TRAINING SUPPORT PACKAGE FOR

MAINTAIN M17 DECONTAMINATION APPARATUS

THIS PACKAGE HAS BEEN DEVELOPED FOR: MOS 63J10, QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER COURSE
PROPOONENT FOR THIS IS: Commander, United States Army Combined Arms Support Command, Training Directorate, Ordnance Division, Suite 227, 401 1st Street, Fort Lee, VA 23801-1511.
FOREIGN DISCLOSURE RESTRICTIONS: The materials contained in this course have been reviewed by course instructors in coordination with the installation/activity foreign disclosure authority. This course is releasable to military students from all authorized requesting countries.
### TRAINING SUPPORT PACKAGE (TSP)

<table>
<thead>
<tr>
<th>POI Number Title:</th>
<th>091-63J10-981 QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFN Number(s) Title(s):</td>
<td>63J1-I03 MAINTAIN M17 DECONTAMINATION APPARATUS</td>
</tr>
<tr>
<td>Effective Date:</td>
<td>TBD</td>
</tr>
<tr>
<td>Supersedes TSP(s):</td>
<td>None</td>
</tr>
<tr>
<td>TSP Use:</td>
<td>Any accredited Ordnance TASS Battalion and the Army Ordnance Center And School.</td>
</tr>
<tr>
<td>Comments Recommendations:</td>
<td>Send comments and recommendations directly to: Commander, United States Army Combined Arms Support Command, Training Directorate, Ordnance Division, Suite 227, 401 1st Street, Fort Lee, VA 23801-1511.</td>
</tr>
</tbody>
</table>
PREFACE

Purpose:
This training support package provides the instructor with a standardized lesson plan and student evaluation for presenting instruction for:

**Lesson number:** 63J1-I03

**Lesson title:** Maintain M17 Decontamination Apparatus.

This TSP contains:

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<td>18</td>
</tr>
<tr>
<td>63J1-I03 VGT 1 TO VGT 5</td>
<td>20</td>
</tr>
</tbody>
</table>
SECTION I. ADMINISTRATIVE DATA

All Courses Including This Lesson:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>091-63J10-981</td>
<td>Quartermaster/Chemical Equipment Repairer</td>
</tr>
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</table>

Task(s) Taught or Supported:

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Task Title</th>
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</thead>
</table>

Task(s) Reinforced:

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Task Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

Academic Hours:

The academic hours required to teach this course are as follows:

<table>
<thead>
<tr>
<th>IDT</th>
<th>ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOURS/METHODS</td>
<td>HOURS/METHODS</td>
</tr>
<tr>
<td>1.0/CO</td>
<td>0.0/D</td>
</tr>
<tr>
<td>4.0/PE1</td>
<td></td>
</tr>
</tbody>
</table>

*Total Hours: 5.0

Test Lesson:

<table>
<thead>
<tr>
<th>Testing:</th>
<th>1.0</th>
<th>63J1-I04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of test results:</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Prerequisite
Lesson(s):

Lesson Number Lesson Title
Students must have successfully completed previous Annex lessons.

Clearance
and Access:

UNCLASSIFIED

References:

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>TITLE</th>
<th>DATE</th>
<th>Par NO.</th>
<th>Add. Info</th>
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</thead>
<tbody>
<tr>
<td>DA PAM 738-750</td>
<td>Army Maintenance Management System</td>
<td>08/94</td>
<td>All</td>
<td>None</td>
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<tr>
<td>TM 3-3-4230-228-10</td>
<td>M17A1 Decon Apparatus Operator's Manual</td>
<td>06/90</td>
<td>All</td>
<td>None</td>
</tr>
<tr>
<td>TM 3-4230-228-23</td>
<td>M17A1 Decon Apparatus Organizational and Direct Support Maintenance Manual</td>
<td>09/89</td>
<td>All</td>
<td>None</td>
</tr>
</tbody>
</table>

NOTE:

Make assignments so as to allow sufficient time for the students to complete the assignments by the desired due date. Explain assignments and provide due date and arrangements for collecting and providing feedback on the assignments.

Student Study Assignments:

None.

Instructor Requirements:

PE 1:6
CO 1:Group

Additional Personnel Requirements:

None
Equipment Required:

- M17A1 Decon Apparatus, M17A1 Accessory Kit

Materials Required:

**Instructor materials:**
- 63J1-I03, Suppl 1, Practical Exercise Checklist (PE1), 63J1-I03, Suppl 2, Instructor Malfunction Guide, Overhead Projector, VGT (23)

**Student materials:**
- TM 3-4230-228-10, Jul. 90 C1, TM 3-4230-228-23&P Sep 89 C2, M17A1 Decon Apparatus, General mechanic’s tool box, Multimeter

Training Area and Range Requirements:

- One classroom and shop area.

Ammunition Requirements:

- None

NOTE:

Before presenting this lesson, thoroughly prepare by studying this lesson and identify reference material.

Instructional Guidance:

During this lesson, the instructor will guide the students through the completion of Maintenance of the M17 Decontamination Apparatus.

<table>
<thead>
<tr>
<th>Approvals: NAME / RANK/ POSITION/ DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writer ________________________________</td>
</tr>
<tr>
<td>Safety Officer ________________________</td>
</tr>
<tr>
<td>Annual Reviewer ________________________</td>
</tr>
<tr>
<td>Annual Reviewer ________________________</td>
</tr>
</tbody>
</table>
SECTION II. INTRODUCTION

Method of instruction: CO
Instructor to student ratio is: 1:Group
Time of instruction 0.1 hours
Media used: None.

Motivator:

During the Gulf war the U.S. was expecting a chemical attack, the M17 was deployed for decontamination of equipment and personnel. When the U.S. redeployed, the M17A1 was used to clean the equipment. If you or your equipment had been contaminated by nuclear, biological or chemical agents, how would you decontaminated this equipment? The M17 would be used for decontamination, of personnel and equipment or the other material exposed to nuclear, biological or chemical agents.

NOTE:

Provide students with the terminal learning objective.

<table>
<thead>
<tr>
<th>Terminal Learning Objective:</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the completion of this lesson the student will:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action:</th>
<th>Maintain the M17 Decon Apparatus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions:</td>
<td>In a classroom/shop operation, given instruction, an M17 Decon Apparatus, references, necessary tools and equipment.</td>
</tr>
<tr>
<td>Standards:</td>
<td>IAW TM 3-4230-228-10 &amp; TM 3-4230-228-23.</td>
</tr>
</tbody>
</table>

Safety:

Ensure students remove all rings, watches, and jewelry when performing any electrical or maintenance tasks. Do not operate any machinery in an enclosed area unless it is adequately ventilated. Do not operate any machinery unless otherwise instructed by an instructor. Park vehicles on ground which is as level as possible, and chock the front and rear wheels before performing maintenance. Soldiers WILL NOT START equipment without an instructor present.

Risk Assessment
Level:

Low
NOTE:
Obtain approval of any training that receives a high risk assessment level.

Environmental Considerations:

When working with equipment, in the event of an accidental spill of hydraulic fluid, fuels, oils, solvents, acids, and coolants. The spill must be contained and cleaned up immediately. Floor dry sweep is the most effective material to contain and clean up environmental spills. The student will report the incident to the instructor who will direct appropriate cleanup actions. All contaminated floor dry materials must be stored in a separate container. The container must be inspected by qualified environmental specialist before to determine proper disposal procedures. Additional warnings and cautions concerning environmental hazards will be explained to you at the applicable point in later lessons.

NOTE:
Add considerations that are applicable to your specific training location or installation.

Evaluation:
In lesson 63J1-I04 and 63J1-I05 you, the student, will have three hours to take a job knowledge and performance test on the material presented in this lesson.

Instructional Lead-in:
We are now ready to begin our instruction on the Maintenance of the M17 Decon Apparatus.
SECTION III. PRESENTATION

A. ENABLING LEARNING OBJECTIVE 1

NOTE:
Inform the students of the enabling learning objective requirements.

<table>
<thead>
<tr>
<th>Action</th>
<th>State the characteristics of the M17.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions</td>
<td>In a classroom environment, given a M17 Decon Apparatus, instruction, Multimeter, DA Form 2404, and references.</td>
</tr>
<tr>
<td>Standard</td>
<td>IAW TM 3-4230-228-10, TM 3-4230-228-23.</td>
</tr>
</tbody>
</table>

1. Learning Step/Activity 1 - Instructor will lead a discussion on the M17 Decon Apparatus.

   Method of instruction- CO
   Instructor to student ratio is- 1:Group
   Time of instruction – 0.3.
   Media – Overhead Projector.

   NOTE:
   Show VGT #1, purpose and characteristics or refer to TM 3-4230-228-10.

   a. Purpose: decontamination of equipment and material expose to nuclear, biological or chemical agents. It is used with water and also water mixed with decontaminant. When using decontaminates, the injector system must be used. The unit also provides showers for personnel.

   b. Characteristics:

   (1) Light weight - 360 lb. (4 men carry).

   (2) Portable - transport in any type of vehicle.

   (3) Self contained - do not need any external power source.

   (4) Showers personnel - maximum up to 12 personnel at a time.

   (5) Decontaminate equipment - military equipment.
(6) Issue to all battalions and some company size units.

(7) Is provided with either 1580 gallons or 3000 gallons collapsible tank.

NOTE:

Show VGT #2 (Control Panel). Explain the function of the components of the control panel.

c. Control panel - houses all controls and instruments.

(1) Function selector switch - is a three position switch, select the operating position (off, showers, wands).

(2) Water pressure gage - indicates outgoing water pressure (wands 110-130 psi, showers 40-50 psi).

(3) Hourmeter - indicates hours and minutes of operation.

(4) Burner fuel valve control - controls outlet temperature by regulating fuel flow to burner.

(5) Water temperature gage - indicates temperature of outgoing water (wands 212-250 F or 100-120 C, showers 90 F or 32 C).

(6) Fuel pressure gage - indicates pressure at outlet side of the fuel pump (90 to 105 psi).

(7) Reset indicator light - when lit indicates burner did not light within allotted time an integral switch resets the timer.

NOTE:

Conduct a check on learning and summarize the learning activity.

2. Learning Step/Activity 2 - Instructor will lead a discussion on the M17 Decon Apparatus.

Method of instruction- CO
Instructor to student ratio is- 1:Group
Time of instruction – 0.3
Media – Overhead Projector.

a. Engine - is a one cylinder, two cycle air cool.

(1) The output of the engine when running at 4250+/−50 rpm is 7.3 hp.
(2) When adjusting the engine speed the dial indicator must be placed against the engine starter and the dial must be set from 4200 to 4400 rpm.

(3) The build in generator produces 6 vac at 17 watts, 2.8 amps. This power goes in to the ECM box where is change to DC voltage, the output after the ECM should be at least 5 VDC.

(4) Drives all systems through a centrifugal clutch which engages at 2700 rpm.

(5) Fuel mixture: 20:1 ratio (1 quart of two cycle oil to 5 gallons of gasoline).

(6) The spark plug gap on the 197 cc engine is 0.020 to 0.035 inch.

(7) Engine fuel system:

(a) Fuel is supplied to the engine from a five gallon fuel can.

(b) An in line ball pump is used to prime the fuel system.

(c) Fuel is drawn through the sediment strainer and fluid fuel filter before entering the fuel pump and carburetor.

NOTE:

Discuss the water system.

b. Water pump:

(1) The water pump is roller type, over capacity, belt driven by the engine through the centrifugal clutch, that engages at 2700 rpm.

(2) Provides a water supply to the system.

(3) The pump can provide varying flow rates to the outlet and is controlled by an automatic water pressure regulating valve.

(4) The water pressure regulating valve will allow any over supply of water to returned to the inlet side of the pump.

(5) Two flow switches, mounted on the coil assembly, sense the system water flow. The signals send by the flow switches are received by the electronic control module, which controls burner ignition and output.
c. Heat Exchanger:

(1) Burns fuel to heat the water.

(2) Is a double-walled, convection type unit.

(3) The functional components consist of:

(4) A burner, monitored by an electronic control system through an igniter plug.

(5) A heating coil, the heated air forced around the water coils air is received in the burner from the fan mixed with the atomized fuel, and ignited, and then out the exhaust.

(6) Pressurized fuel is received and atomized by the burner fuel jet.

(7) The unit burns various types of fuel:

(8) Primary fuel: leaded or unleaded gasoline.

(9) An alternate can be: Diesel fuel, JP4, or Kerosene.

(10) Heat output: 700,000 BTU.

(11) The heat exchanger is located behind the control panel and the engine.

(12) Heater fuel system - Fuel is supplied to the burner from a five gallon fuel can through a strainer and fluid filter assembly by the engine driven fuel pump. The fuel then passes through the magnetic valves to the burner fuel jets. Excess fuel is routed through the check valves back to the fuel can. The system operates on primary jet until there is need for water temperature.

(a) Fuel pump drive belt.

(b) Heater fuel pump.

(c) Heater fuel filter.
d. Electronic control module (ECM)

(1) System’s brain monitors the water pressure and the water temperature.

(2) Monitor’s and controls burner ignition through the use of valves, switches and thermostats.

(3) The electronic control module receives alternating current (6 vac) from the engine generator and converts it to direct current (5 VDC or greater) for the systems use.

e. Air system - consist of the axial vane fan enclosed in a shroud. When the centrifugal clutch engages, the fan assists in drawing air form around the engine cooling fins to cool the engine, and supplies preheated air to the heat exchanger. In the heat exchanger, air supplied by the fan is used for combustion.

NOTE:

Conduct a check on learning and summarize the learning activity.

3. Learning Step/Activity 3 - Instructor will lead a discussion on the purpose, and location of components.

   Method of instruction- CO
   Instructor to student ratio is- 1:Group
   Time of instruction – 0.3
   Media – Overhead Projector.

NOTE:

Inform the students to follow along in the TM as each item is discussed.

a. Igniter, voltage tripler, and air vent assembly.

(1) Igniter - should receive no less than 5 VDC from ECM, the igniter provides 10,000 VDC to voltage tripler.

(2) Voltage tripler - receive 10,000 VDC from igniter and step it up to 30,000 VDC.
(3) Air vent - heated air passes through tee assembly to cool down the photo cell and escapes through the air vent

b. Fuel igniter, mica window and photo cell

(1) Fuel igniter plug - provides spark to ignite the air fuel mixture inside the burner.

(2) Mica window - protects the photo cell.

(3) Photo cell - senses the light inside the burner and send the signal to the electronic control module.

NOTE: Show VGT # 5 and show the components of accessory kit.

c. Minor components.

(1) Shower unit - 2 sets connected to pressure hose to provide personnel showers (12 max at one time).

(2) Injector - used to apply a mixture of water and decontaminate for decontamination of equipment.

(3) Spray wands - hand held, trigger operated, connected to the pressure hose to decontaminate equipment.

(4) Discharge hose - (pressure hose) two 50 ft. sections. Transfer heated water from the branch hose to the wands or showers.

(5) Suction hose - transfer water from water source to the inlet assembly.

NOTE: Conduct a check on learning and summarize the learning activity.

4. Learning Step/Activity 4 - Instructor will lead a discussion on the electrical system of the M17 decon.

Method of instruction- CO
Instructor to student ratio is- 1:Group
Time of instruction – 0.2
Media – None.
NOTE:
Refer students to Appendix F-1 and explain the wiring schematics on the M17 Decon Apparatus. Conduct a check on learning and summarize the learning activity.

B. ENABLING LEARNING OBJECTIVE 2

NOTE:
Inform the students of the enabling learning objective requirements.

<table>
<thead>
<tr>
<th>Action</th>
<th>Repair the mechanical / electrical components of the M17 Decon Apparatus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditions</td>
<td>In a shop environment and a good ventilated area.</td>
</tr>
<tr>
<td>Standard</td>
<td>TM 3-4230-228-10 and TM 3-4230-228-23&amp;P.</td>
</tr>
</tbody>
</table>

1. Learning Step/Activity 1 - Instructor will lead a discussion on the preventive maintenance, operation, troubleshoot and repair of the M17 Decon mechanical and electrical components.

Method of instruction- PE
Instructor to student ratio is- 2:Group
Time of instruction – 4.0
Media – None.

NOTE:

a. The instructor will repeat the training objective and safety precautions to the students. Check shop area to ensure that all necessary training materials, tools, and equipment listed on the heading page are available for the use of the students. The instructor will use 63J1-103, Suppl 2, Instructor Malfuction Guide. Move the students to shop area, divide the class in small groups, issue DA Form 2404 and refer to TM 3-4230-228-10, and have them to perform PMCS.

b. Move the students and equipment outside go over operation safety and put the equipment in to operation. Have students performed inspection; troubleshooting and repair of induced malfunctions and test operate the M17 Decon Apparatus. Failure to make the unit operational will result in remedial training. Students must utilize TM 3-4230-228-10 and TM 3-4230-228-23&P to set-up, troubleshoot, repair and operate the M17. The instructor will monitor students' progress using 63J1-103, Suppl 1, PE, and conduct an informal review during the PE.
a. Operation safety:

(1) Do not depress the reset indicator longer than one second nor make more than one attempt to light the burner before performing troubleshooting.

(2) Depressing the reset indicator opens the solenoid valve allowing fuel to build up inside the burner which could cause and external fire once burner ignites.

(3) While operating in the steam wand mode and squeezing the trigger, if you don’t feel warm water within five seconds or you do not hear the sound of the burner igniting after making three attempts, stop operations and perform troubleshooting IAW TM 3-4230-228-23&P.

(4) Do not repeatedly squeeze the trigger in a pumping up action.

(5) Do not squeeze the trigger more than three times in the attempt to ignite the burner. Both of these actions opens the solenoid valve and allow fuel to build up inside the burner which could cause an external fire once the burner ignites.

(6) Use a drip pan when connecting and disconnecting fuel tank the M17, have a rag available when priming the carburetor to prevent fuel spills.

NOTE: Conduct a check on learning and summarize the learning activity.

SECTION IV. SUMMARY

Method of instruction- CO
Instructor to student ratio: 1:Group
Time of Instruction: 0.1 hours
Media: None

Review/Lesson Summary: For approximately the past five hours we have talked about Maintenance of the M17 Decontamination Apparatus.

NOTE: Make sure you repeat the terminal learning objective of the lesson.
NOTE:
Determine if students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Q. When adjusting the engine speed the dial indicator must be set between?
   A. 4200 and 4400 rpm

Q. What is the output power of the M17 Decon engine (197 cc) when running at 4250 +/- 50 ?
   A. 7.3 hp

Q. When troubleshooting the igniter assembly you must check the input power to the igniter coming from the ECM it should give you a voltage reading of no less than ?
   A. 5 VDC

Transition to Next Class
The next lesson will be I Annex Job Knowledge Test.

SECTION V. STUDENT EVALUATION

Testing
   a. The test will be administered during the lesson 63J1-I04 and 63J1-I05. You (the student) will have three hours to take a written and job performance, hands-on, test on this lesson and other lessons covered in this annex. With references but without assistance you must make at least 70% accuracy on the Job Knowledge Test, 63J1-I04, and 100% accuracy on the Job Performance Test, 63J1-I05.

   b. Refer student to the Evaluation Plan.
Feedback
Requirements:

a. Schedule and provide student feedback on the evaluation and any information to help answer students’ questions about the test.

b. Provide remedial training as needed.

END
PRACTICAL EXERCISE CHECKLIST

COURSE(S): QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER(63J10)

SUBJECT: MAINTAIN M 17 DECONTAMINATION APPARATUS

REFERENCES: TM 3-4230-228-10, TM 3-4230-228-23&P

DIRECTIONS TO THE INSTRUCTOR:

Conduct a detailed review to ensure that each student can accomplish the following performance measures.

_____ 1. Select and use references correctly.

_____ 2. Perform PMCS and record on DA Form 2404.

_____ 3. Identify major components.

_____ 4. Inspect the unit.

_____ 5. Troubleshoot the unit.

_____ 6. Repair the unit.

_____ 7. Test operate the unit.

_____ 8. Complete the task without injury to personnel or damage to the equipment.

INSTRUCTOR COMMENTS:
STUDENT NAMES: ______________________________________________

____________________________________________

____________________________________________

____________________________________________

____________________________________________

____________________________________________

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____________________________________________

ROSTER NUMBER_____________CLASS NUMBER______________

START TIME ______ STOP TIME ______ TOTAL TIME_____

INSTRUCTOR’S ___________________________ DATE ________
SIGNATURE