MIL-STD-1407B

17 December 1985

SUPERSEDING

MIL-STD-1407A

16 July 1975

MILITARY STANDARD

HEATERS, VEHICULAR COMPARTMENT; HEATERS, COOLANT, ENGINE;

HEATERS, SPACE; HEATERS, DUCT-TYPE



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DEPARTMENT OF DEFENSE Washington, DC 20301

Heaters, Vehicular Compartment; Heaters, Coolant, Engine; Heaters, Space; Heaters, Duct-Type.

- 10 This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.
- 2. Beneficial comments (recommendations additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Belvoir Research and Development Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

This Military Standard is issued to implement Department of the Army policy specified in AR 700-115 regarding the use of only Standard Family Heaters as described herein for Field Army type application and systems, and to provide a guide to all Department of Defense users for the selection of such Standard Family Heaters. The use of this standard plays a prime role in the Military Standardization Program being carried out by the Department of Defense. The use of heaters listed herein will eliminate item duplication.

This publication includes existing heaters that constitute the Standard Family of Military Heaters and units currently under development which will be added to the Standard Family as they become available. The data sheets give BTUH output and general application characteristics available at this time.

For assistance in the use, installation, and technical data contact:

(a) Heaters, Vehicular Compartment

Commander

U. S. Army Tank - Automotive Command

ATTN: AMSTA-GBM

Warren, MI 48397-5000

(b) Heaters. Coolant. Engine

Commander

U. S. Army Tank - Automotive Command

ATTN: AMSTA-GBM

Warren, MI 48397-5000

(c) Heaters, Space (Nonblower Type)

Commander

U. S. Army Natick Research and Development Center

ATTN: STRNC-ES

Natick. MA 01760-5014

(d) Heaters, Space (Blower Type)

Comnander

U. S. Army Belvoir Research and Development Center

ATTN: STRBE-FES

Fort Belvoir, VA 22060-5606

(e) <u>Heaters</u>, <u>Space</u>, <u>Electric</u>

Commander

U. S. Army Belvoir Research and Development Center

ATTN: STRBE-FES

Fort Belvoir, VA 22060-5606

(f) Heaters, Duct-Type, Portable

Commander

U. S. Army Belvoir Research and Development Center

ATTN: STRBE-FES

Fort Belvoir, VA 22060-5606

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MIL-STD-1407B

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1. SCOPE

- 1.1 <u>Coverage</u>. This standard covers the heating capacity (expressed in British Thermal Units per hour, Btuh) and general application characteristics for heaters with various capacities and operating characteristics. It covers vehicular compartment heaters, engine coolant heaters, space heaters (blower and nonblower types), (fuel and all-electric types), and portable duct-type heaters. These models comprise essentially the complete Standard Family of Military Heaters to satisfy the various requirements. Data sheets of operating and physical characteristics as presently established are presented for each heater. Information is also included on units currently under development which will be added to the Standard Family as they become available.
- 1.2 Method of reference. When available, a National Stock Number is given for each heater listed herein, and it should be used for referencing a particular model. Reference to models without National Stock Numbers should be made by the nomenclature listed. When it has been determined that a special nonfamily item is required, the requirement for the special item with supporting documentation should be processed in accordance with procedures contained in Ar 700-115.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this standard to the extent specified herein.

SPECIFICATIONS

FEDERAL O-A-548 - Antifreeze/Coolant, Engine: Ethylene Glycol, Inhibited, Concentrated. - Inhibitor, Corrosion, Liquid Cooling System. O-I-490 VV-F-800 - Fuel Oil, Diesel. VV-G-1690 - Gasoline, Automotive, Leaded or Unleaded. MILITARY - Gasoline, Automotive, Combat. MIL-G-3056 - Heaters, Coolant, Engine: Multi-Fuel-MIL-H-3177 Burning, 24-Volt DC. MIL-H-3199 - Heaters, Vehicular Compartment 28-Volt, DC. MIL-H-4607 - Heater, Engine and Shelter, Ground, Type H-1. MIL-G-5572 - Gasoline, Aviation: Grades 80/87, 100/130, 115/145. MIL-T-5624 - Turbine Fuel, Aviation, Grades JP-4 and JP-5.

MIL-H-11511	Heater, Space: Multifuel, with Blower, 60,000 Btu/Hr.
MIL-A-11755	- Antifreeze, Arctic-Type.
MIL-H-12340	- Heater, Space, (Yukon, M-1950, with Accessories) .
MIL-H-13514	Heaters, Space, Radiant Type, Portable, 45,000 Btu/Hr.
MIL-H-14516	- Heaters, Space: Oil-Fired 70,000 BTU Per Hour, Theater of Operations Type.
MIL-F-46162	- Fuel, Diesel, Referee Grade.
MIL-H-46792	- Heater, Vehicular Compartment: Multi.fuel Burning 24 Volt, Dc.
MIL-H-52204	Heaters, Space: Multifuel, with Blower, 15,000 Btu/Hr.
MIL-H-52641	 Heater, Electric, 1,500 Watts, 115 Volts, AC, with Fan.
MIL-H-62315	 Heater Assembly, Combustion, Vehicular Compartment , 60,000 BTU/HR.
MIL-T-83133	- Turbine Fuel, Aviation, Kerosene Type, Grade JP-8.

STANDARDS

MILITARY

MS 3102

- Connector, Receptacle, Electric, Box mounting.

(Copies of specifications and drawing required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS

For purposes of this document the following definitions apply.

- $3.1~{
 m Heaters}$, vehicular compartment. A device designed to heat the interior of a vehicle by utilizing the heat from the engine coolant system, or a liquid fuel type burner.
- 3.2 <u>Heaters, coolant, engine</u>. A heater designed to burn fuel or to utilize electric power to apply heat through direct connection to the engine coolant system to facilitate starting in low temperatures; may also supply heated coolant to heat exchanger.
- 3.3 <u>Heaters, space</u>. A device designed to burn various types of fuel within an enclosure which protects and confines the fire. It is used for the purpose of raising the temperature of the air in its immediate vicinity.

- 3.4 Heater, space, electric. A device having a heating element which, when connected to an electrical source, directly imparts heat.
- 3.5 Heater, duct type, portable. A heater equipped with integral connections for attaching flexible ducts to direct heat to equipment or spaces such as engine surfaces, railroad cars, warehouses, and tents. It is equipped with a blower, and must be mounted on skids or wheels, or be capable of being hand carried.

3.6 Abbreviations.

Btuh

- British Thermal Units per Hour - Heat required to produce a temperature rise of 1° F in 1 pound of water in 1 hour.

- (Hertz) Frequency of electrical power in

cycles per second.

- Cubic feet of airflow per minute.

- Gallons per hour.

- Pounds.

- Pounds per square inch gage.

- Gallons per minute.

Hz

cfm gal/hr <u>lbs</u>

psiq apm

4. GENERAL REQUIREMENTS

(Not applicable.)

- 5. DETAIL REQUIREMENTS
- 5.1 Data sheets. Data sheets containing detailed output and general application characteristics, and an outline sketch and photograph, when available, are included herein for each model heater (see Index).

Custodians:

Army - ME Navy - MC

Air Force - 84

Preparing activity: Army - ME

Project 4520-0274

Review activities:

Army - AT, ER

DLA - CS

User activity:

Army - MI

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NSN 4520-01-081-0773 Gasoline Burning 400,000 Btuh	38

Nomenclature: Heater, Vehicular Compartment: Multifuel-

Burning, 24 Volt DC, 30,000 Btuh.

Capacity

Heat Output Btuh

Nominal 30,000 Minimum at high setting 27,000 Low setting 15,000

Air Discharge Rate cfm

Minimum O-inch water 115 static pressure

Minimum with 0.75-inch water 80

static pressure

Power Requirements

Voltage nominal 24 dc
Voltage range 19-30
Current Maximum 20
Start (amps)

Current Maximum 8

Run (amps)

Frequency Direct Current

Operating Weight Max, lbs 21

Fuel Consumption lbs/min

High setting 0.049 Low setting 0.031

Fuels:

Diesel fuel per VV-F-800

specification

Gasoline per specification VV-G-1690, MIL-G-3056

Jet fuel per specification MIL-T-5624

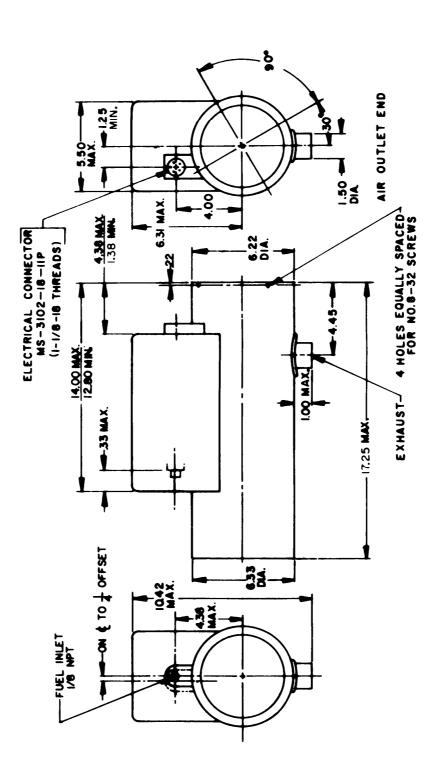
Control, when specified: Manual start and stop, manual cycling from

high to low setting.

National Stock Number: 2540-00-113-4180

Line Item Number:





All dimensions in inches; unless otherwise specified tolerances are $\angle 1.030$ inches, $\angle 1/2^{\circ}$ on angles. NOTE:

HEATER, MULTIFUEL, 30,000 BTU/HR; DIMENSIONS

2

FIGURE

7

Nomenclature:	Heater, Vehicular Compartment, Multifuel, 60,000 Btuh, Single Air and Dual Air
Heat Output (Btuh) Nominal Minimum at high setting Low setting	60,000 57,000 30,000
Air Discharge Rate (cfm), minimum, with water static pressure of O inches 1.3 inch	200 150
Power Requirements Voltage (volts) Nominal Range	24 19-30
Current Max. (Amperes) Start Run	16 15
Operating wt., approx., (lbs)	35
Fuel Consumption, Max. lbs/min High setting Low setting	0.092 0.052
Fuels per specification Diesel	VV-F-800
Control Start and stop Setting changes	Manual Manual
National Stock Number Dual Air Single Air	2540-01-169-5159 2540-01-162-3834 2540-01-083-0691 2540-00-930-8938
Procurement Specification Dual Air Single Air	MIL-H-62315

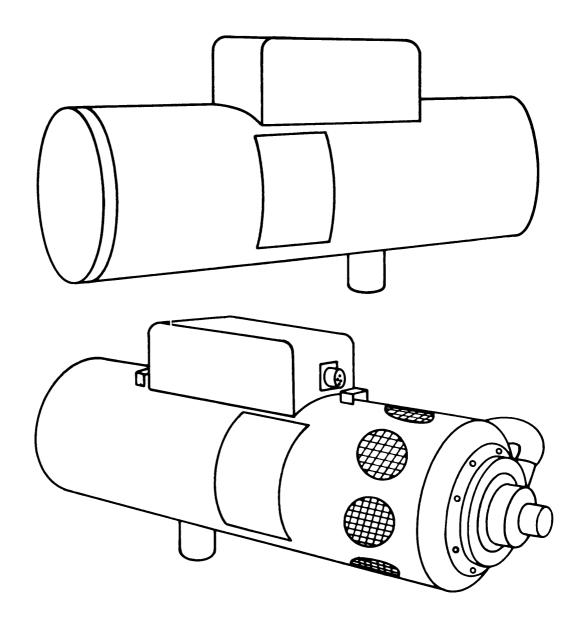


FIGURE 3. Stewart-Warner model 10560C, single air heater, NSN 2540-01-083-0691.

X-4439

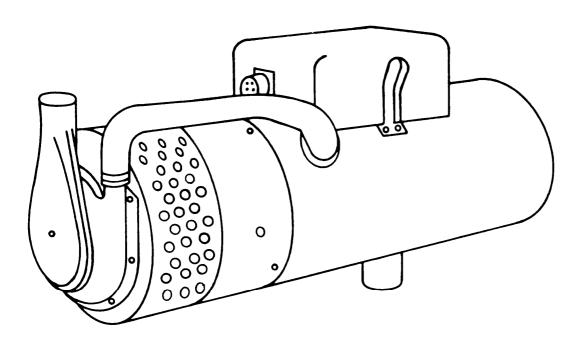


FIGURE 4. Stewart-Warner, dual air heater, model
No. 10560M24BI, NSN 2540-01-169-5159
and model No. 10560M24,
NSN 2540-01-071-0651.

X-4440

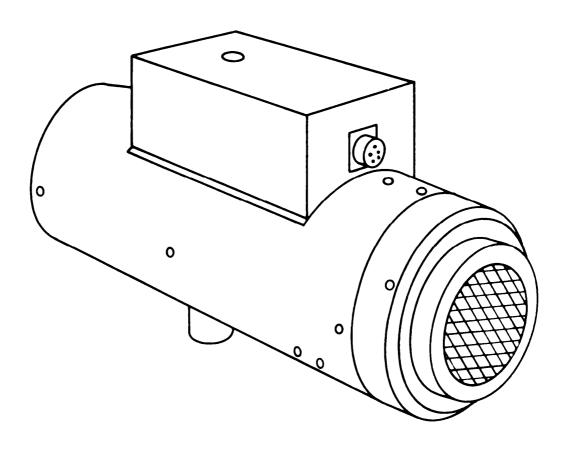


FIGURE 5. Hupp model No. MF-510A, single air heater,

NSN 2540-00-930-8938.

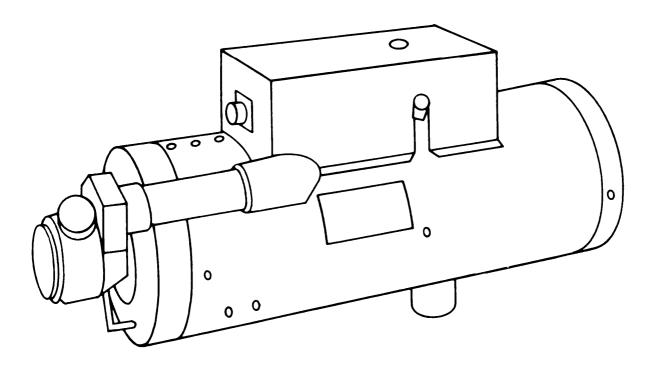


FIGURE 6. Hupp dual air heater, model No. MF510C,

NSN 2540-01-162-3834 and No. MF510B,

NSN 2540-01-071-0652.

X-4442

Heater, Vehicular Compartment: 24 Volt DC Nomenclature:

(Liquid Coolant Operated, Personnel) 20,000

Btuh.

Capacity

Heat Output Btuh

20,000 Nominal Minimum $w/1.6 H_20$ 12,000

static pressure

Air Discharge Rate cfm

150 Minimum O-inch water static pressure

75 Minimum 1.6-inch water

static pressure

Power Requirements

24 Voltage nominal

20-28.5 Voltage range

Frequency Direct Current

Water and antifreeze compound conforming to Coolants 0-A-548, or water and corrosion inhibitor compound conforming to 0-I-490, or arcticantifreeze compound conforming to MIL-A-11755.

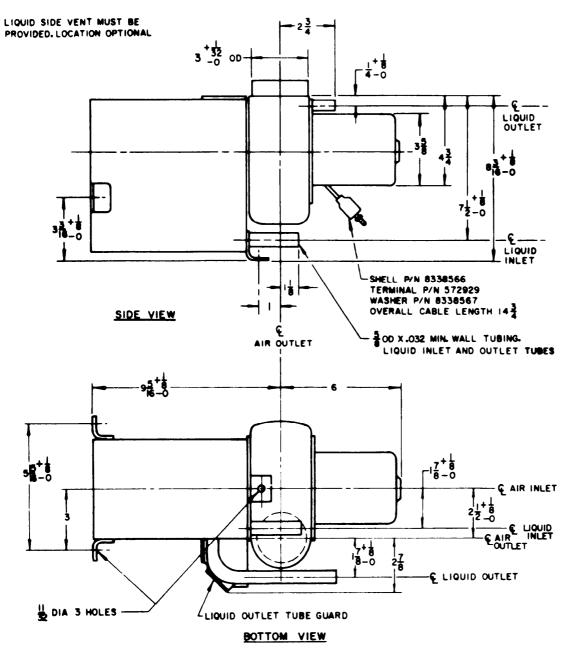
Control, when specified: Manual start and stop, with automatic

operation if suitable thermostat is installed.

2540-00-869-0424 National Stock Number:

Line Item Number:

MIL-H-3199 Specification:



MOTES:

- 1. THIS HEATER SHALL COMFORM TO TYPE II, CAPACITY "A" OF MIL-H-3199.
- 2. DIMENSIONS ARE IN INCHES, MAXIMUM, UNLESS OTHERWISE SPECIFIED.

FIGURE 7. HEATER, LIQUID COOLANT OPERATED, 20,000 BTU/HR; DIMENSIONS

Nomenclature: Heater, Vehicular Compartment: 24 Volt DC

(Liquid Coolant Operated, Personnel) 30,000

Btuh.

Capacity

Heat Output Btuh

 $\begin{array}{lll} \mbox{Nominal} & 28,000 \\ \mbox{Minimum w/1.6 } \mbox{H}_{\tiny 2}\mbox{O} & 15,000 \\ \end{array}$

static pressure

Air Discharge Rate cfm

Minimum 0-inch water 150

static pressure
Minimum 1.6-inch water 75

static pressure

Power Requirements

Voltage nominal 24 Voltage range 20-28.5

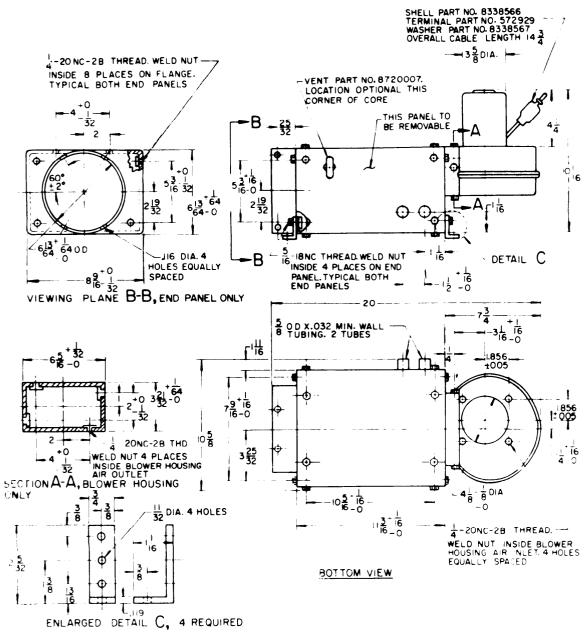
Frequency Direct Current

Coolants Water and antifreeze compound conforming to

0-A-548, or water and corrosion inhibitor compound conforming to 0-I-490, or arcticantifreeze compound conforming to MIL-A-11755.

National Stock Number: 2540-00-202-8591

Line Item Number:



NUILS:

- 1. THIS HEATER SHALL CONFORM TO TYPE II, CAPACITY B OF MIL-H-3199
 2. BASID ASSEMBLY IS SHOWN, HEATER MAY BE ADAPTED TO VARIOUS CONFIDERATIONS BY HEARMANGING OR INTERCHANGING END PANELS OR BLOWER HOUSING ATTACHMENT.
 3. INTERNALLY MOUNTED WELD NOTS ARE TO BE USED FOR ALL FASTENERS. SIZE IS OPTIONAL UNLESS.
- OTHERWISE SPECIFIED.

 4. DIMENSIONS ARE IN INCHES, MAXIMUM, UNLESS OTHERWISE SPECIFIED.

HEATER, LIQUID COOLANT OPERATED, 30,000 BTU/HR; **DIMENSIONS** X-2777

Nomenclature: Heaters, Coolant, Engine: Multifuel Burning,

24 Volt DC, 15,000 Btuh (MIL-H-3177).

Capacity

Heat Output Btuh

Nominal 15,000 Minimum 13,500

Coolant-Pump Characteristics

Discharge pressure, psig 1.75
Flow minimum, gpm 0.25

Power Requirements

Voltage nominal 24

Frequency Direct Current

Maximum Dimensions, Inches

Height 11
Width 7
Length 15
Weight, lbs 25

Fuel Consumption approx,

gal/hr

Fuels: Conforming to:

Diesel fuel VV-F-800, Grades DF-A, DF-1

Gasoline VV-G-1690, MIL-G-3056

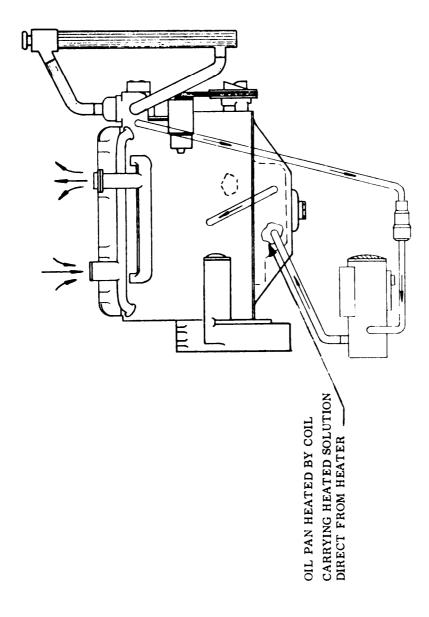
Turbine fuel, aviation MIL-T-5624, Grades JP-4 and JP-5.

0.3

National Stock Number: 2990-00-927-4254

Line Item Number:





Nomenclature: Heater, Coolant, Engine: Multifuel Burning,

24 Volt DC, 30,000 Btuh.

Capacity

Heat Output Btuh

Nominal 30,000 Minimum 27,000

Coolant Pump Characteristics

Discharge pressure, psig 3050 Flow minimum, gpm 0.50

Power Requirements

Voltage nominal 24

Frequency Direct Current

Maximum Dimensions, Inches

Height 11
Width 7
Length 20
Weight, lbs 35

Fuel Consumption, gal/hr 0.6

Fuels: Conforming to:

Diesel fuel VV-F-800, Grades DF-A, DF-1

Gasoline VV-G-1690, MIL-G-3056

Turbine fuel, aviation MIL-T-5624, Grades JP-4 and JP-5.

National Stock Number: 2990-00-135-6427

Line Item Number:

Nomenclature: Heater, Space, Multifuel, with Blower, 15,000

Btuh.

Capacity

Minimum Output 15,000

Air Discharge Rate, cfm

Minimum 0.2 inch water 115

static pressure

Minimum 0.35 inch water 100

static pressure

Power Requirements

 Type
 I
 II
 Iv

 Voltage
 120
 120
 28

 Frequency
 60
 400
 dc

Phase 1

Operating Weight, lbs 40

Fuel Consumption, gal/hr .25

Fuels: Conforming to:

Gasoline VV-G-1690, MIL-G-3056, any other up to 100

octane.

Diesel Fuel VV-F-800, Grades DF-1, DF-2 and DF-A.

Control Manual start, automatic cycling.

National Stock Number:

Type I 4520-01-010-0316 Type 11 4520-00-709-9223 Type IV 4520-00-357-0518

Line Item Number:

Type I Not assigned.
Type II Not assigned.
Type IV Not assigned.

Specification: MIL-H-52204.

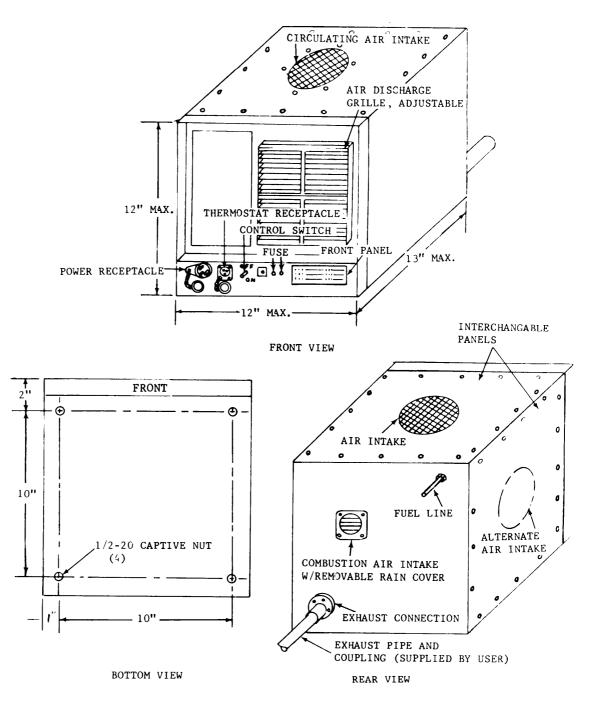


FIGURE 10. . HEATER, SPACE, MULTIFUEL, 15,000 BTU/HR; DIMENSIONS

X-2780

Nomenclature: Heater, Space, Multifuel, with Blower, 60,000

Btuh.

Capacity

Heat Output Btuh

Minimum 60,000

Air Discharge Rate, cfm

Minimum at 0.2 inch water 500

static pressure

Minimum at 0.35 inch water 425

static pressure

Power Requirements

Type I II
Voltage 120 208
Frequency 50/60 400
Phase 1 3

Operating Weight, lbs 130

Fuel Consumption, gal/hr 175

Fuels: Conforming to:

Gasoline WV-G-1690, MIL-G-3056, any other up to 100

octane.

Diesel Fuel VV-F-800, Grades DF-1, DF-2 and DF-A.

Control Manual start, automatic cycling

National Stock Number:

Type I 4520-00-683-8595
Type II Not assigned.

Line Item Number:

Type I K26301

Type II Not assigned.

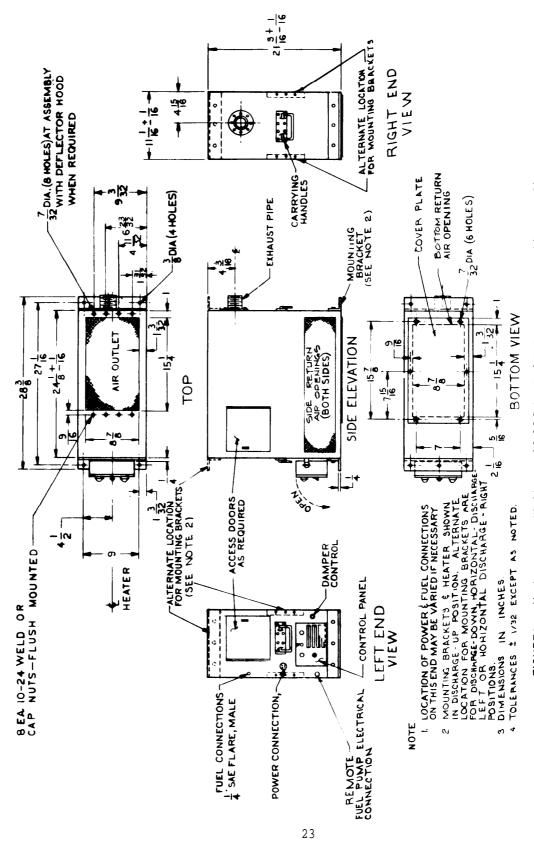
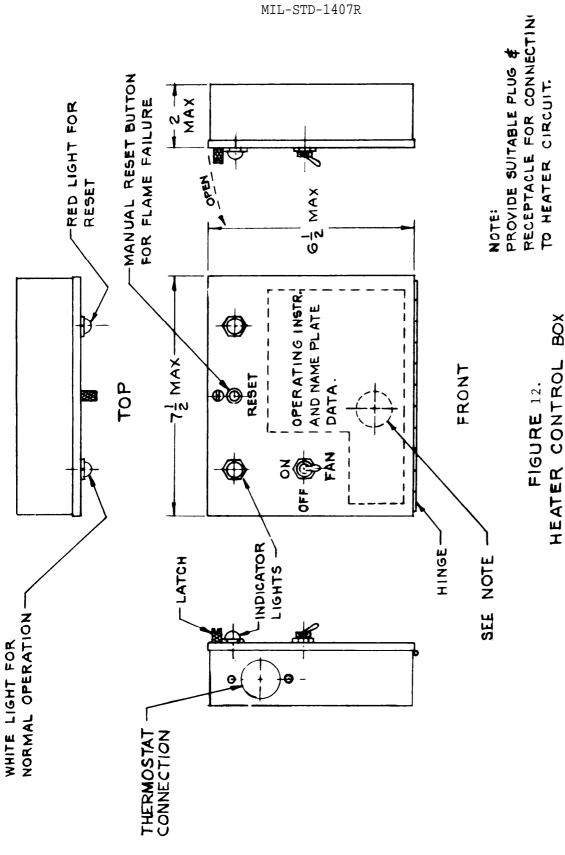


FIGURE11. Heater, space, with blower, 60,000 btu/hr (discharge up position) (see note 2).

X-1028C

X-2210



24

Nomenclature: Heater, Space, Electric with Blower, 5,000

Btuh.

Capacity

Heat Output Btuh

Minimum 5,000

Air Discharge Rate, cfm

Minimum at 0-inch water 92

static pressure

Power Requirements

Voltage 115
Frequency 60
Phase 1
Watts 1500

Operating Weight, lbs 25

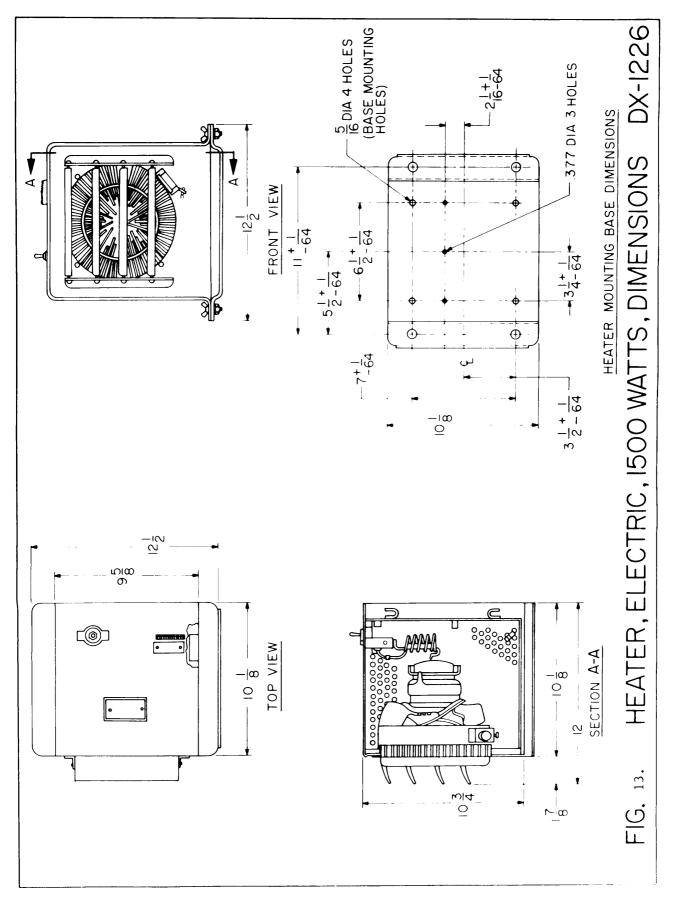
Control Manual start-stop, switch adjustable

thermostat regulation. Permits fan operation

without heating.

National Stock Number: 4520-00-177-6198

Line Item Number:



Nomenclature: Heater, Space, Radiant Type, Portable,

Nonblower, 45,000 Btuh (M-1941).

Capacity

Heat Output Btuh 45,000

Fuel

Type I Coal or solid fuel burning.

Type II Oil burning.

Fuel Consumption

Type I 1/4 ton coal per week. Type II 2/3 gallon per hour.

Fuels

Type I Coal and other solid fuels.

Type 11 Diesel, conforming to VV-F-800, Grade DF-2 or

lighter; jet fuel or gasoline, any grade.

Operating Weight, lbs 44

Heat Output Control

Type I Manual, by setting of stack-damper and ash

door and by manipulation of unburned fuel and

fire.

Type II Manual, by float valve.

National Stock Number:

Type I 4520-00-257-4877
Type II 4520-00-927-4214

Line Item Number:

Type I K25890
Type II K25943



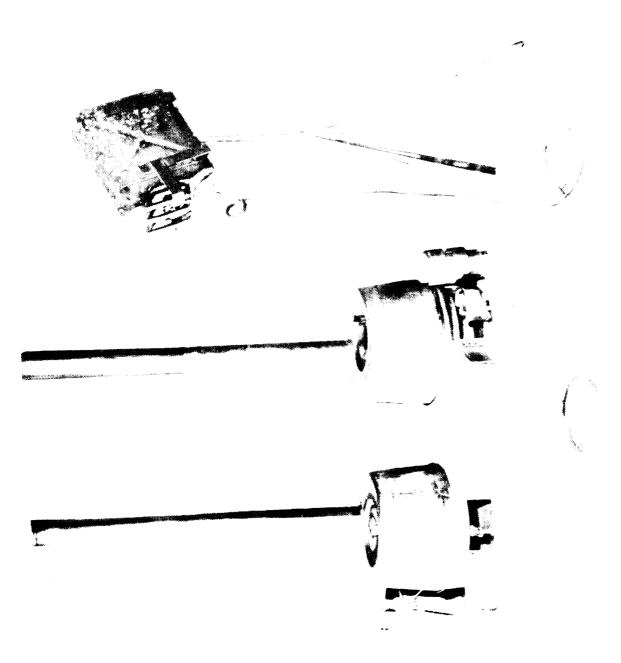
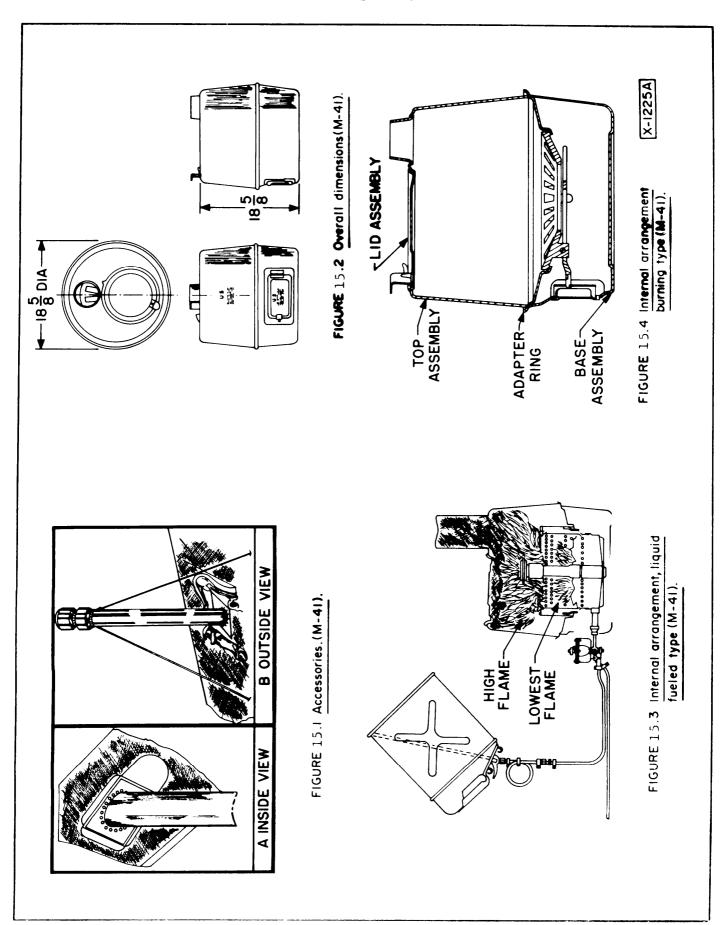


FIGURE 14. Heater, radiant type, portable, 45,000 btu/hr (M-1941).



Nomenclature: Heater, Space, Radiant Type, portable,

Nonblower, 60,000 Btuh (Yukon).

Capacity

Heat Output Btuh 60,000

Fuel Consumption, gal/hr 0.625

Fuels Normally gasoline, but provision made for

solid fuel to be used when necessary.

Weight (Packed), lbs 33

Size: Height with diverter 106 inches Height stovetop, 16 inches

assembled.

Length, assembled 30 inches

with stack.

Width, assembled. 10 inches

Control Drip valve with sight glass.

National Stock Number: 4520-00-287-3353

Line Item Number: K26275

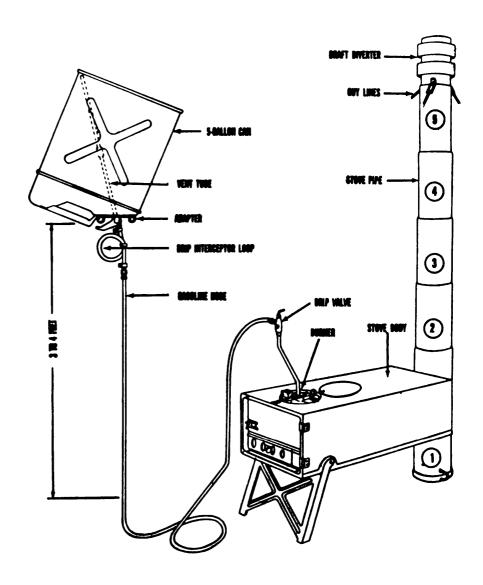


FIGURE 16. INSTALLATION SETUP OF YUKON STOVE

X-2782

Nomenclature Heater, Space, Fuel Oil, Floor Installation,

Nonblower, 70,000 Btuh (Barracks Heater).

Capacity

Heat Output Btuh 70,000

Fuel Consumption, gal/hr 3/4

Fuels Diesel, Grades DF-A, DF-1, and DF-2, conforming

to VV-F-800.

Weight, lbs 87

Control Manual, float type fuel valve.

National Stock Number: 4520-00-540-0557

4520-00-540-0557, with fan and smoke stack.

Line Item Number: K26164

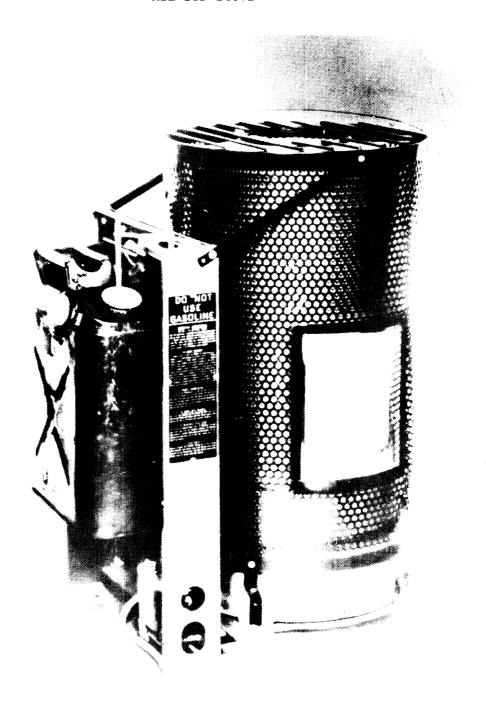
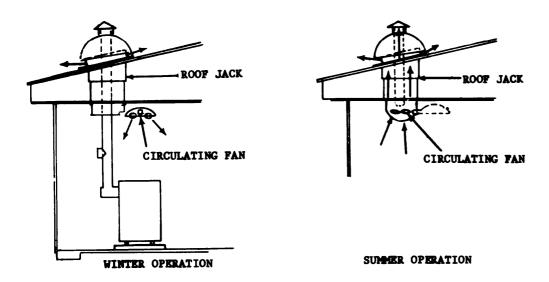


FIGURE 17. Heater, space, oil-fired, 70,000 btu/hr (barracks heater).

X-2783B



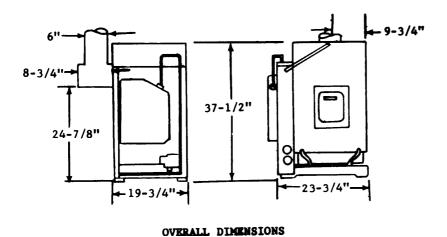


FIGURE 18. Heater, space; oil-fired, 70,000 btu/hr; dimensions and accessories (barracks heater).

X-2784B

Nomenclature: Heater, Duct-Type, Portable, Multifuel,

Self-powered, 250,000 Btuh, Wheel-Mounted.

Capacity

Heat Output Btuh

Minimum 250,000 at 0" F outdoor temperature

Air Discharge, cfm

Minimum 1-inch water 1300 to 1900

static pressure

Power Source Integral turbine engine

Operating Weight, lbs 650

Size: Width 40 inches
Height 58 inches
Length 65 inches

Fuel Consumption, gal/hr 3.25

Fuels Gasoline, DF-1, DF-2, DF-A, JP-4, JP-5,

Kerosene.

Control Manual start, automatic cycling.

National Stock Number Not assigned, under development.

Line Item Number: Z32890

Specification: Not assigned, under development.

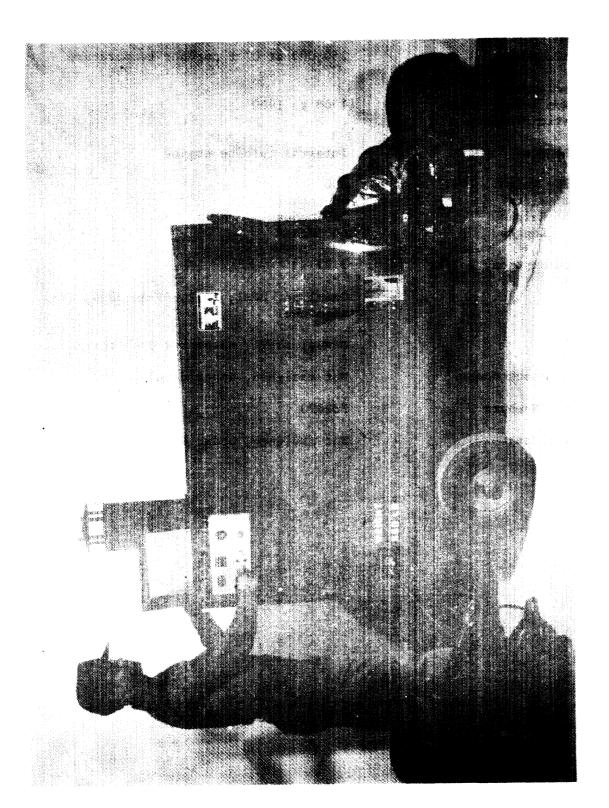


FIGURE 19. Heater, duct type, portable, multifuel, self-powered,

X-4107A

250,000 BTUH, wheel-mounted

Nomenclature: Heater, Duct-Type, Portable, 400,000 Btuh.

Capacity

Heat Output Btuh

Minimum 400,000 at (-) 65° F.

Air Discharge, cfm 1100 to 1500

Prime Mover:

Class 1 Equipped with a commercial gasoline engine.
Class 2 Equipped with an electric motor, 208/220

volt, 3 phase, 60 Hertz.

Class 3 Equipped with a military standard gasoline

engine 1-1/2 hp., Model No. 1A08-III.

Class 4 Equipped with a commercial diesel engine.

Conforming to:

Dry Weight, lbs 675 for class 1, 2, or 3 heaters.

800 for class 4 heaters.

VV-G-1690, MIL-G-3056, MIL-G-5572

VV-F-800, Grades DF-1, DF-2 and DF-A.

MIL-T-5624, Grades JP-4 and JP-5, MIL-T-83133,

Fuels:

For classes 1,2, and 3 only

Gasoline

For class 4 only

Diesel fuel

Turbine Fuel

Grade JP-8.

Fuel Consumption, gal/hr

Control Manual start, automatic control of air

discharge temperature.

National Stock Number: 4520-00-203-0224

Army Line Item Number: K24931



Figure 20. Heater, duct type, portable, 400,000 Btuh.

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