

## CHAPTER 12

### FIELD KITCHEN SANITATION

#### RESPONSIBILITIES AND STANDARDS

The FOS must ensure that established sanitation standards are followed in the areas of personal hygiene, cleaning, and maintaining equipment, dishwashing, waste disposal, and inspecting, storing, and handling food. Storage considerations, insect and rodent control, water supply purity, and sanitation in other areas of field operations are in FM 21-10 and FM 21-10-1. The unit's field sanitation team advises on sanitation standards and helps ensure that these standards are maintained. Class I storage and sanitation standards are detailed in Chapter 6 of this manual. A food service sanitation video titled *Food Service Sanitation* is available from TASC (catalog number TVT 10-110). Part I is garrison operations and Part II covers field operations. Commanders should ensure that the FOS has access to the shower and laundry facilities for all the food service personnel. The field standard is one shower per week, and in hot arid climates, two per week. Food service personnel should, however, maintain high personal standards of hygiene at all times to prevent a foodborne illness impact. Clean uniforms should be worn at all times.

#### PERSONAL HYGIENE

The safety of food depends largely on the health and hygiene of the people who handle it. Everyone who works in the field kitchen should maintain high standards of personal hygiene. The standards discussed below must be enforced.

#### Food Handlers Certificates

Local medical authority may require food handler certificates for food service workers. Remember,

it is possible to have a health examination one day and to be sick the next day.

#### Inspection

The FOS or shift leader must inspect all food handlers each day as they report for work. Send personnel who exhibit signs of illness to the medical unit for an examination. Personnel are responsible for reporting any symptoms of infection or disease before they begin work or at the time a problem develops. The FOS's inspection should include:

- Infected cuts, sores, bums, boils, rashes, or other skin or wound infections.
- Unclean hands and fingernails. Fingernails should be trimmed with no nail polish.
- Diarrhea (known or suspected). Ask workers.
- Signs of respiratory illness (coughing, sneezing)
- Excessive jewelry. Plain wedding band or medical alert device only.
- Unclean or improperly maintained clothing.

#### Hygiene Standards for Food Service Operations

Food handlers can transmit germs in many ways. They can pick up germs by picking their nose, scratching, using the latrine, eating, and smoking. Individuals responsible for handling or preparing food should practice the procedures shown in Figure 12-1, page 12-2, to assure proper sanitation and personal hygiene.

- Hands and arms should be washed thoroughly and often with soap and water. At a minimum, hands must be washed-
  - Before beginning duty.
  - After using toilet facilities.
  - After servicing burner units or handling gasoline cans.
  - After handling soiled or contaminated equipment or utensils.
  - After smoking.
  - Before preparing food.
  - After preparing one food item, but before preparing another.
  - After performing custodial duties, including handling garbage or other refuse.
  - After moving or unloading rations.
- Wear clean garments and maintain personal cleanliness.
- Wear required headgear properly to keep hair away from foods and food contact surfaces.
- Strictly prohibit the use of tobacco by personnel preparing or serving food, or while engaged in any activity in food preparation areas.
- Do not clean latrines, work with garbage cans, drains, grease traps, or perform other KP duties during periods of food preparation.
- Do not permit unauthorized personnel in food preparation, storage, or sanitation support areas.
- Avoid unnecessary hand contact with food. Handle food with clean utensils, such as tongs, scoops, spoons, or forks.

Figure 12-1. Proper sanitation procedures

### Field Handwashing Facilities

Locate handwashing devices at appropriate places such as the bivouac area, outside the latrines, near the kitchen and dining area, and at other locations as needed.

### WATER TREATMENT

Water for drinking and cooking should come only from approved sources. In an emergency, water for washing food, heating insulated food containers, and dishwashing can be obtained from unapproved sources if suitable disinfectants are used. TB MED 577, Chapter 3, paragraph 3-2b(1) states: "Emergency Situation. No standards apply when personnel are cut off from supply lines and treated water is not available from Quartermaster supplies. Each individual should select the clearest, cleanest water with the least odor, and then treat the water using individual water purification procedures. Such procedures are limited to disinfection using iodine tablets, chlorine ampules, boiling (FM 21-10 Chapter 2, Section IV)." This paragraph is directed toward the individual soldier, not collective unit operations. Food service operations need fuel, rations, and water, all from approved sources. Disinfect water before using it for preparing food, drinking, or dishwashing. If the water is in a man-made container, such as a tank or pipe, first test it for previous disinfection. Use MREs or other operational rations when potable water is not available to minimize the potential for water and foodborne illness.

### Testing for Chlorine

To test for chlorine, use the chlorination kit (NSN 6850-00-270-6225) recommended by AR 40-5 and authorized by CTA 50-970. Figure 12-2, page 12-3, shows the steps to take for testing chlorine in water.

### Disinfecting Water in 5-Gallon Cans

A 5-gallon can of water can be disinfected using chlorine ampules. Follow the procedures in Figure 12-3, page 12-3, to make enough solution for two 5-gallon cans and disinfect the water can.

1. Determine the desired chlorine residual in parts per million as determined by the medical authority.
2. Test at the point of consumption for required chlorine residual.
3. Flush the spigots and rinse the color comparator with the sample water.
4. Fill comparator and add one crushed DPD comparator tablet.
5. Cover the comparator top and rotate back and forth (do not shake) allowing the tablet to dissolve. If chlorine is present, the sample water will change to a shade of pink.
6. Hold the comparator to the light, compare color chart on the right to the water color on the left, and read chlorine residual in parts per million where the colors match.
7. If residual meets medical authority standard, the water is fit for consumption or other use.
8. If residual is lower than the medical authority standard, re-chlorinate using calcium hypochlorite ampules, bulk calcium hypochlorite, or liquid bleach as appropriate for amount of water being treated and availability of products.
9. After treatment, wait 10 minutes and recheck for chlorine residual. If it meets requirements, wait an additional 20 minutes before using water.

*Figure 12-2. Steps to test for chlorine*

1. Test water for the desired chlorine residual in parts per million.
2. If you need to raise the chlorine residual in accordance with medical authority standards, break the chlorine ampule into the canteen cup. Hold the ampule in both hands with the etch mark pointing toward the canteen cup and your thumbs behind the etch mark. Then push the ampule with your thumbs.
3. Add water to the cup until it is about half full and stir until the ampule dissolves.
4. Pour half of the solution into each of two 5-gallon cans. Add water to the cans, close the tops, and shake the cans several times.
5. After 10 minutes test for chlorine residual parts per million. If it meets medical authority standards, then wait an additional 20 minutes before drinking the water.
6. If Chlorine residuals are not met, prepare a second chlorine solution. Add one quarter canteen cupful of solution to each can. Wait 10 minutes. Read the chlorine residual. If the required residual is not met, add the remaining chlorine solution. If the chlorine residual is still inadequate after this second disinfectant cycle, contact preventive medicine before continuing or using the water.

*Figure 12-3. Steps for disinfecting water in 5-gallon cans*

## Disinfecting Water in 400-Gallon Water Trailers

Water in 400-gallon water trailers can be disinfected by using calcium hypochlorite. Follow the procedures shown in Figure 12-4.

### Disinfecting Water by Boiling

Disinfect water temporarily by boiling it in any suitable container. Bring the water to a rolling boil. Boil water for 15 minutes to ensure disinfection. Remember, boiling does not leave any residual disinfecting power. Store the water in a clean, covered container, and use it as soon as possible.

## FOOD UTENSILS AND POT AND PAN WASH LINE

In field kitchens not equipped with a SC, all dishwashing is done with a pot and pan wash line. A mess kit laundry is only used when mess kits are used in place of paper products. It consists of three 32-gallon corrugated steel cans with immersion heaters. A fourth can is used as a waste receptacle. Mess kit laundry lines are established as shown on page 12-8.

## RATIONS TRANSPORT

Use soap and water to clean trucks used to carry rations and ice. Do not put rations on the truck bed. Put ice and perishables in an ice chest; ensure that all other items are on dunnage. Cover the top, sides, and back of the trucks to keep out dirt. Protect rations from dirt and weather before, during, and after unloading.

## TRASH MANAGEMENT

FM 21-10 outlines procedures for waste disposal. They apply to operations under the AFFS. Commanders will determine, based on the scenario and federal, state, local, or host-nation laws, whether to burn, bury, backhaul, or use dumpsters to dispose of waste from field kitchens. Inform all personnel of the policy on garbage disposal in an area of operations. Waste must be removed from the kitchen area at least daily.

Accumulated waste will attract rodents and insects. Proper disposal of kitchen waste is also essential in limiting the battlefield signature your unit leaves the enemy. Dispose of liquid and solid wastes as discussed below.

### Liquid Waste

Dispose of liquid waste in a soakage pit or trench that is equipped with a grease trap that strains out solid matter and grease. The soil absorbs the liquid waste. Figure 12-5, page 12-5, shows how to build a grease trap and soakage pit. Two pits are needed so that each pit can rest every other day. In porous soil, a soakage pit 4 feet (1.2 meters) square and 4 feet (1.2 meters) deep will take care of 200 gallons (760 liters) of liquid per day. If the ground water level is close to the surface or if there is rock or clay near the surface, have a soakage trench dug. Figure 12-6, page 12-5, shows how to build a soakage trench with a grease trap. Due to environmental concerns, liquid or solid grease may require separate disposal.

1. Test for the desired chlorine residual in parts per million.
2. If you need to raise the chlorine residual level in accordance with medical authority standards, then add three MRE spoonfuls (or 22 ampules) of calcium hypochlorite to a 1/2 canteen cup of water. Stir for about one minute or until water and calcium hypochlorite mix to a milky solution.
3. Put the solution in the water trailer. If the trailer is full before you add the chlorine solution, mix the solution by either stirring it with a clean pole or by towing the trailer for 10 minutes.
4. Test the water again to make sure it has enough chlorine.
5. Wait an additional 20 minutes before drinking the water

*Figure 12-4. Steps for disinfecting water in  
400-gallon water trailers*



### Solid Waste

Bury, burn, or backhaul solid waste. These procedures are described below.

**Burying.** During peacetime, most state laws prohibit burying trash. However, during wartime, if the unit will be at a site for less than one week, bury solid waste in pits or trenches. These pits or trenches must be at least 27 meters (90 feet) from the dining area and at least 27 meters away from any water source used for cooking or drinking. Use the garbage pit if the unit will beat the site for only one day. If the unit will be at the site for two days to a week, use a garbage trench. Be sure cans are flattened and boxes are broken up before they are dumped. T-Ration cans should be nested one inside the other.

**Burning.** During peacetime, most state laws prohibit burning of trash. During wartime, if the unit is going to be at the site for more than one week, burn solid

waste in an open incinerator. Use an inclined incinerator or a cross-trench incinerator. Incinerators will not burn wet garbage, so the liquid waste must be separated from the solid waste. This must be done by straining the garbage with a coarse strainer, such as an oil bucket, a can, or a 55-gallon drum with holes in the bottom. Pour the liquid through a grease trap into a soakage pit or trench. Burn the solids that are left. Garbage that will not burn must be buried or hauled to a disposal site. Field incinerators must be at least 45 meters (150 feet) from the kitchen and dining areas so that the odor will not bother the cooks and the diners. Figure 12-7 shows how to build inclined and cross-trench incinerators.

**NOTE:** Incinerators make smoke. Do not use an incinerator if it will possibly disclose your location to the enemy.

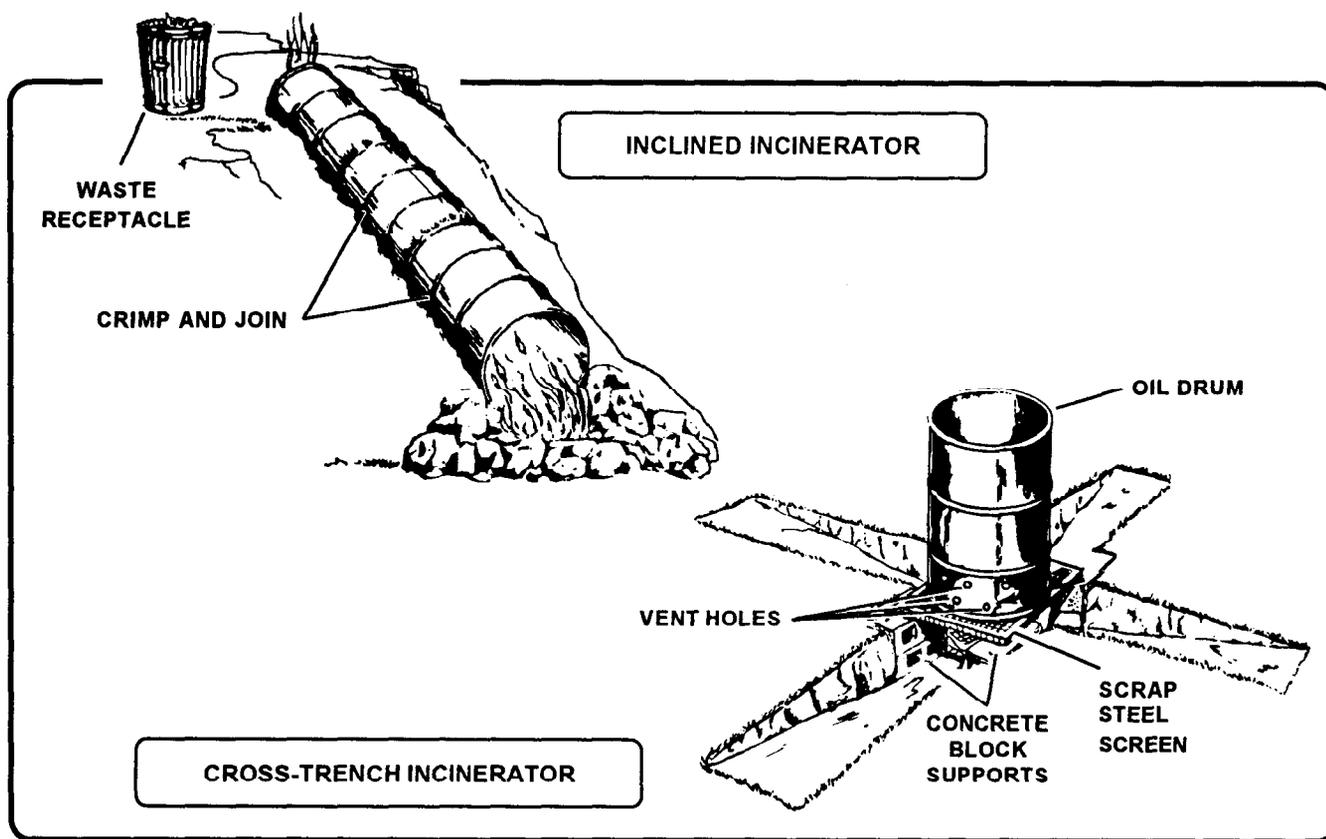


Figure 12-7. Inclined and cross-trench incinerators

**Backhauling waste.** When the operation plan calls for returning waste to a designated disposal point, the FOS must arrange for transportation support. Waste should be bagged or boxed when possible. Excess boxes and T-Ration pans must be nested to conserve space.

## SANITATION CENTER OPERATIONS

When fully deployed, the SC will provide the primary means to wash and sanitize field kitchen components. To set up the dishwashing operations follow the procedures in Figure 12-8.

### Washing Procedures

Follow the procedures below when washing pots and pans in the field.

**Scraping.** Scrape all food particles from pots and pans as soon as possible after use. Use a long-handled scraper (NSN 7330-00-205-1950) or a rubber scraper.

**Prewashing.** Use the fourth sink in the food preparation and service set for hospitals as a prewash sink. Water temperatures must be about 80 degrees Fahrenheit. After food scraps and particles are removed, items to be cleaned and sanitized are placed in the prewash for removal of heavy food particles, grease and burned-on food. Use a long-handled brush for this also.

**Washing.** Fill the wash sink with 20 gallons of warm water and heat it to 110 degrees to 120 degrees Fahrenheit (hot to touch). Add 12 ounces of hand-dishwashing compound, NSN 7930-00-281-4731. Stir vigorously to produce suds. Then thoroughly wash the item in the wash solution using a long-handled brush. Remove it from the wash solution and shake it vigorously to remove the excess solution. Change the wash solution when contaminated with food particles and grease. It is important that the wash solution temperature be kept between 110 degrees and 120 degrees Fahrenheit to soften greasy film.

1. Turn the handle on the top right-hand side of the sink clockwise to close the drain. Fill each sink with 20 gallons of water.
2. Use hand-dishwashing compound (NSN 7930-00-281-4731 (50-pound bags)) in field dishwashing procedures at the rate of 12 ounces per 20 gallons of water.
3. Use the same detergents for both field dishwashing and for hand-dishwashing operations. Never use machine dishwashing compounds for field dishwashing.
4. Maintain the temperature for the wash solution between 110° F to 120° F.
5. Maintain the first rinse temperature at 120° F to 140° F, this temperature will break down the soap residual for the final rinse.
6. Maintain the final rinse temperature at least at 170° F (77° C).
7. Use proper scraping and washing; they are important steps in field dishwashing.
8. Change the wash solution when it becomes contaminated by food particles and grease. Contamination is evident when there are no suds or a thin grease film develops on the water's surface. Change the rinse water whenever there is grease, suds or food particles on the surface. Drain the sink by turning the handle at the top right of the sink counterclockwise.

Figure 12-8. Procedures for setting up dishwashing operations

**Rinsing.** Two sinks are used for rinsing. Rinse dishes as discussed below.

**First rinse.** Use the second sink for rinsing detergent and abrasives off the equipment. Keep the water between 120 degrees and 140 degrees Fahrenheit at all times. Change the water as necessary.

**Second rinse.** Use the third sink for sanitizing. Submerge the item for 30 seconds in water that is at least 170 degrees Fahrenheit or higher. Then vigorously shake the item to remove as much water as possible. It is important to keep the rinse water at the proper temperature. Change the water when a grease film appears on the surface.

**Air drying.** Air-dry the equipment on the storage rack. Do not use towels or napkins.

**Cleaning up.** Drain the wash water. Wash the sinks using hand-dishwashing compound, hot water and a brush. Follow with a hot water rinse.

### Safety Precautions

Observe all safety precautions including those discussed below. Ensure that—

- There is a fire extinguisher in the fueling area, lighting areas and in the M2 burner unit area of operation.
- Each area is 50 feet from the next area and 50 feet from any open flame.
- An operating pressure of 6 to 20 pounds is maintained.
- When the M2 burner unit is in the rack, it is as far to the rear of the rack as possible. The edge of the sink will become very hot if the burner is not placed all the way to the rear. Some models of the SC are equipped with a heat retaining flap that is lowered over the rack opening after the burner unit is in place. **THIS FLAP BECOMES EXTREMELY HOT. DO NOT TOUCH IT WITH YOUR BARE HANDS. USE A HOT PAD!**
- Heavy rubber gloves (if available) or tongs should be used when handling pots and pans in the wash cycle.

### POT AND PAN WASH LINE AND MESS KIT LAUNDRY LINE

Two methods of washing and sanitizing field kitchen components is the pot and pan wash line and the mess kit laundry line. Figure 12-8, page 12-9, provides step-by-step procedures for proper cleaning and sanitizing using this method. The mess kit laundry is setup about 15 meters (50 feet) from the kitchen. Hand dishwashing compound (NSN 7930-00-281-4731) should be used for dishwashing. One mess kit laundry line can handle mess kits for up to 80 people. If more people are being served, more laundries need to be set up. The water must be replaced after being used by 80 people during the operation. For water conservation, do not change all cans at the same time.

Dispose of the wash water, clean the 32-gallon can, refill it with fresh water, and rotate it in the line for use as the final rinse.

Use the first rinse as the wash water and the final rinse as the first rinse.

**NOTES:** 1. *Pot and pan wash line is used when paper products are used in lieu of the mess kit. The wash line is set up the same as the mess kit laundry line. The wash line is used to clean all food service equipment. The water is to be changed and rotated the same as the mess kit laundry line, except the main objective is to change the water as often as necessary to maintain sanitary standards (It is not based on the number of personnel subsisted).*

2. *Do not use machine-dish washing soap or compounds.*

### CHEMICAL DISINFECTING METHOD

Disinfectant, food service (chlorine-iodine type), NSN 6840-00-810-6396 (4.77-ounce pouch) is intended primarily for use in the field where the rinsing solution cannot be kept at the proper temperatures. When food service disinfectant is dissolved in water (between 75 and 110 degrees Fahrenheit), it releases both iodine and chlorine gas, which disinfect the utensils. If the compound is dissolved in too warm water (above 130 degrees Fahrenheit), the gases

are released too rapidly and the disinfecting action is soon lost. Figure 12-9, page 12-10, provides a step-by-step procedure for proper cleaning and sanitizing using this method. Make a chlorine-iodine solution for rinsing the washed equipment by dissolving the contents of one package of food service disinfectant in a

container (canteen cup), and pour the mixture into the 20 to 25 gallons of warm rinse water. Stir thoroughly to dissolve. Make a fresh solution for every 100 people and never reuse a solution. Disinfect the utensils by swishing them in the chlorine-iodine water for at least one minute.

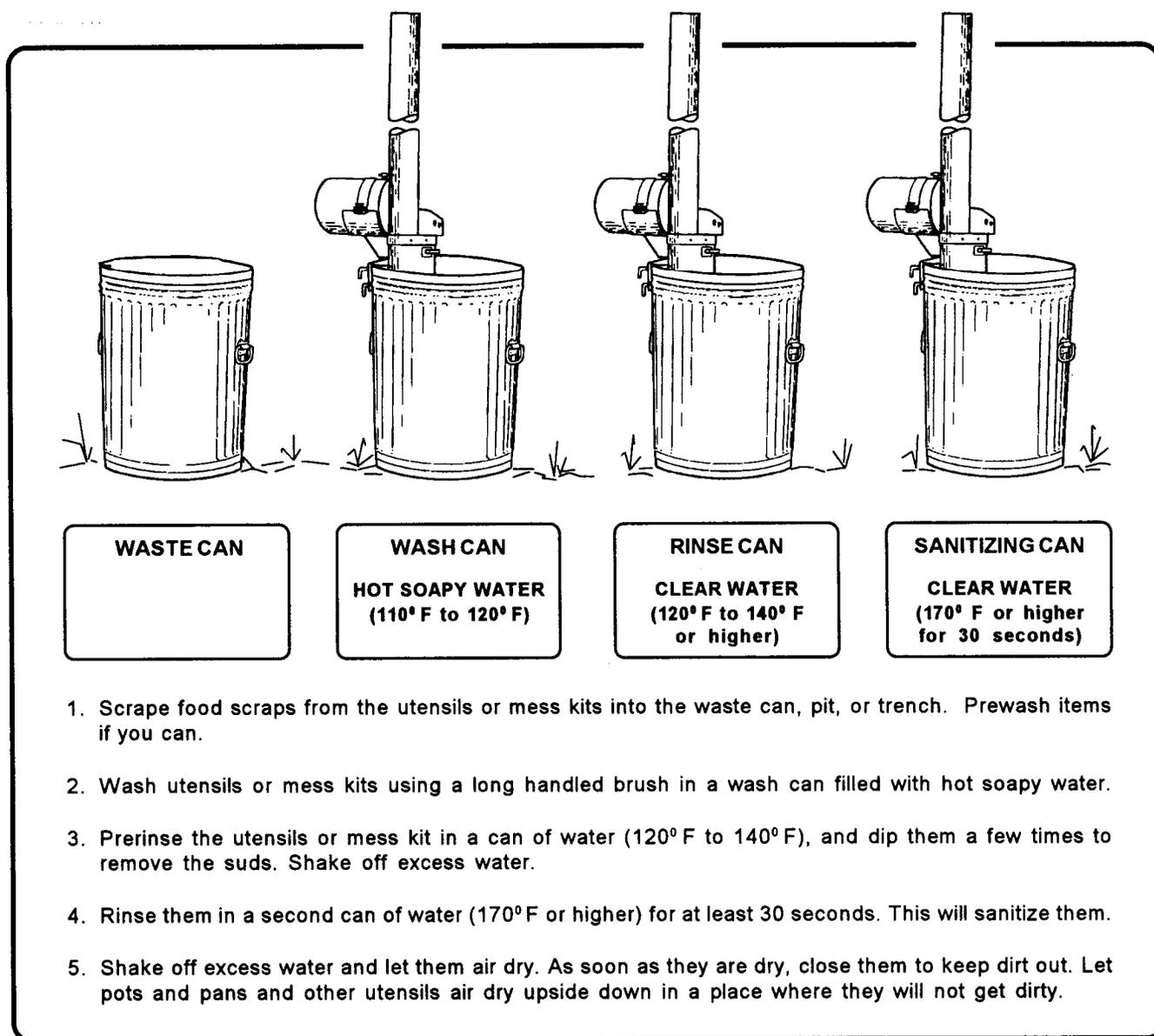


Figure 12-8. Procedures for using mess kit and pot and pan wash line

1. Scrape food scraps into a waste can, pit, or trench. Prewash items if you can.
2. Wash the items in hand-dishwashing compound solution.
3. Rinse the items in clean water.
4. Disinfect the items by swishing them in a disinfectant solution for at least one minute. Make a fresh solution for every 100 people. Do not use the solution again.  
*NOTE: The water temperature must be between 75°F and 110°F.*
5. Let the items air dry in a place where they will not get dirty. Close mess kits after they dry.

*Figure 12-9. Procedures for washing and sanitizing dishes with disinfectant solution.*