
TRAINING SUPPORT PACKAGE
FOR

400,000 BTU HEATER



THIS PACKAGE HAS BEEN DEVELOPED FOR: MOS 63J10,
QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER COURSE
PROPONENT 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.
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course have been reviewed by course instructors in coordination with the
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military students from all authorized requesting countries.

TRAINING SUPPORT PACKAGE (TSP)

POI Number**Title:**

091-63J10-981

QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER COURSE

PFN**Number(s)****Title(s):**

63J1-E01

400,000 BTU HEATER

Effective**Date:**TBD

Supersedes**TSP(s):**None

TSP Use:Any accredited Ordnance TASS Battalion and the Army Ordnance Center And School.

Comments**Recommendations:**

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.

PREFACE

Purpose:	
This training support package provides the instructor with a standardized lesson plan and student evaluation for presenting instruction for:	
Lesson number:	63J1-E01
Lesson title:	400,000 BTU HEATER

**This TSP
contains:**

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SECTION I. ADMINISTRATIVE DATA

**All Courses
Including
This Lesson:**

Course Number	Course Title
091-63J10-981	Quartermaster/Chemical Equipment Repairer

**Task(s) Taught
or Supported:**

Task Number	Task Title
091-63J-2067	Correct Malfunction of Fuel System on a Heater
091-63J-2068	Correct Malfunction of Electrical System on a Heater
091-63J-2069	Correct Malfunction of Burner Assembly on a Heater
091-63J-2070	Correct Malfunction of Ignition System on a Heater
091-63J-2071	Perform Preventive Maintenance Checks and Services on a Heater

**Task(s)
Reinforced:**

Task Number	Task Title
None	

**Academic
Hours:**

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

IDT	ADT
<u>HOURS/METHODS</u>	<u>HOURS/METHODS</u>
	1.0/CO
	0.0/D
	3.0/PE1

*Total Hours:	4.0
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**Test
Lesson:**

Testing:	1.0	63J1-E04
	2.0	63J1-E05
Review of test results:	0.0	

Prerequisite**Lesson(s):**

Lesson Number Lesson Title

None

Clearance**and Access:**

UNCLASSIFIED

References:

NUMBER	TITLE	DATE	Par NO.	Add. Info
DA PAM 738-750	Army Maintenance Management System	08/94	All	None
TM 9-4520-251-14	400,000 BTU Heater, Operator through General Support Maintenance	06/93	All	

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:**

400,000 BTU Heater (6 each)

**Materials
Required:**

Instructor materials: 63J1-E01, Suppl 2, Practical Exercise Checklist (PE1)

Student materials: TM 9-4520-251-14, 400,000-BTU Heater, General Mechanic's Tool Kit, 63J1-E01, Suppl 1, Practical Exercise (PE1).

**Training Area
and Range
Requirements:**

One classroom and shop.

**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 400,000 BTU Heater.

Approvals: NAME / RANK/	POSITION/ DATE
Writer _____	
Safety Officer _____	
Annual Reviewer _____	
Annual Reviewer _____	

SECTION II . INTRODUCTION

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

Motivator:

The 400,000-BTU heater is a compact, fully enclosed, self-contained, trailer-mounted, ground-portable, gasoline engine-driven unit. The 400,000-BTU heater is used to heat vehicles, buildings, and field shelters. As we all know, a warm soldier is more effective. As a Quartermaster Repairer, you will be tasked from time to time to ensure the equipment operates to its full capacity. This unit is common to all U.S. Army Units.

During this lesson, given a 400,000 BTU heater, tools and references, soldier will inspect, troubleshoot, repair installed faults and test operate the heater IAW appropriate references.

NOTE:

Provide students with the terminal learning objective.

Terminal Learning Objective: At the completion of this lesson the student will:	
Action:	Repair the 400,000 BTU Heater.
Conditions:	In a classroom/shop environment, given instruction, a 400,000 BTU Heater, references, necessary tools and equipment.
Standards:	IAW TM 9-4520-251-14.

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 a 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-E04 and 63J1-E05 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 400,000 BTU Heater.

SECTION III. PRESENTATION

A. ENABLING LEARNING OBJECTIVE 1

NOTE:

Inform the students of the enabling learning objective requirements.

Action:	Describe the characteristics of the 400,000 BTU Heater.
Conditions:	In a classroom supported by a conference, with references and with assistance.
Standard:	IAW TM 9-4520-251-14.

1. Learning Step/Activity 1 - Instructor will lead a discussion on the purpose and operation of the 400,00 BTU Heater.

Method of instruction- CO

Instructor to student ratio is- 1:Group

Time of instruction – 0.8

Media – None.

NOTE:

Issue students TM 9-4520-251-14. (Description of controls and indicators). Have students follow you through the TM and take notes as you discuss the components.

- a. Purpose. Used to heat vehicles, buildings, and field shelters. As we all know, a warm soldier is more effective. The 400,00 BTU Heater is, as stated earlier, compact, fully enclosed, self-contained, trailer mounted, ground portable, gasoline engine-driven unit.
- b. Inspect and troubleshoot major components.
 - (1) Front half-hood. Open for access to engine, engine primer, drive belt, fuel lines, and fittings.
 - (2) Access door. Opens for access to burner control knob and temperature selector valve.
 - (3) Fan. Provides combustion air and ventilating air.
 - (4) Engine. Gasoline engine to drive fan, fuel pump, and ignition armature.
 - (5) Fuel pump. Pumps gasoline from fuel tank to combustor and engine.

- (6) Gasoline filter. Ensures that only clean fuel is fed to combustor and engine.
- (7) Trailer. Provides mounting for heater assembly and means of transporting heater.
- (8) Fuel tank. Holds supply of gasoline for combustor and engine. Fuel tank holds a maximum of 34.5 gallons.
- (9) Heat exchanger. Fuel burns inside heat exchanger. Fan blows air over exterior of heat exchanger. Heated air is blown out the rough air outlet port.
- j. Exhaust stack. Expels burned gasoline fumes to exterior of heater.
- k. Controls and indicators. Use for putting the heater into operation.
- l. Three 6-inch and two 12-inch hoses. Duct hot air from the heat exchanger to desired location.

NOTE:

Conduct a check on learning and summarize the enabling learning objective.

B. ENABLING LEARNING OBJECTIVE 2

NOTE:

Inform the students of the enabling learning objective requirements.

Action:	Inspect the 400,000 BTU Heater.
Conditions:	In a shop environment, given a 400,000 BTU Heater, references, necessary tools, and equipment.
Standard:	IAW TM 9-4520-251-14.

1. Learning Step/Activity 2 - Instructor will lead in a PE on the inspection and troubleshooting of the 400,000 BTU Heater.

Method of instruction- PE1
 Instructor to student ratio is- 1:6
 Time of instruction – 1.0
 Media – None.

NOTE:

Move students to shop area. The instructor will repeat the objective and safety precautions to the students. The instructor will assist students where needed, ensuring they follow all safety precautions and clarifying any questions or problems they may have.

Assign soldiers to a work station. Inform soldiers to locate the TM for the 400,000 BTU Heater. Have instructor check if manual is correct. Have students inspect equipment using PMCS charts, inspect and troubleshoot the 400,000 BTU Heater. Ensure all students do each task.

Throughout the exercise, 63J1-E01, Practical Exercise Checklist to observe the soldiers performance. Conduct on the spot (informal) review to emphasize a point or to get the soldier back on track when they are not working towards the objective. Have students locate the PMCS section in the manual and allow them to read.

Ensure students know that Daily PMCS is done by the operator and Quarterly PMCS is done at unit level and it is performed IAW guidelines set in the PMCS Chart. Instructor will guide students step by step through preparing DA Form 2404 and performing Daily PMCS.

When all students complete the PMCS and DA Form 2404, inform them if any deficiencies or shortcomings were found that those items must be corrected before putting the equipment into operation and collect all DA Form 2404s.

NOTE:

Conduct a check on learning and summarize the enabling learning objective.

C. ENABLING LEARNING OBJECTIVE 3

NOTE:

Inform the students of the enabling learning objective requirements.

Action:	Repair the 400,000 BTU Heater.
Conditions:	In a shop environment, given a 400,000 BTU Heater, tools and TMDE.
Standard:	IAW TM 9-4520-251-14.

1. Learning Step/Activity 1 - Instructor will lead in a practical exercise on repairing and test operating the 400,000 BTU Heater.

Method of instruction- PE1
Instructor to student ratio is- 1:6
Time of instruction – 2.0
Media – None.

NOTE:

The instructor will repeat the training objective and safety precautions to the students. Check shop area to ensure that all necessary training materials, tools, references and equipment listed in the heading page are available for use by the students. Check equipment to insure faults have been installed.

Divide class into groups and assign groups to a work station. Issue 63J-E01, Suppl 1, Practical Exercise (PE1). Insure students have correct reference to perform inspection, troubleshooting and repair to the 4000,000 heater. When students have completed the task, test operate the heater.

Throughout this exercise, use 63J1-E01 Suppl 2, Practical Exercise Checklist (PE1) to observe student's progress. If students fails to properly maintain, use, or care for the equipment, provide on the spot review to get student back on track. Inform the students of the importance of safety when dealing with live equipment and ensure all students have removed their jewelry.

NOTE:

Allow the students to repair after troubleshooting trace the circuits on their own and assist if necessary. Instructor will ensure all safety precautions are followed at all times.

NOTE:

Conduct a check on learning and summarize the enabling learning objective.

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 4.0 hours we have talked about the 400,000 BTU Heater.

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. What type of fuel does this heater use?

A. Gasoline

Q. What is the fuel pressure requirement?

A. 135 to 150 PSI

Q. What regulates the amount of heat?

A. Temperature control

**Transition to
Next Class:**

The next lesson will be 120,000 BTU Heaters.

SECTION V. STUDENT EVALUATION

Testing:

- a. The test will be administered during the lesson E04 and E05. 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-E04, and 100% accuracy on the Job Performance Test, 63J1-E05.
 - 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

63J1-E01
Suppl 1
Mar 98

SUPPLEMENTAL TRAINING MATERIAL

Practical Exercise

COURSE: QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER (63J10)

SUBJECT: REPAIR 400,000-BTU HEATER

INTRODUCTION:

1. During previous portions of this lesson you were tasked to explain major components, you also had the opportunity to inspect, repair, and troubleshoot the heater.
2. This practical exercise is designed to test your knowledge to troubleshoot, repair/replace components of ignition system of the 400,000-BTU heater.
3. Do not start this exercise until told to do so.

CAUTION: Remember to follow all safety precautions listed in the technical manual.

PERFORMANCE:

1. Select the proper TM.
2. Select the general mechanic's tool kit.
3. Employ all safety precautions.
4. Inspect, troubleshoot, repair/replace ignition system components.
5. Use DA Form 2404 to record all deficiencies found.
6. Notify the instructor when you finish the task.
7. You will explain to instructor what the task was, how it was accomplished, what principles were applied and what your results were.

63J1-E01
Suppl 2
MAR 98

SUPPLEMENTAL TRAINING MATERIAL

Practical Exercise Checklist (PE1)

COURSE: QUARTERMASTER/CHEMICAL EQUIPMENT REPAIRER (63J10)

SUBJECT: 400,000 BTU HEATER

REFERENCES: TM 5-4520-251-14

DIRECTIONS TO THE INSTRUCTOR:

1. Complete this form as the student performs the task. Once the student has correctly performed a step, place a check in the column. After the tasks have been completed, fill out the student data sheet.
2. Ensure that each student participates. Rotate students so that all members of the group use references and tool and perform the hands-on steps of the task. If time permits, repeat task with different members performing different tasks.
3. Ensure that the student completes each performance step IAW applicable references.
4. If a safety violation occurs, stop the student, correct on the spot and restart the group.
5. If a student misses the practical exercise or a team needs remedial training for longer than the PE allows, then conduct the remedial training IAW TRADOC Reg. 350-6, para 3-5(b), pg 3-3.
6. Conduct a detailed review to ensure that each student can accomplish the following performance measures.

____ a. Select and use references correctly

____ b. Perform PMCS correctly

____ c. Inspect the heater correctly

____ d. Troubleshoot the heater correctly

____ e. Repair the heater correctly

____ f. Test the heater correctly

_____g. Perform the task without injury to personnel or damage to the equipment

STUDENT NAMES:_____

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

ROSTER NUMBER:_____ **CLASS NUMBER:** _____

START TIME:_____ **STOP TIME:**_____ **TOTAL TIME:** _____

-

INSTRUCTOR'S _____ **DATE** _____
SIGNATURE