



UNITED STATES MARINE CORPS  
2D MARINE AIRCRAFT WING  
II MARINE EXPEDITIONARY FORCE  
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AGSD

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WING ORDER 11320.1

From: Commanding General, 2D Marine Aircraft Wing  
To: Distribution List

Subj: FIRE PROTECTION DURING FIELD EXERCISES

Ref: (a) NAVAIR 00-80R-14  
(b) MCWP 3-21.1

Encl: (1) Fires  
(2) Fire Prevention and Protection  
(3) Portable Fire Extinguishers  
(4) Encampment Layout  
(5) Camp Layout  
(6) Dining Facility Layout  
(7) Kerosene Heater  
(8) Kerosene Heater Diagram  
(9) Space Heater Arctic  
(10) Space Heater Arctic Diagram  
(11) Fire Prevention Regulations  
(12) Fire Bill

1. Situation. This Order provides a basic source of information to assist 2d Marine Aircraft Wing (2d MAW) personnel at all echelons of command, in carrying out their responsibilities for implementing an aggressive and disciplined fire protection program. The fire prevention practices and other criteria contained in enclosures (1) through (12) are minimum requirements. Commanders will issue supplementary instruction and directives covering specific problems which are particular to each field exercise. Fire prevention and protection must be considered in relating to preventing, detecting, controlling, and extinguishing fires to prevent loss of life, and minimize injury to personnel and damage to property.

2. Mission. To provide guidance to 2d MAW organizations and Camp Commandants in planning and executing field fire protection

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and prevention programs.

### 3. Execution

#### a. Commander's Intent and Concept of Operations

(1) Commander's Intent. Fundamental objectives of the 2d MAW Fire Protection Programs are to prevent loss of life, injury to personnel, damage to government property, and to provide cost effective fire prevention and protection services. Fires can be minimized or prevented by detecting, identifying, and eliminating hazardous procedures, operations, and conditions.

(2) Concept of Operations. A planned fire prevention and protection program will be established at each camp site, and will conform to the following principles:

(a) Pre-deployment planning will include effective fire protection measures.

(b) Pre-deployment planning must be formulated to provide measures which afford increased protection to life, material, equipment, and facilities.

(c) Pre-deployment planning must also be consistent with the mission, as well as sound engineering and economic principles.

b. Subordinate Element Missions. Camp Commanders shall ensure compliance with the fire prevention and protection measures outlined in this Order when deployed in a field environment.

c. Coordinating Instructions. Fire protection inspections of camp facilities, adjacent areas, and fire protection equipment shall be conducted. To achieve and enforce these goals and programs, a base/tent camp Fire Marshal (s), Military Occupational Specialty 7002 Officer or 7051 Staff Non-commissioned Officer, shall be designated.

4. Administration and Logistics. Recommendations concerning the contents of this Order are invited. Such recommendations will be forwarded to the Commanding General, 2d MAW (Attn: AC/S, AGSD) via the appropriate chain of command.

### 5. Command and Signal

a. Command. This Order applies to all organizations/units attached or assigned to 2d MAW.

b. Signal. This Order is effective on the date signed.



J. L. PARKER  
Chief of Staff

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## FIRES

1. General. To provide adequate fire protection in a field environment, a good understanding is needed of what occurs when a substance burns. The purpose of this enclosure is to explain fire chemistry, classification, and extinguishing methods.

2. Definition of Fire. Fire is the rapid oxidation of a fuel accompanied by a release of energy in the form of heat and light.

3. Chemistry of Fire. Fire burns in two basic modes.

a. Smoldering Mode. This is when a fire has just begun and is not yet growing in size or intensity. Five elements are necessary for combustion to occur.

- (1) Fuel
- (2) Oxygen
- (3) Heat (ignition source)
- (4) Chemical Chain Reaction

b. Free Burning mode. The increase in temperature causes additional oxygen to be drawn into the flame area. Due to the temperature increase, the fuel (combustible material) begins to break down, giving off flammable vapors that combine with oxygen and burn. This is known as a chemical reaction which is the fourth element needed to support combustion.

4. Classification of a fire. There are five classifications of fires. The classification of a fire is determined by the type of fuel being burned.

a. Class A fires are defined as fires involving solids, such as wood, wood products, cloth, textile, fibrous materials, paper and paper products, or anything that leaves an ash.

b. Class B fires are defined as fires involving flammable liquids such as gasoline, oils, grease, kerosene, alcohol, and paint.

c. Class C fires are defined as fires involving electrical equipment where the

electrical non-conductivity of the extinguishing media is of primary importance.

d. Class D fires are defined as fires involving combustible metals such as magnesium, titanium, sodium, and potassium. Magnesium is found in the Meal Ready to Eat individual ration heaters.

e. Class K fires are defined as fires involving cooking oils and fats.

## 5. Methods to Extinguish Fires

a. The most widely used method of fire extinguishment is cooling and/or quenching. Temperature control involves the absorbing of heat which cools the fuel to a point where it ceases to release enough vapors to maintain a flammable mixture. Heat is carried away from a fire by radiation, conduction, and convection, as well as being absorbed by a cooling agent. Of all the extinguishing agents, water absorbs more heat per volume than any other agent. Deep-seated fires sometimes require penetration by the extinguishing agent for adequate cooling and quenching.

b. The removal of fuel to extinguish a fire is effective, although not always practical or possible. Natural gas fires can be extinguished by turning off the fuel supply. A fire in a space heater can be extinguished in the same manner.

c. The "smothering" or "blanketing" process extinguishes fires by separating the oxygen from the other essentials that make a fire. A common example of this method is extinguishing a grease fire in a frying pan by placing the cover on the pan. Smothering is generally an easy method for extinguishing fire; however, all fires cannot be extinguished by smothering. For example, plastics such as cellulose nitrate and metal such as titanium cannot be extinguished by smothering. In these cases, a class "D" extinguisher is used and creates a crust that encapsulates the fire until the fire finishes burning.

d. The inhibition of chain reaction is another concept of extinguishing fires. Much research is being done which may result in a new and better method of fire extinguishing. Specifically, extinguishing agents that absorb or combine with electrically charged atoms tend to slow the chemical action of the fire and therefore reduce the heat generated, which could result in the fire being extinguished.

FIRE PREVENTION AND PROTECTION

1. Responsibilities. Camp Commandants are responsible for establishing effective fire prevention and protection programs. Commanders at all echelons will actively participate in the host activity's Fire Protection Program by ensuring appropriate fire protection standards are disseminated and complied with. Prior to deploying, the Camp Commandant should insure all personnel are trained in the use of fire extinguishers and tent heaters, if applicable, while in garrison. If this is not achieved, personnel should receive this training, when practical, upon deploying to the field. While in garrison, classes on fire extinguishers can be arranged by contacting the base/air station's Fire Department or Aircraft Rescue and Firefighting units.

2. Fire Prevention. While deployed, fire prevention regulations will be published and posted in all occupied structures (tent/Quonset hut/building/ect.). As part of the Fire Prevention Program, a class on these fire prevention regulations will be conducted, as soon as possible but no later than 72 hours, following establishment of these regulations at the deployment site. Fire prevention regulations may vary with each deployment, however, all fire prevention regulations shall include the measures contained in enclosure (11).

3. Fire Protection Program.

a. Structures (tent/Southeast Asia (SEA) hut/ect.) used as living quarters, administrative offices, and communication centers will have a minimum of one Class A/B/C fire extinguisher.

b. Dining facilities will have the following types of fire extinguishers:

(1) Dining area(s) - Class A extinguishers (minimum of one each for every 75 feet).

(2) Galley area (s) - Multipurpose extinguishers (Class A, B, C).

(3) Store Room (s), office (s), bake shop (s), and burner shack (s) - Multipurpose extinguishers.

c. Multipurpose dry chemical extinguishers (minimum thirty pound) shall be placed in billeting fire lanes every 100 feet

Marking these extinguishers (with chemlights, ect.) during the hours of darkness is recommended.

d. Commanders will provide fire watches for each bivouac and storage area to assist the Fire Marshal with implementing and enforcing fire prevention measures. Fire watches and security assignments may be combined.

e. Field expedient fire alarms will be installed near each multipurpose extinguisher point and constructed to produce a loud sound. Examples include the following:

(1) Hand crank siren.

(2) Steel rod triangle. A steel rod triangle is a steel rod about five feet long shaped into a triangle. An additional rod about 29 inches long is attached by rope or string to be used as a striker. Both of which hang on an inverted L shaped frame.

(3) Can, drum, or rim. A five-gallon can with one end removed, the end quarter of a 55-gallon drum, or an old wheel rim work well in place of the steel rod triangle.

f. When available electrical or hand crank sirens should be installed in Petroleum, Oil, and Lubricant storage areas, and ammunition and warehouse yard areas.

g. The deployed unit's Communication Officer, will establish and maintain reliable channels of communication with the local Fire Department/Aircraft Rescue and Fire Fighting detachment (when available) for the purpose of reporting a fire.

h. Prior to distribution, all extinguishers will be checked to ensure operational integrity. Purple K Powder-type extinguishers should be given special consideration. Ensure contents are not solidified.

PORTABLE FIRE EXTINGUISHERS

1. Principles for Extinguishing Fires. Many fires are small in origin and may be extinguished by the use of proper portable fire extinguishers. Fire extinguishers represent an important segment of any fire protection program. However, their successful functioning depends upon the following conditions:

- a. The Extinguisher is properly located and in good working order.
- b. The extinguisher is the proper type for the fire.
- c. The fire is discovered while still small enough for the fire extinguisher to be effective.
- d. Personnel are trained on extinguisher selection and use.

2. Principles for Selecting Extinguishers. Selecting the best portable fire extinguisher for a situation depends on:

- a. The nature of the combustible material which might be ignited.
- b. The potential severity of the fire.
- c. The effectiveness on the type of fire hazard.
- d. The ease of use.
- e. The personnel available to operate the extinguisher and their physical abilities and emotional reaction as influenced by their training.
- f. The ambient temperature condition and other special atmospheric considerations, i.e., wind, draft, and presence of fumes.
- g. The upkeep and maintenance conditions.
- h. Suitability for environment. Plain water extinguishers should be protected against temperatures below 40 degrees Fahrenheit with calcium chloride. Do not use calcium chloride solutions in stainless steel extinguishers.

3. Health and Safety Conditions Affecting Selection. When selecting an extinguisher, consider the health and safety

hazards as described in the following paragraphs involved in its maintenance and use.

a. Prominent caution labels on the extinguishers are necessary for the identifying types and uses. Warning signs at entry points to confined spaces should indicate alternate exit routes, if available. The provision for remote application of extinguishing agents should be considered for areas not easily accessible (extra long range extinguisher nozzles are an example). To minimize hazards in remote/confined areas, special ventilation, breathing apparatuses, personal protective equipment, and adequate training of personnel are measures that must be considered.

b. Bromochloridefluoromethane (Halon 1211) extinguishers contain a liquid extinguishing agent that turns to vapor at normal atmospheric pressure. These vapors as well as the decomposition products produced when applied to a fire can be very dangerous. When using extinguishers in unventilated places personnel should avoid breathing gases produced by thermal decomposition of the agent. Misuse or excessive discharge of Halon 1211 for one to five minutes can lead to unconsciousness or death due to the heart becoming abnormally sensitive to elevated adrenaline levels. Halon 1211 is no longer being produced and may not be authorized in certain states or counties.

c. Carbon dioxide extinguishers contain an extinguishing agent which will not support life when used in sufficient concentration to extinguish a fire. The use of this type of extinguisher in an unventilated space can deplete the oxygen supply. Prolonged occupancy of such spaces can result in loss of consciousness due to oxygen deficiency.

d. Conductive agents (i.e., water, Aqueous Film Forming Foam, wetting agents, and carbon dioxide extinguishers having a metal horn) should not be used for Class C fires (energized electrical equipment) until the electrical equipment is de-energized to prevent a shock hazard. Prior training can assist personnel in choosing agents to combat fires and the resulting effects.

e. Dry chemical extinguishers, when used in small unventilated areas, may reduce visibility for a period of up to several minutes. A dry chemical discharge may also clog filters in air systems and deplete the oxygen supply.

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f. Most fires produce toxic byproducts of decomposition and some burning products produce highly toxic gasses. Fire may also consume available oxygen or produce dangerously high exposure to convection or radiant heat. All of these may affect how a fire can be safely approached with extinguishers.

#### 4. Recommended Fire Extinguishers for Field Exercises

a. The water, dry chemical, and carbon dioxide (ABC) dry chemical extinguisher is the recommended fire extinguisher for field use because of its ability to extinguish Class A/B/C fires. These extinguishers are available through open purchase through supply sources such as L N Curtis or Fisher Scientific. The capacity for fire extinguishers is 10, 20 and 30 pounds.

b. The following extinguishers are suitable substitutes:

<u>Class of fire</u>	<u>Type of extinguisher</u>
A	Water
B	Dry Chemical (PKP)
C	Carbon Dioxide (cannot be recharged in a field environment)
A/B/C	Halon 1211

ENCAMPMENT LAYOUT

1. General. Though the physical layout of a base/tent camp is primarily dictated by the mission, fire safety must also be a factor to consider when planning the encampment layout.

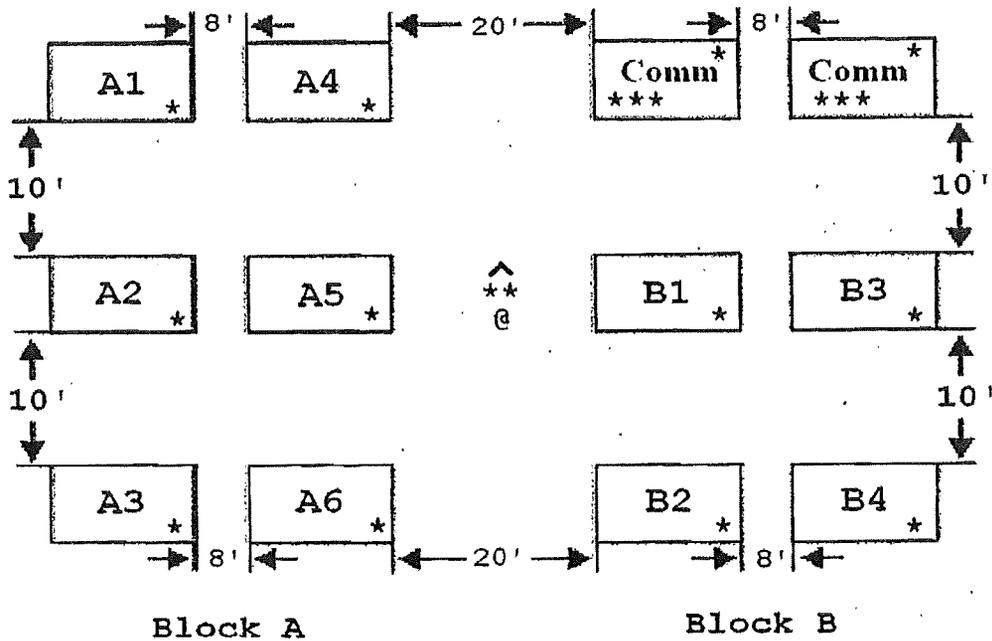
Enclosures (5) and (6) are typical camp and dining facility layout plans showing the minimum fire protection and structure spacing (i.e., tent/SEA hut/ect.)

2. Camp Layout. The plan for layout of tent camps must begin at the earliest possible stages of exercise planning. In order to ensure overall safety and proper arrangement of tents in accordance with reference (b), the Camp Commandant shall provide the proposed layout of the camp, to the AGSD Fire and Emergency Services Officer, no later than 30 days prior to the start of any exercise for review. The Camp Commandant shall also:

a. Assign an alphanumeric address, alphabetical prefix, and numeric suffix to each tent/SEA hut/building/ect.

b. Submit a camp overview diagram, with addresses, to the local Fire Marshal (see enclosure (5)).

CAMP LAYOUT



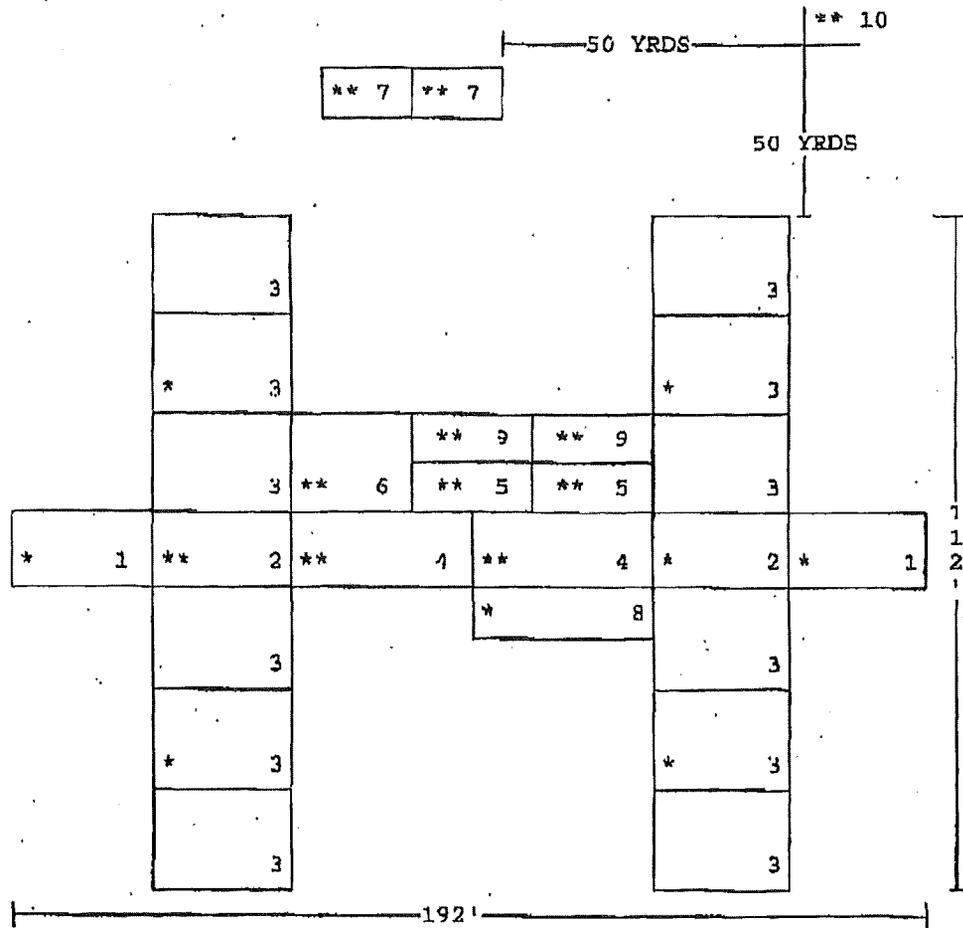
- \* - Class A or B Extinguisher
- \*\* - Multipurpose (Class A/B/C) Dry Chemical Extinguisher (every 100ft)
- \*\*\* - Class C Extinguisher
- ^ - Alarm (See Chapter 2, paragraph 6.)
- @ - Optional Fire Barrel Staging Area

Tents should be configured into blocks of six tents (two rows of three tents). Tents within the block should be spaced at least ten feet apart side to side and eight feet apart end to end. A 20 foot fire lane should separate each tent block. This spacing will allow firefighters to attack the fire from any angle and to reach any tent within the block.

- NOTE:
1. All tent distance measurements are from stake to stake.
  2. Fire barrels are optional if sufficient firefighting.
  3. Stationary objects are not permitted in fire lanes.
  4. Communication centers extinguishers: (1) Class A or B and (1) Class C or Class A/B/C (multipurpose) dry chemical Extinguisher.

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DINING FACILITY LAYOUT



- |                    |                          |
|--------------------|--------------------------|
| 1 Warm-up Tent     | 6 Bake Shop              |
| 2 Serving Tent     | 7 Burner Shack           |
| 3 Dining Tents     | 8 Pot Shack              |
| 4 Galley Tents     | 9 Reefer Area            |
| 5 Storeroom/Office | 10 Burner Light Off Area |

- \* - Class A Extinguisher
- \*\* - Multipurpose Extinguisher
- \*\*\* - Class C Extinguisher (As needed for generators/electrical equipment)

KEROSENE HEATER

1. General. When tent heaters are used, they will be recognized as the greatest fire hazard within/to the camp. This fire hazard is normally created by improper installation, misuse, lack of preventive maintenance, and improper or careless refueling procedures.

2. Pre-Operation Inspection/Preventive Maintenance. Upon receiving heater(s) from the supply point, the fuel tank, wick assembly, and all switches of each heater need to be inspected as follows:

a. Remove the two heater body retaining screws and lift the heater body off the heater base.

b. Remove the wick assembly from the heater by unscrewing three nuts and pulling off heater control knob; lift wick assembly off.

c. With wick assembly off, check inside of the fuel tank for debris (sand, dirt, rust, ect.). Clean debris from tank, if found.

d. Check condition of wick.

(1) Ensure wick is not crystallized and is even all the way around retaining ring.

(2) Check height of wick, which when turned all the way up should be  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch taller than the assembly.

e. Put wick assembly back on heater, tighten the three wing nuts, and insert heater control knob back in place.

f. Put heater body in place and tighten the two retaining screws.

3. Filling/Starting Heater

a. Open fuel tank cap and fill tank with kerosene until tank is full then put cap back on.

b. Place heater in tent (18 inches from all objects in tent).

- c. Allow wick to absorb fuel, until top of wick is completely moist (about 15 minutes).
- d. Push wick lock down.
- e. Open wick access door.
- f. Light match; push down on wick access switch, and light wick.
- g. Let wick access switch go and close wick access door.

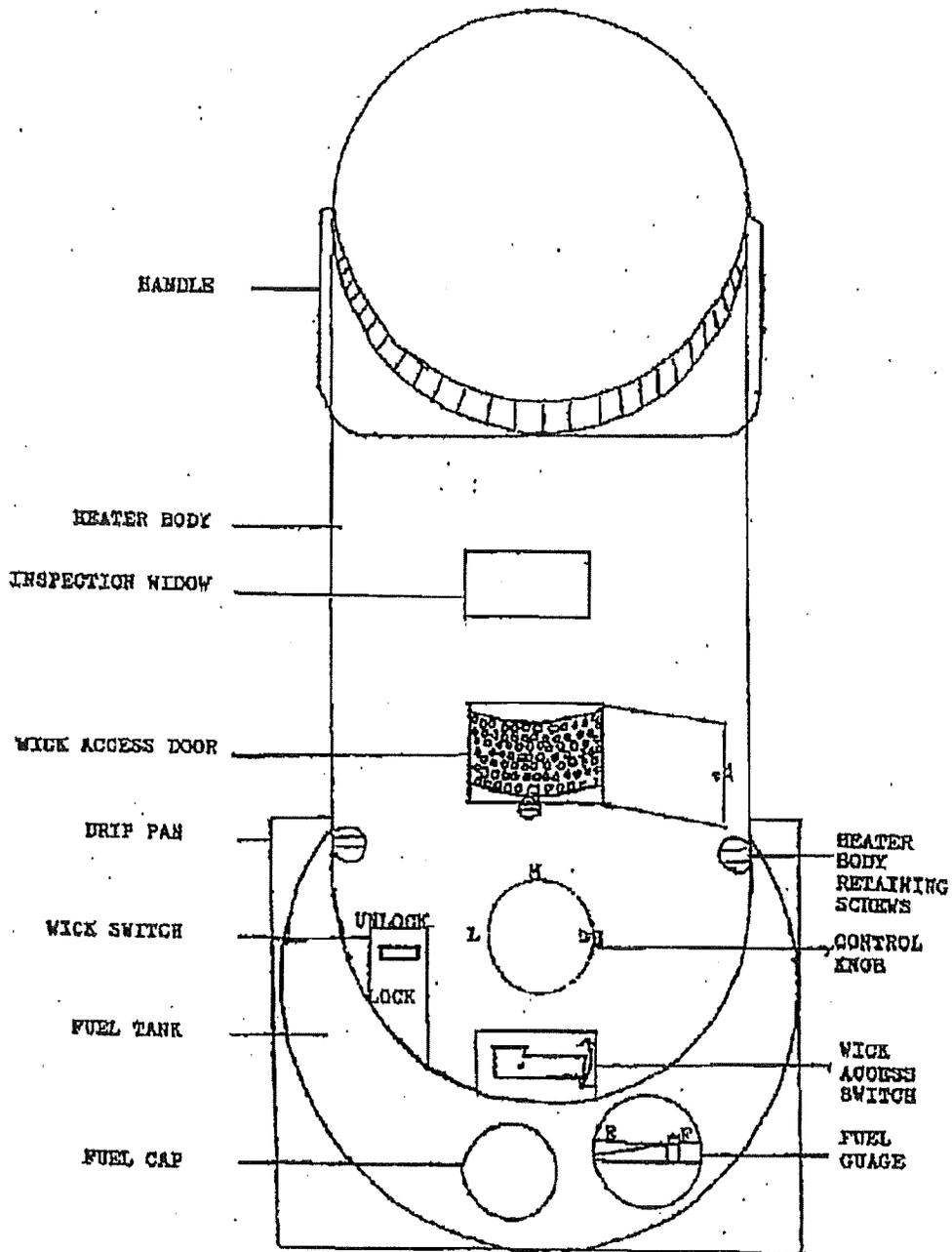
4. Preventive Maintenance. Repeat steps in Paragraph 2 every three days, clean out all debris (make sure heater is off and almost empty of fuel).

5. Wick Replacement. Recommend heaters be returned to supply point for wick replacement.

6. Heater Regulations

- a. Never leave lit heater unattended.
- b. Never attempt to fill a lit heater.
- c. Never attempt to move a lit heater.
- d. Never smoke while filling a heater.
- e. Never use heater for cooking or drying clothes.
- f. Always ensure that fire extinguishers are located near heaters.
- g. Never store heater fuel in tents.
- h. Fuel containers must be clearly marked.
- i. Ensure the area of operations is well ventilated to prevent build-up of fumes.
- j. Keep flammable materials/liquids away from heaters.
- k. Never refill heaters inside tent.

KEROSENE HEATER DIAGRAM



SPACE HEATER ARCTIC

1. Pre-Operation Inspection/Preventive Maintenance. Upon receiving heater(s) from the supply point, the fuel hoses, fuel control valve, solid fuel grate, nested stack assembly, gravity feed adapter, and body assembly of each heater need to be inspected as follows:

a. Inspect the stack cap and nested stack assembly for built up soot and creosote which will impair operation.

b. Inspect the body assembly for ash deposits from last use. Ensure the door and lid assemblies work properly.

c. Inspect the fuel control valve for proper operation. Remove from service if valve is damaged or bent beyond the 90 degree position.

d. Inspect the fuel hoses for cuts or swollen areas. Replace any defective hoses.

e. Inspect the fuel can stand for stability and fuel can for leaks. Correct any discrepancies prior to using heater.

f. Inspect the gravity feed adaptor for installed gasket and visually check for leaks.

g. Inspect the solid fuel grate for damage. Grate should not bend and allow fuel to touch the bottom. (Grate is not for liquid fuel use).

2. Starting Heater

a. Perform the necessary daily preventive maintenance.

b. Wipe up any liquid fuel that has leaked or collected in the bottom of the heater.

c. Set fuel On/Off control to On and adjustment knob to Hi. Open heater lid. Pour priming cup of fuel into bottom of heater.

d. Use small ball of toilet paper to soak up remaining fuel from priming cup. Light fuel soaked paper and toss into bottom of heater. Close lid assembly.

e. Adjust the flow adjustment knob to achieve desired output level. (It takes 5-10 minutes for heater to give off heat).

3. Preventive Maintenance. Repeat steps for pre-operation

every day, clean out all debris (make sure heater is off and fuel control valve is shut off).

#### 4. Heater Regulations

a. Tent heaters will be placed on a noncombustible base or sandbox no smaller than 36" X 36".

b. Tent stoves will be installed at least four feet from tent walls.

c. All operators will be trained to operate any type of stove.

d. At least two sheet-metal screws or rivets will be used to secure the ends of each pipe section.

e. At least two stack pipe sections will extend above a tent peak.

f. A stack cap will be installed at the top of the stack assembly.

g. A two inch ventilation space will be kept between the exhaust pipe and tent.

h. Three guy wires will be used to secure exhaust stack pipes. The guy wires should be attached to tent lines.

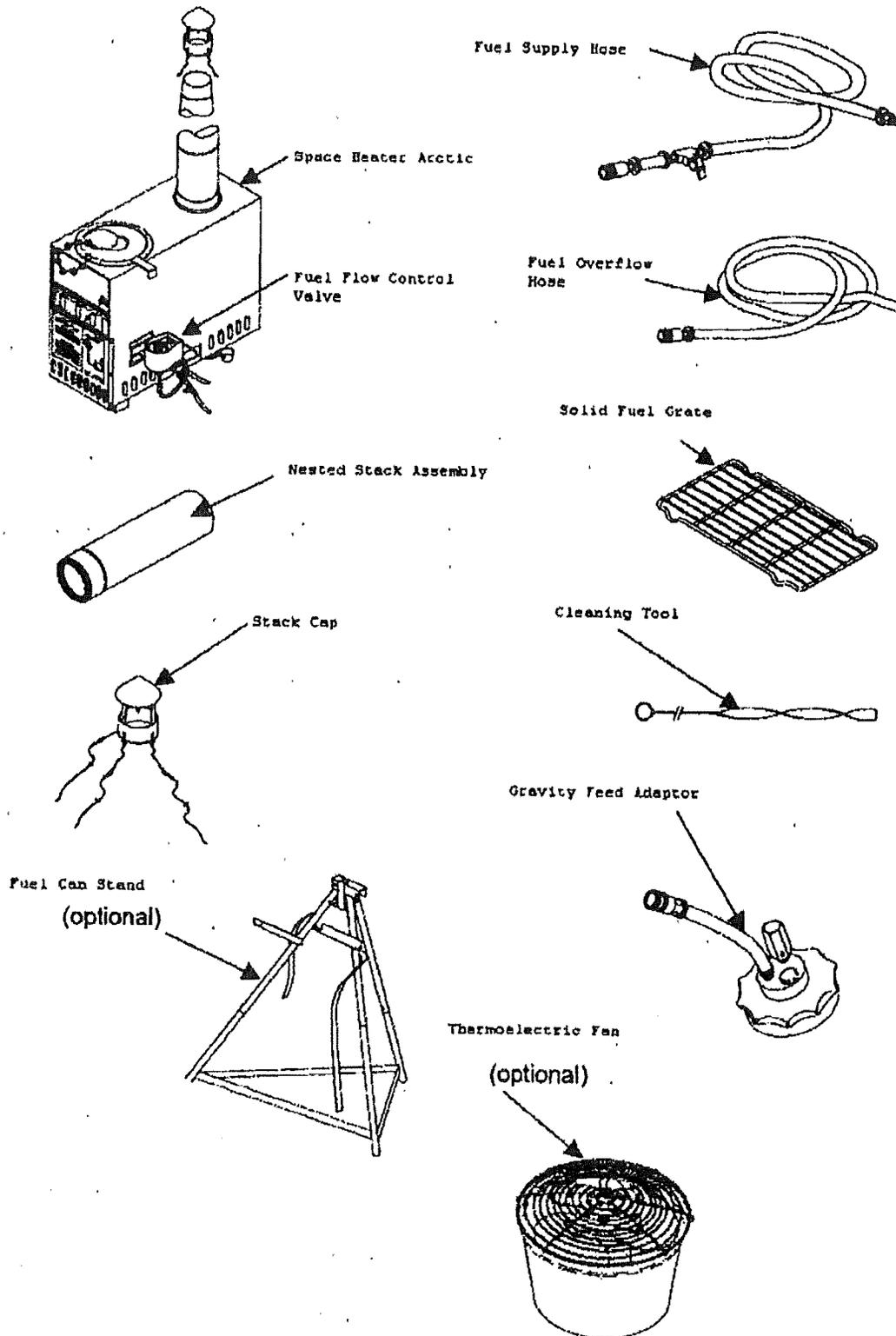
i. Only properly marked five-gallon cans will be used as fuel supply containers.

j. Combustible and flammable materials will be kept at least 50 feet from space heaters.

k. Ammunition, explosives, simulators, pyrotechnics, and corrosive materials will not be stored in tents with stoves.

l. Ensure the area of operation is well ventilated to prevent the build-up of fumes.

SPACE HEATER ARCTIC DIAGRAM



FIRE PREVENTION REGULATIONS

1. General

a. Maintaining a high state of cleanliness within the base/tent camp is a basic factor of an effective fire prevention program.

b. Combustible waste will be periodically collected and safely disposed of in order to reduce the possibility of fire and prevent the extension of fire.

c. Properly ventilated metal lockers and cabinets should be provided, where practical, for the storage of highly combustible and hazardous types of supplies.

d. Trash and refuse containers will be noncombustible, and provided with metal covers. Open top wastebaskets shall be made of metal or other noncombustible material.

e. Butt cans will be provided in bivouac areas. Their contents will be dumped into an earthen pit and covered daily.

f. Open fires require the prior approval of the Camp Commander and Fire Marshal. Approval may be obtained by submitting an open flame request. An example of the request is located in Ref (b).

g. Heaters, stoves, cooking ranges, and other heat producing equipment will not be located less than 18 inches from any wall in a tent or building.

2. Specific

a. Combustible material(s) will not be stored, placed, or suspended near heating devices or smoke pipes.

b. Trash and refuse containers will not be stored, placed, or suspended near heating devices or smoke pipes.

c. To prevent extension of a fire from trash containers to structures (tent/SEA hut/building), dumpsters and other central trash disposal units shall be spaced a minimum of 15 feet from combustible material.

d. Trash-burning incinerator will be located at least 50 feet from combustible buildings and will be screened appropriately to prevent discharge of glowing embers.

e. Smoking in bed is prohibited.

f. Personnel will not discarded cigars, cigarettes, pipe ashes, or burning matches in or near any building, tent, or storage area.

g. Smoking is prohibited in areas where liquid/breathing oxygen is stored or administered.

h. Appropriate "NO SMOKING" signs will be posted in the following areas:

- (1) Fuel storage areas
- (2) Fuel dispensing points
- (3) Warehouses
- (4) Paint shops
- (5) Carpenter shops
- (6) Ammunition/explosive storage handling areas
- (7) Motor repair shops

FIRE BILL

1. General

a. Camp Commandants shall establish fire regulations in the form of a tent camp fire bill which will be distributed to tenant organizations within the camp area. The fire bill and evacuation directions should be posted in a visible place on each tent or structure.

b. ARFF Officers, if available, will assist Camp Commandants with the preparation of the fire bill.

c. Fire bill postings will display the following information at a minimum:

- (1) Building number where posted.
- (2) Location of nearest fire alarm box or phone number to the fire department.
- (3) Directions to spread the alarm; pass the word.
- (4) Directions to close windows/doors if time permits.
- (5) Directions to use all available fire extinguishing methods if possible prior to the arrival of the fire department.

NOTE: If available, NAVMAC Form 3-11320/9 should be used for Fire Bill postings.

# FIRE BILL

BUILDING NO. \_\_\_\_\_

## IN CASE OF FIRE

1. USE NEAREST FIRE ALARM BOX OR TELEPHONE EXT. \_\_\_\_\_

Know the location of the nearest alarm box and the nearest telephone in your area. When *using* telephone, REPORT BUILDING NUMBER. Upon arrival direct Fire Department to the scene of fire.

2. SPREAD THE ALARM—PASS THE WORD.  
All personnel except fire parties clear the area.
3. IF TIME PERMITS, CLOSE DOORS AND WINDOWS TO CONTAIN THE FIRE AND PREVENT DRAFTS. DO NOT ENDANGER YOURSELF OR OTHERS IN THIS EFFORT.
4. USE PROPER EQUIPMENT AT HAND TO EXTINGUISH THE FIRE, PENDING ARRIVAL OF THE FIRE DEPARTMENT.