated round 1/2 turn.
- Pushed round into chamber with heel of fist, swinging arm up and away from closing breech.
- Stood clear of path of recoil.
- Placed firing safety switch in **FIRE** position.
- Announced **UP**.

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7. UNLOAD MISFIRED MAIN GUN ROUND

- Told Gunner to turn main gun and turret power switches OFF.
- Placed firing safety switch in SAFE position.
- Opened breech.
- Held breech operating handle down while TC (Gunner) pried round out of chamber.
- Returned breech operating handle to latched position.

8. LOAD COAX

- Pushed forward on rear of left cover latch rod assembly and raised cover.
- Placed machinegun safety in FIRE position.
- Charged (cocked) machinegun by pulling charger handle to rear.
- Inspected chamber for obstructions by looking and feeling in chamber.
- Placed safety in SAFE position.
- Lowered feed tray.
- Fed ammunition belt through chute of ammunition box.
- Placed first round of ammunition belt in feed tray slot with open side of ammunition link loops facing down.
- Closed machinegun cover assuring that lock rod is engaged.

9. READY COAX IN RESPONSE TO FIRE COMMANDS

- Placed coax safety in FIRE position.
- Announced UP.

10. CLEAR AND UNLOAD COAX

- Placed safety in SAFE (S) position.
- Pushed forward on rear of left rod assembly and opened cover assembly.
- Removed ammunition belt from machinegun.
- Lifted feed tray group, looked and felt that receiver and chamber were clear of ammunition.
- Placed safety to FIRE (F) position.
- Pulled charger handle rearward, depressed manual firing trigger and allowed barrel extension to close slowly.
- Placed safety in SAFE (S) position.
- Closed cover assembly.
11. APPLY IMMEDIATE ACTION TO REDUCE COAX STOPPAGE

Yes No NA

On command, STOPPAGE:

- Waited 5 seconds to allow for a hangfire.
- Charged the machinegun, locking the recoiling parts to the rear.
- Checked to see if the ammunition is feeding into the weapon.
- Pulled barrel extension to the rear.
- Placed safety in SAFE.
- Raised cover and removed the ammunition.
- Removed misfired round from chamber.
- Placed safety in FIRE (F) and hand functioned the weapon one cycle.
- Reloaded the weapon.
- Announced UP.

12. CHANGE COAX BARREL

- Opened cover assembly and removed belted ammunition.
- Charged weapon to sear position and placed safety in SAFE.
- Removed live ammunition or spent cartridge from weapon chamber and links from encircled area.
- Insured weapon is clear by looking into and feeling receiver and chamber.
- Pulled disconnector ring to rear to allow receiver assembly to rotate downward.
- Removed barrel assembly from jacket assembly.
- Installed new barrel assembly in jacket assembly.
- Rotated receiver assembly upward and allowed disconnector to engage into jacket assembly mounting block.
- Placed safety in FIRE and hand functioned weapon one cycle.
- Loaded weapon and attempted to fire.

(WARNING: Use asbestos gloves when removing a hot barrel.)

13. LOAD M85

- Unlatched and raised cover.
- Visually checked and felt in chamber for round.

(NOTE: If bolt was in forward position, placed safety in FIRE (F) position and pulled charger handle rearward until bolt assembly was in rear position. Checked and felt in chamber for round.)
• With safety in FIRE (F) position, pulled charger handle fully rearward and while keeping tension on handle pulled trigger extension handle, depressing trigger to allow bolt assembly to close slowly.

• Placed .50 caliber ammunition in ammunition box and fed bolt until three or four rounds were in flexible chute.

• Pulled rounds into feed tray assembly.

• Placed leading round of belt on tray with gun side of links down so it is held by belt retaining paws.

• Closed cover assembly.

• Charged machinegun.

14. CLEAR AND UNLOAD M85

• Placed cupola firing safety switch in OFF position.

• Held cupola electrical power control switch in OFF position momentarily.

• Assured safety was in SAFE (S) position.

• Unlatched and opened cover assembly.

• If bolt assembly was in forward position, placed safety in FIRE (F) position and pulled charger handle until bolt assembly was fully rearward.

• Kept tension on charger handle, pulled trigger extension handle to depress trigger and allowed bolt assembly to close slowly.

• Placed safety in SAFE (S) position.

15. APPLY IMMEDIATE ACTION TO REDUCE STOPPAGE OF M85

• Waited 5 seconds to allow for hangfire.

• Charged the machinegun locking recoiling parts to rear.

• Checked to see if ammunition was feeding into machinegun.

• Attempted to fire weapon.

• Charged the machinegun to sear position.

• Rotated safety to SAFE (S).

• Raised cover and removed ammunition.

• Removed misfired round from chamber.

• Rotated safety to FIRE (F) and hand functioned the weapon one cycle.

• Reloaded the weapon.

• Attempted to fire weapon.
SCORING.

To pass, the Tank Commander must have:

a. Stated the correct action for each of the eight test trials for during-firing and before-firing conditions.

b. Responded in each trial without hesitation, immediately after feeling the tape.

c. Executed the first five fire commands in a total time of 35 seconds, and the second four commands (five loading reactions) in 1 minute 35 seconds.

d. Responded to MISFIRE, including unloading the misfire round, within 2 1/2 minutes.

e. Responded to STOPPAGE by removing misfired round within 10 seconds of command, and completed procedure within 15 seconds.

f. Selected the correct round in response to each fire command.

g. Checked replenisher tape at least once during the test.

h. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)
PART H. TARGET ACQUISITION (W)

CONDITIONS. The Tank Commander is in a classroom and is administered TEC pre-tests 020-171-1611-F, 020-171-1613-F, 020-171-1614-F, and 935-171-0203-F.

INSTRUCTIONS TO TANK COMMANDER. "You have received a test booklet and an answer sheet. Write your name social security number, tank number, and today's date on the answer sheet. The test consists of four parts: Target Range Estimation (TEC Lesson 020-171-1611-F), Locating and Reporting Targets (TEC Lesson 020-171-1612-F), Target Acquisition Scanning Techniques (TEC Lesson 020-171-1614-F), and Armor Vehicle Recognition (TEC Lesson 935-171-0203-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish turn in the test booklet and answer sheet to the Test Proctor."

TASKS.

Explain the range estimation method in which you estimate the range half the distance to the target.
Explain the range estimation method in which a target at a known range appears half as big as a like target at an unknown range.
Explain the range estimation method in which a target at a known range appears half as big as a like target at an unknown range.
Explain the range estimation method in which a target at a known range appears twice as big as a like target at an unknown range.
Explain location of targets by the clock system.
Explain reporting of targets by the clock system.
Explain the technique of quick search scanning of an area.
Explain ways to adapt your eyes to the darkness.
Explain how to preserve night vision.
Explain how to scan an area at night.
*Identify US and Foreign Armor Vehicle.

NOTES.

a. See Module TC-8 for remedial training of deficiencies.

b. Estimated time, 1 hour.
TANK COMMANDER'S READINESS TEST

PART H. TARGET ACQUISITION

The Test Proctor will administer the following TEC Lesson pre-tests and the Tank Commander will answer only those questions so indicated.

1. Target Range Estimation (020-171-1611-F)
   - Tank Commander will answer questions 2, 4, and 5.

2. Locating and Reporting Targets (020-171-1612-F)
   - Tank Commander will answer question 1.

3. Target Acquisition Scanning Techniques (020-171-1614-F)
   - Tank Commander will answer questions 1, 3, 4, and 6.

4. Armor Vehicle Recognition (935-171-0203-F)
   - Tank Commander will identify all vehicles shown on TEC tape, vehicle 1 through vehicle 17.
TANK COMMANDER'S READINESS TEST

PART H. TARGET ACQUISITION


ANSWER SHEET

Name ________________________________
SSN ________________________________ Tank No. __________________________
Scorer' ______________________________ Test Date _________________________

020-171-1611-F
2. Step a.
   Step b.
   Step c.

020-171-1612-F
1.a. Target
   b. Posture
   c. Direction
   d. Range

020-171-1614-F
1. ________________________________
3. ________________________________
4. ________________________________
6.a. ________________________________
6.b. ________________________________
<table>
<thead>
<tr>
<th>VEHICLE</th>
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<tbody>
<tr>
<td>1.</td>
<td></td>
<td>10.</td>
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<tr>
<td>2.</td>
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<td>11.</td>
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<td>3.</td>
<td></td>
<td>12.</td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
<td>13.</td>
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<tr>
<td>5.</td>
<td></td>
<td>14.</td>
<td></td>
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<tr>
<td>6.</td>
<td></td>
<td>15.</td>
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<tr>
<td>7.</td>
<td></td>
<td>16.</td>
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<tr>
<td>8.</td>
<td></td>
<td>17.</td>
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<td>9.</td>
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</table>

**COMMENTS.** (Recommended remedial training, etc.)

| PASS FAIL |
TANK COMMANDER'S READINESS TEST

PART H. TARGET ACQUISITION


ANSWER KEY

TARGET RANGE ESTIMATION
(020-171-1611-F)

2. The Tank Commander diagram or description must include these steps:
   Step a. Divide the distance to the target in half.
   Step b. Estimate the distance to the halfway point in 100 meters increments.
   Step c. Double the range for estimated range to target.

4. 1000 meters
5. 600 meters

LOCATING AND REPORTING TARGETS
(020-171-1612-F)

1.a. Target: TANK
   b. Position: MOVING LEFT
   c. Direction: ONE O'CLOCK (12:00 or 200 is acceptable)
   d. Range: ONE FIVE HUNDRED

TARGET ACQUISITION SCANNING TECHNIQUES
(020-171-1614-F)

1. A, C
2. B, C
3. A

6.a. Short, jerky movements
   b. Pause a few seconds at each point.
<table>
<thead>
<tr>
<th>VEHICLE</th>
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<th>VEHICLE</th>
<th>COUNTRY</th>
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</thead>
<tbody>
<tr>
<td>AMX-30</td>
<td>French</td>
<td>AMX-13</td>
<td>French</td>
</tr>
<tr>
<td>M60</td>
<td>US</td>
<td>M60A1</td>
<td>US</td>
</tr>
<tr>
<td>CHIEFTON</td>
<td>British</td>
<td>JAG-PANZER</td>
<td>German</td>
</tr>
<tr>
<td>ASU-57</td>
<td>Soviet</td>
<td>PT-76</td>
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<tr>
<td>M551</td>
<td>US</td>
<td>T-34</td>
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<tr>
<td>T-10</td>
<td>Soviet</td>
<td>LEOPARD</td>
<td>German</td>
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<td>CENTURIAN</td>
<td>British</td>
<td>ASU-85</td>
<td>Soviet</td>
</tr>
<tr>
<td>M60A2</td>
<td>US</td>
<td>T-62</td>
<td>Soviet</td>
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<tr>
<td>T-55</td>
<td>Soviet</td>
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</tbody>
</table>

**SCORING KEY.**

Award 5 points for each correct response (165 points possible).

PASSING SCORE = 150 points.
TANK COMMANDER'S READINESS TEST

PART I. LOCATING AND REPORTING TARGETS (HO)

CONDITIONS. Fully operational M60A1 tank located at an observation point on a target acquisition course. The course includes silhouettes, tank and truck targets located at ranges from 400 meters to 1500 meters. The TC will observe from the open hatch position. (The tank will be positioned so the TC's target area of responsibility (10:00 o'clock clockwise to 2:00 o'clock) overlaps the right and left boundaries of the target acquisition course.) Note: TC's actual area of responsibility for target acquisition extends from 9:00 o'clock clockwise to 6:30 o'clock.

INSTRUCTIONS TO TANK COMMANDER. "This is a test of your target acquisition ability. You will be required to scan the area, estimate range to various targets, and report target locations. React to my instructions."

TASKS.

Conduct a quick search scan of the area.
*Locate and identify targets in the area.
Estimate range to targets in the area.
Report locations of targets in the area.

NOTES.

a. Tank Commander should not be given this test until he has passed Tank Commander's Readiness Test, Part H.
b. Tasks should be performed in order given.
c. See example layout of Target Acquisition Course.
d. See Module TC-9 for remedial training of deficiencies.
e. Estimated time, 3/4 hour.

PERFORMANCE MEASURES.

1. CONDUCT A QUICK SEARCH SCAN OF THE AREA

Given the special command, SCAN YOUR TARGET AREA OF RESPONSIBILITY:

*Scanned area directly in front, going close in to far out.

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2. LOCATE AND IDENTIFY TARGETS IN THE AREA

Given the special command, LOCATE AND IDENTIFY TARGETS IN THE AREA, the Tank Commander will have five minutes to locate and identify all targets.

- Located and identified target 1 (TROOPS).
- Located and identified target 2 (TANK).
- Located and identified target 3 (TANK).
- Located and identified target 4 (TRUCK).
- Located and identified target 5 (TROOPS).
- Located and identified target 6 (TRUCK).
- Located and identified target 7 (TANK).
- Located and identified target 8 (TROOPS).

3. ESTIMATE RANGE TO TARGETS IN THE AREA

Given the range of 1000 meters to target 2 and the special command, DETERMINE RANGE TO ALL TARGETS IN THE AREA, the Tank Commander will determine the range to all targets within ± 100 meters.

- Determined range to target 1 as 400 meters.
- Determined range to target 3 as 500 meters.
- Determined range to target 4 as 1200 meters.
- Determined range to target 5 as 1000 meters.
- Determined range to target 6 as 1200 meters.
- Determined range to target 7 as 1500 meters.
- Determined range to target 8 as 900 meters.

4. REPORT LOCATION OF TARGETS IN THE AREA

Given a designated target and the special command, REPORT LOCATION OF TARGET NO. ____ , the Tank Commander will report the type, posture (moving or stationary), location (by clock system, within one hour deviation), and range to the target (within ± 100 meters).

- Target 1. TROOPS, STATIONARY, TEN O'CLOCK, FOUR HUNDRED.
- Target 3. TANK, STATIONARY, ONE O'CLOCK, FIVE HUNDRED.
<table>
<thead>
<tr>
<th>Target 4. TRUCK, MOVING LEFT TO RIGHT, ELEVEN O'CLOCK, ONE TWO HUNDRED.</th>
<th>Yes No NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target 5. TROOPS, STATIONARY, ONE O'CLOCK, ONE THOUSAND.</td>
<td></td>
</tr>
<tr>
<td>Target 6. TRUCK, STATIONARY, TWELVE O'CLOCK, ONE TWO HUNDRED.</td>
<td></td>
</tr>
<tr>
<td>Target 7. TANK, STATIONARY, TWELVE O'CLOCK, ONE FIVE HUNDRED.</td>
<td></td>
</tr>
<tr>
<td>Target 8. TROOPS, STATIONARY, TWO O'CLOCK, NINE HUNDRED.</td>
<td></td>
</tr>
</tbody>
</table>

SCORING.

To pass, Tank Commander must have:

a. Located and identified all targets in the area within five minutes.

b. Estimated range to all targets within ±100 meters.

c. Given location of all targets within one hour deviation.

d. Been checked "Yes" or "NA" on each performance measure.

COMMENTS. (Recommended remedial training, etc.)  PASS FAIL
TARGET ACQUISITION COURSE

Example. (Tank Commander's target area of responsibility is from 10:00 o'clock to 2:00 o'clock. During field operations, the area is clockwise from 9:00 o'clock to 6:30 o'clock.)

Left limit ———— 1600 meters ———— Right limit

(No marker)

1/2" = 100 meters

Observation Point
TANK COMMANDER'S READINESS TEST

PART J. TACTICAL OPERATIONS (W)

CONDITIONS. The Tank Commander is in a classroom and is administered TEC pre-tests 020-171-5361-F and 020-171-5364-F.

INSTRUCTIONS TO TANK COMMANDER. "You have received a test booklet and an answer sheet. Write your name, social security number, tank number, and today's date on the answer sheet. The test consists of two parts: Initial Fire Commands, M60/M60A1/M60A3 Tank (020-171-5361-F). Do not write in the test booklet; indicate your answers on the answer sheet. The Test Proctor is not allowed to answer any questions concerning test content. When you finish, turn in the test booklet and answer sheet to the Test Proctor".

TASKS.

List necessary elements contained in the initial fire command for various targets.
Explain ammunition setting on ballistic computer when using the coax.
List correct range settings for coax targets at various ranges.
Identify correct sight pictures for engaging various targets with the coax.
Identify correct sight pictures for engaging various targets with the caliber .50 machinegun.

NOTES.

a. See Module TC-10 for remedial training of deficiencies.
b. Estimated time, 1/2 hour.
TANK COMMANDER'S READINESS TEST

PART J: TACTICAL OPERATIONS

The Test Proctor will administer the following TEC Lesson pre-tests, and the Tank Commander will answer only those questions so indicated:

- Initial Fire Commands, M60/M60A1, M60A3 Tank (020-171-5361-F)
  - Tank Commander will answer questions 1, 2, 3, 5, 7, 8, and 9.

- Machinegun Engagements, M60/M60A1/M60A3 Tank (020-171-5364-F)
  - Tank Commander will answer all questions.
TANK COMMANDER'S READINESS TEST

PART J: TACTICAL OPERATIONS

The Test Proctor will administer the following TEC Lesson pre-tests, and the Tank Commander will answer only those questions so indicated:

- Initial Fire Commands, M60/M60A1, M60A3 Tank (020-171-5361-P)
  - Tank Commander will answer questions 1, 2, 3, 5, 7, 8, and 9.

- Machinegun Engagements, M60/M60A1/M60A3 Tank (020-171-5364-P)
  - Tank Commander will answer all questions.
TANK COMMANDER’S READINESS TEST

PART J: TACTICAL OPERATIONS

TEC Lessons 020-171-5361-F
and 020-171-5364-F

ANSWER SHEET

Name ____________________________________________

SSN ________________________ Tank No. ____________

Scorer ________________________ Test Date __________

020-171-5361-F

1. Enemy tank, frontal engagement:

_______________________________________________

(Fire command elements)

2. Enemy tank, flank engagement:

_______________________________________________

(Fire command elements)

3. A building to be burned:

_______________________________________________

(Fire command elements)

5. Enemy bunker at 1500 meters:

_______________________________________________

(Fire command elements)

7. Enemy troops at 500 meters with coax machinegun:

_______________________________________________

(Fire command elements)

8. Antitank gun at a range of 1700 meters:

_______________________________________________

(Fire command elements)

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9. Surprise target, enemy tank, within battlesight range:

(Fire command elements)

020-171-5364-F

1. 6.
2. 7.
3. 8.
4. 9.
5. 10.

COMMENT. (Recommended remedial training, etc.)

PASS FAIL
TANK COMMANDER'S READINESS TEST

PART J: TACTICAL OPERATIONS

PRE-TEST ANSWER KEY

ANSWER KEY

INITIAL FIRE COMMANDS, M60/M60A1/M60A3 TANK
(020-171-5361-F)

1. GUNNER...SABOT...TANK...FIRE
2. GUNNER...SABOT...TANK...FIRE
3. GUNNER...SMOKE...BUILDING...FIRE
5. GUNNER...HEP...BUNKER...
   ONE FIVE HUNDRED...FIRE
4. B

MACHINEGUN ENGAGEMENTS, M60/M60A1/M60A3 TANK
(020-171-5364-F)

1. HEP
2. A
3. 850 meters
4. 500 meters
5. B
6. Near
7. Near
8. Far
9. Continuous Fire and Adjust.
   Fire in assigned sector on command.
10. C

SCORING KEY.

Award 5 points for each correct response (85 possible points).

PASSING SCORE = 75 points.
TANK COMMANDER'S READINESS TEST

PART K. TACTICAL OPERATIONS (HO)

CONDITIONS. Fully operational M60A1 tank with BII, skilled driver, tank course including suitable areas for defilade and simulated targets (moving and stationary main gun, coax, and M85).

INSTRUCTIONS TO TANK COMMANDER. "This is a test of your ability to fight your tank. We are going on a simulated combat mission. Your tank has a basic load of ammunition and we expect to encounter enemy vehicles and troops. You will be scored on what you do as well as how you do it. Do you have any questions? ... Ready? ... We are preloading SABOT ... Begin."

TASKS.

*Designate crew sectors of responsibility for target acquisition.
*Acquire targets.
*Preset SABOT battlesight information.
Main gun battlesight engagement, moving to a halt, single stationary target, SABOT. (1 Tank)
Main gun battlesight engagement, moving to a halt, two moving targets, SABOT, TC masked. (2 Tanks)
.50 caliber and coax engagement, moving to a halt, one moving target and one stationary target. (1 moving BRDM and 1 Infantry Squad; Gunner engages infantry squad with coax.)
.50 caliber and main gun engagement moving to a halt, three stationary targets, SABOT. (1 BRDM and 2 Tanks; Gunner engages two tanks with main gun.)
*Preset HEAT battlesight information.
Main gun battlesight engagement, moving to a halt, three stationary targets, HEAT. (3 Tanks)
.50 caliber and coax engagement, moving to a halt, three stationary targets. (1 Infantry Squad; Gunner engages 1 RPG TM and 1 ATGM TM with coax.)
Main gun RCLDF engagement, at the halt, three stationary targets, HEAT, TC masked. (1 Infantry Squad and 2 Tanks; Gunner engages two tanks with main gun.)
.50 caliber and coax engagement, at the halt, two stationary targets, TC masked. (1 BRDM and 1 Infantry Squad; Gunner engages Infantry Squad with coax.)
Main gun battlesight engagement, at the halt, one stationary target and one moving target, SABOT. (2 Tanks)
*Apply burst-on-target (BOT) adjustment.
*Apply target-form (TF) adjustment.
*Apply standard adjustment.
#Lay telescope reticle on target properly.
NOTES.

a. Tank Commander should complete Tank Commander's Readiness Tests A through J before taking this part.

b. Scorer should act as the Gunner and Loader during this test.

c. The targets should be appropriate for the engagement. However, the order in which the targets appear is not important.

d. After Tasks 1 through 13 have been completed, scorer will designate targets to TC and indicate where a miss occurred. TC will apply BOT, TF, and standard adjustment corrections. Scorer will verify sight picture each time TC announces ON THE WAY.

e. See example layout for "dry" TCQC course and second round adjustment targets.

f. See Module TC-11 for remedial training of deficiencies.

g. Cross training tasks are indicated by a # symbol.

h. Estimated time, 2 hours.

PERFORMANCE MEASURES.

1. DESIGNATE CREW SECTORS OF RESPONSIBILITY FOR TARGET ACQUISITION

   . Assigned Gunner's sector as: clockwise from 10:00 o'clock to 2:00 o'clock.
   . Assigned Loader's sector as: counterclockwise from 9:30 o'clock to 5:30 o'clock.
   . Assigned Driver's sector as: clockwise from 10:00 o'clock to 2:00 o'clock.
   . Assigned TC's (own) sector as: clockwise from 9:00 o'clock to 6:30 o'clock.

2. ACQUIRE TARGETS

   . Detected targets in assigned observation sector.

3. PRESET SABOT BATTLESIGHT INFORMATION

   . Instructed Loader to load SABOT.
   . Instructed Gunner to index SABOT into the ballistic computer.
   . Indexed 1600 meters into the rangefinder.
4. MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT, ONE STATIONARY TARGET, SABOT (1 TANK)

- Determined that target was within battlesight range.
- Started engagement within 1 second of target appearance.
- Announced GUNNER, BATTLESIGHT.
- Laid gun for direction within 3 seconds.
- Announced TANK.
- Did not announce FIRE until he was in position to observe through binoculars or rangefinder.
- After Gunner announced IDENTIFIED, announced FIRE.

5. MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT, TWO MOVING TARGETS, SABOT, TC MASKED (2 TANKS)

- Determined that targets were within battlesight range.
- Engaged most dangerous target first.
- Started engagement within 1 second of target appearance.
- Announced GUNNER, BATTLESIGHT.
- Laid gun for direction within 3 seconds.
- Announced TWO TANKS, RIGHT TANK FIRST.
- Did not announce FIRE until he was in position to observe through rangefinder.
- After Gunner announced IDENTIFIED, announced FIRE.
- After first target was destroyed, shifted fire to second target.
- Issued proper fire command for second target.

6. .50 CALIBER AND COAX ENGAGEMENT, MOVING TO A HALT, ONE MOVING AND ONE STATIONARY TARGETS, .50 CALIBER AND COAX (1 BRDM AND 1 INFANTRY SQUAD)

- Started engagement within 1 second of target appearance.
- Announced GUNNER, COAX.
- Laid gun for direction within 3 seconds.
- Announced TROOPS.
- When Gunner announced IDENTIFIED, announced FIRE AND ADJUST, CALIBER FIFTY.
- Placed safety in FIRE (F) position.
- Assured rate of fire selector was to the right for low rate of fire.
- Held cupola electrical power control switch momentarily in ON position.
- Placed machinegun firing switch in ON position.
- Applied one half lead (2 1/2 mils) in direction of target apparent motion.
7. **.50 CALIBER AND MAIN GUN PRECISION ENGAGEMENT MOVING TO A HALT, THREE STATIONARY TARGETS, .50 CALIBER AND SABOT (1 BRDM AND 2 TANKS)**

- Laid lead line (at 1000 meter range line) at center of mass of target.
- Depressed machinegun firing trigger switch and fired 10-20 round bursts.
- Fired .50 caliber within 7 seconds of announcing CALIBER FIFTY.
- Announced TC COMPLETE.

- Determined that target was beyond battlesight range.
- Started engagement within 1 second of target appearance.
- Announced GUNNER, SABOT.
- Laid gun for direction within 3 seconds.
- Determined range to target to an accuracy of ± 50 meters within 5 seconds.
- Announced TWO TANKS, RIGHT TANK FIRST (or LEFT TANK FIRST).
- When Gunner announced IDENTIFIED, announced FIRE AND ADJUST, CALIBER FIFTY.
- Placed safety in FIRE (F) position.
- Assured rate of fire selector was to the right for low rate of fire.
- Held cupola electrical power control switch momentarily in ON position.
- Placed machinegun firing switch in ON position.
- Laid 1200 meter rangeline at center of mass of target.
- Depressed machinegun firing trigger switch and fired 10-20 round bursts.
- Fired .50 caliber within 7 seconds of announcing CALIBER FIFTY.
- Announced TC COMPLETE.

8. **PRESET HEAT BATTLESIGHT INFORMATION**

- Instructed Loader to load HEAT.
- Instructed Gunner to index HEAT into the ballistic computer.
- Indexed 1000 meters into the rangefinder.

9. **MAIN GUN BATTLESIGHT ENGAGEMENT, MOVING TO A HALT, THREE STATIONARY TARGETS, HEAT (3 TANKS)**

- Determined that targets were within battlesight range.
- Started engagement within 1 second of target appearance.
- Announced GUNNER, BATTLESIGHT.
- Laid gun for direction within 3 seconds.
Announced THREE TANKS, RIGHT TANK FIRST (or LEFT TANK FIRST, or CENTER TANK FIRST).

Did not announce FIRE until he was in position to observe through binoculars or rangefinder.

After Gunner announced IDENTIFIED, announced FIRE.

After first target was destroyed, shifted fire to second and then third targets.

Issued proper fire command for second and third targets.

10. .50 CALIBER AND COAX ENGAGEMENT, MOVING TO A HALT, THREE STATIONARY TARGETS, .50 CALIBER AND COAX (1-RPG TM, 1 ATGM TM, AND 1 INFANTRY SQUAD)

. Started engagement within 1 second of target appearance.
. Announced GUNNER, COAX.
. Laid gun for direction within 3 seconds.
. Announced TWO ANTI-TANK GUNS, CLOSE IN ONE FIRST.
. When Gunner announced IDENTIFIED, announced FIRE AND ADJUST, CALIBER FIFTY.
. Placed safety in FIRE (F) position.
. Assured rate of fire selector was to the right for low rate of fire.
. Held cupola electrical power control switch momentarily in ON position.
. Placed machinegun firing switch in ON position.
. Laid 1400 meter rangeline at near edge of target.
. Depressed machinegun firing trigger switch and fired 10-20 round bursts.
. Fired .50 caliber within 7 seconds of announcing CALIBER FIFTY.
. Traversed and elevated .50 caliber for area coverage.
. Announced TC COMPLETE.

11. MAIN GUN RCLDF ENGAGEMENT, AT THE HALT, THREE STATIONARY TARGETS, HEAT, TC MASKED (2 TANKS AND 1 INFANTRY SQUAD)

(Note: At the start of the RCLDF engagement a round of HEP is in the chamber and HEP is indexed in the ballistic computer.)

. Announced GUNNER, DIRECT FIRE, INDEX HEP, FIRE HEAT, TWO TANKS - HULL DOWN FIRST, DEFLECTION SEVEN ZERO LEFT, ELEVEN HUNDRED, QUADRANT PLUS SIX.

After Gunner reads back DEFLECTION SEVEN ZERO LEFT and QUADRANT PLUS SIX and IDENTIFIED:

. Announced FIRE AND ADJUST, CALIBER FIFTY.
. Placed safety in FIRE (F) position.
. Assured rate of fire selector was to the right for low rate of fire.
. Held cupola electrical power control switch momentarily in ON position.
. Placed machinegun firing switch in ON position.
. Placed IR switch in 24V position.
. Rotated light source control for desired reticle brightness.
. Rotated focusing ring until target appears sharp.
. Laid 800 meter rangeline at near edge of target.
. Depressed machinegun firing trigger switch and fired 10-20 round bursts.
. Fired .50 caliber within 7 seconds of announcing CALIBER FIFTY.
. Traversed and elevated .50 caliber for area coverage.
. Announced TC COMPLETE.

12. .50 CALIBER AND COAX ENGAGEMENT, AT THE HALT, TWO STATIONARY TARGETS, .50 CALIBER AND COAX, TC MASKED (1 INFANTRY SQUAD AND 1 BRDM)

. Started engagement within 1 second of target appearance.
. Announced GUNNER, COAX.
. Laid gun for direction within 3 seconds.
. Announced TROOPS.
. When Gunner announced IDENTIFIED, announced FIRE AND ADJUST, CALIBER FIFTY.
. Placed Safety in FIRE (F) position.
. Assured rate of fire selector was to the right for low rate of fire.
. Held cupola electrical power control switch momentarily in ON position.
. Placed machinegun firing switch in ON position.
. Placed IR switch in 24V position.
. Rotated light source control for desired reticle brightness.
. Rotated focusing ring until target appears sharp.
. Laid 900 meter rangeline at center of mass of target.
. Depressed machinegun firing trigger switch and fired 10-20 round bursts.
. Fired .50 caliber within 7 seconds of announcing CALIBER FIFTY.
. Announced TC COMPLETE.

13. MAIN GUN BATTLESIGHT ENGAGEMENT, AT THE HALT, ONE STATIONARY TARGET AND ONE MOVING TARGET, SABOT (2 TANKS)

. Determined that targets were within battlesight range.
. Engaged most dangerous target first.
14. MAIN GUN BATTLE SIGHT ENGAGEMENT, MOVING TO A HALT, ONE STATIONARY TARGET (1 TANK) APPLY BOT

After Gunner has fired and announced LOST:

- Relays to maintain correct initial sight picture on rangefinder. (Notes point of sight reticle where tracer appears in relation to target.)
- Announces OVER-RIGHT-BOT (or other appropriate sensing.)
- Moves imaged tracer point on reticle, by gun controls, to center of mass of target.
- Announced ON THE WAY.
  (NOTE: SCORER VERIFIES SIGHT PICTURE.)

15. MAIN GUN BATTLE SIGHT ENGAGEMENT, MOVING TO A HALT, ONE STATIONARY TARGET (1 TANK) APPLY TARGET FORM

After Gunner has fired and announced LOST, Scorer announces, OVER, DROP ONE HALF FORM-FIRE:

- Relays to maintain correct initial sight picture on rangefinder.
- Moves sight reticle down by gun controls half the distance of the visible height of target vehicle.
- Announced ON THE WAY.
  (NOTE: SCORER VERIFIES SIGHT PICTURE.)

16. MAIN GUN BATTLE SIGHT ENGAGEMENT, MOVING TO A HALT, ONE STATIONARY TARGET (1 TANK) APPLY STANDARD ADJUSTMENT

After Gunner has fired and announced LOST, Scorer announces OVER:

- Relays to maintain correct initial sight picture on rangefinder.
- Moves sight reticle down 1 mil by gun controls.
- Announced ON THE WAY.
17. **LAY TELESCOPE RETICLE ON TARGET PROPERLY**

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<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
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(TC as Gunner. Scorer informs Gunner (TC) that Gunner's primary sight is inoperative.)

After Scorer announced GUNNER, HEAT:

- Turned main gun switch ON.
- Checked that HEAT reticle was positioned in Gunner's telescope.

After Scorer announced TANK, ONE EIGHT HUNDRED:

- Identified target and announced IDENTIFIED within 3 seconds.
- Laid 1800 meter rangeline of telescope at center of mass of target.
- Made final precise lay.
  
  (NOTE: SCORER VERIFIES SIGHT PICTURE.)

- Announced ON THE WAY.
- Fired main gun within 7 seconds of beginning of fire command.

**SCORING.**

To pass, Tank Commander must have:

a. Detected all targets and given the proper ALERT element of the fire commands.

b. Given proper element of each fire command at appropriate time for each target.

c. Taken up correct sight picture for each target engaged.

d. Continued to monitor sight picture after firing.

e. Met all time requirements.

f. Been checked "Yes" or "NA" on all performance measures.

**COMMENTS.** (Recommended remedial training, etc.)

PASS FAIL
"DRY" TANK CREW QUALIFICATION COURSE
(Gunner and TC Dry TCQC)

1" = 400 meters
SECOND ROUND ADJUSTMENT TARGETS
(BOT, TF and Standard Adjustment)

BOT TARGET

Initial Sight Picture (Battlesight)

Subsequent Sight Picture (Battlesight)

Tracer

TF TARGET

Initial Sight Picture (Battlesight)

Subsequent Sight Picture (Battlesight)

Tracer

STANDARD ADJUSTMENT

Initial Sight Picture (Precision)

Subsequent Sight Picture (Precision)

Tracer