Joint Culinary Training Center

Culinary Specialist Reference Book

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Section 1. Basic Culinary Fundamentals

A. Food Protection Standards TM 4-41.11, chpt 5, 5-1

Quality food service improves morale and provides an essential foundation for health and readiness. It is important to maintain a sanitary operation that follows proper food protection guidelines. Food may readily become contaminated and can support the rapid growth of many disease-producing microorganisms. Failure to maintain proper temperature, sanitation standards and personal hygiene for food and equipment will cause diners to get sick. Food service personnel must follow proper sanitation and food protection procedures during the receipt, storage, preparation and serving of food.
NOTE: TB MED 530 provides food protection and sanitation standards and responsibilities for dining facility operations.

Notes for Storage

- All subsistence must be stored at least 6 inches above the floor.
- Store heavy items on the lower shelves.
- Rotate foods based on date of receipt and date of pack.

B. Illness Factors TM 4-41.11, chpt 5, 5-1

The eight most frequently cited factors involved in outbreaks of food-borne illness are:
1. Failing to properly cool foods.
2. Failing to heat or cook foods thoroughly.
3. Allowing infected food service workers to work in the facility.
4. Preparing foods too far in advance of serving.
5. Using raw or contaminated ingredients in foods that receive no further cooking.
6. Allowing foods to remain at bacteria-incubating temperatures.
7. Failing to reheat cooked foods to temperatures that kill bacteria.
8. Allowing cross-contamination of cooked foods with raw items either by workers who improperly handle foods or clean equipment.

C. Hazards TM 4-41.11, chpt 5, 5-2

Foodborne Disease Threat. There are three main types of foodborne disease threats: Chemical hazards, physical hazards, and biological hazards.
NOTE: Refer to TM 4-41.11, chapter 5, par 5-5, to view the Temperature Danger Zone.

D. FOOD PREPARATION TM 4-41.11, chpt 5, 5-3

Food service personnel preparing foods need to be cognizant of the types of foods that they are handling and potential dangers to ensure cross-contaminations do not occur. Preparers should be especially vigilant about hand washing and sanitizing food contact surfaces. If temperatures are not controlled when food is prepared, held and served, food-borne illness may result. Areas to watch include—

1. Thaw foods properly. Thaw foods under refrigeration at temperatures of 40 degrees Fahrenheit or below, under potable running water or as part of the conventional cooking process. **Note: Do not refreeze thawed or tempered meat.**

2. Use the correct cooking temperature and time. Although 140 degrees Fahrenheit is adequate to prevent further bacterial growth, different products must reach certain internal temperatures and time to ensure that bacteria have been killed. Check thermometers for accuracy and use them to ensure that proper temperatures have been reached. See Table 5-2 for required internal cooking temperatures.

3. Discard all breading ingredients after breading food because the ingredients will have become contaminated.

E. FOOD HANDLING TM 4-41.11, chpt 5, 5-4

When handling food, always place emphasis on preventing contamination of the food product. Ensure you use proper techniques when handling utensils and equipment. Observe the following general procedures when handling food:

1. Avoid all bare hand or arm contact with ready-to-eat foods that will not be cooked further before serving.

2. Minimize bare hand or arm contact with food that is not in a ready-to-eat form. When possible, handle food with clean utensils, such as tongs, scoops, spoons or forks.

3. Wear single-use food service gloves or use utensils such as tongs when handling ready-to-eat foods. To maintain sanitary conditions, replace gloves when they become soiled, when switching from one food to another, or after an interruption of work for eating, drinking, tobacco or restroom use, or cleaning of the work area**.**

NOTE: Refer to TM 4-41.11, chpt 5, 5-4, Table 5-2 for Required internal temperatures.
NOTE: Refer to Tri-Service Food Code/ TB MED 530, Table F-1, for a more detailed internal temperature chart.

F. Hazard Analysis Critical Control Point (HACCP)

NOTE: Refer to TM 10-412, A32 for HACCP topic below. Addition HACCP information can be found in the Tri-Service Food Code.

HACCP System: A food safety system that identifies hazards and develops control points throughout the receiving, storage, preparation, service and holding of food. This system is designed to prevent foodborne illness.

1. Critical Control Point (CCP): A point in a specific food service process where loss of control may result in an unacceptable health risk. Implementing a control measure at this point may eliminate or prevent the food safety hazard.

2. Critical Limits: Elements such as time and temperature that must be adhered to keep food safe. The Temperature Danger Zone is defined by the Tri-Service Food Code as 41° F. to 135° F.

3. Foodborne Illness: An illness transmitted to humans through food. Any food may cause a foodborne illness, however potentially hazardous foods are responsible for most foodborne illnesses. Symptoms may include abdominal pain/cramps, nausea and vomiting.

4. Potentially Hazardous Food: A food that is used as an ingredient in recipes or served alone that can support the growth of organisms responsible for foodborne illness. Typical foods include high protein foods such as meat, fish, poultry, eggs and dairy products.

CCP: Serving and Holding (hot foods) 140° F.

5. Food Safety

- Cooking and or heating leftovers
  - Fish – 145 °F for 15 seconds
  - Ground Beef / Pork – 155 °F for 15 seconds
  - Poultry / Leftovers – 165 °F for 15 seconds
  -
- Hot and cold holding storage
  - 41 °F or below & 135 °F and above
  -
- Potentially Hazardous Food
  - May be held for up to 6 hours outside of the safe temperature zone as long as food is brought out cold (41 °F or below) and the temperature does not exceed 70°F during the 6-hour period.
- Chemicals stored near food.

G. Rules for Cooling TM 4-41.11,chpt 7, 7-14

Cool foods requiring refrigeration after preparation to an internal temperature of 40 degrees Fahrenheit or below within four hours. Rapid cooling must bring the product temperature to 70 degrees Fahrenheit within the first two hours. Use one of the following rapid cooling methods when cooling PHFs:

1. Place the food container in an ice bath and stir the food every 10 minutes.
2. Portion food in shallow pans (3 inches or less) or small containers (2 gallons or less).
3. Circulate cold water in a steam-jacketed kettle (where feasible).
4. Store and stir food for a short time in a walk-in freezer.
5. Immerse the cooking container in cold, running water while stirring the food.
6. Distribute the food among several refrigerators.
7. During all handling, use an appropriate cover to protect food from contamination.

H. LEFTOVERS

a. Leftovers are food prepared for a meal that are not served during that meal.
b. Must be handled with extreme care.
c. Bacterial growth in leftover foods can cause severe illness.

d. Potentially Hazardous Foods (PHFs) and non-PHFs.
e. Potentially Hazardous Foods (PHF): foods that support the rapid growth of harmful microorganisms.
f. Milk products, eggs, meat, poultry, fish, shellfish, edible crustaceans.
g. Must be held at a safe temperature zone of 135°F or above for hot foods or 41°F or below for cold food.
h. Most of creamed meats, seafood, gravies, and dressings should not be retained as leftovers.
i. Leftovers cannot be frozen or mixed with fresh ingredients.
j. Leftovers can be offered for service only once.
k. When using leftovers, the original appearance should be changed whenever possible.
l. When reheating leftover PHF's they must be heated to an internal temperature of 165 F and held for 15 seconds.

I. Sanitation TM 4-41.11, chpt 5, 5-5

Food service personnel stress the importance of food appearance and taste. Although this is a good practice, far more important is the enforcement of proper sanitation procedures during food preparation and serving. All food service training programs should include formal and documented training on personal hygiene and sanitation. This training must include but is not limited to sanitation practices for dining areas, food storage, preparation and service. The training must include proper waste disposal; insect and rodent control; and the cleaning of dishes and equipment. The local medical authority can assist the DFM by providing training in the areas of dining facility sanitation.

Manual Ware Washing, Cleaning and Sanitizing

For manual washing, rinsing and sanitizing of utensils and equipment use a sink with at least three compartments. If the dining facility only has two sinks, the DFM can add another container for washing. The two available sinks should be used for rinsing and sanitizing. Portable food contact items such as pots, pans, utensils and nonelectrical items should be cleaned in these sinks in an area separate from food preparation.

PRE-WASH PROCEDURE

Pre-scrape and pre-flush equipment and utensils, and when necessary, pre-soak or scrub them with abrasives to remove food particles and soil. The pre-flush water temperature should be between 80 to 110 degrees Fahrenheit.

FIRST SINK COMPARTMENT

Wash equipment and utensils thoroughly in the first compartment with a detergent solution. The detergent must be approved for food service equipment use and must be used according to the manufacturer's label instructions. Keep the sink clean and the water temperature at a range of 110 to 120 degrees Fahrenheit.

SECOND SINK COMPARTMENT

Rinse equipment and utensils free of detergent and abrasives with clean hot water (120 to 140 degrees Fahrenheit) in the second compartment.

THIRD SINK COMPARTMENT

Sanitize the food-contact surfaces of all equipment and utensils in the third compartment according to one of the methods described below.

Hot Water Method

Sanitize all food-contact surfaces of equipment and utensils by immersion for at least 30 seconds in clean, hot water at a temperature of at least 171 degrees Fahrenheit. Integral heating devices or fixtures should be installed in, on, or under the sanitizing compartment of the sink capable of bringing the water to and maintaining it at a temperature of at least 171 degrees Fahrenheit.

Use a numerical and scaled thermometer that is accurate within 3 degrees Fahrenheit to make frequent checks of water temperatures. Use dish-baskets of such size and design to permit complete immersion of the tableware, kitchenware and equipment in the hot water.

Chemical Sanitizing

When hot water is not available, use chemical sanitizers to sanitize equipment.

Chlorine

Sanitize food-contact surfaces, equipment and utensils by immersing the items for at least 15 seconds using a cleaning solution containing between 100 parts per million (PPM) of chlorine at a potential of hydrogen (pH) range of 6-10. To make the initial bleach solution, use unscented household bleach at one ounce (two tablespoons) per four gallons of water, at a temperature of 75 degrees Fahrenheit, as higher temperatures can cause the chlorine to evaporate from the solution and can corrode certain metals.

Iodine

Immerse for at least 30 seconds in a clean solution containing between 12.5-25 PPM of available iodine and having a pH not higher than 5.0 at a temperature of at least 75 degrees Fahrenheit but not more than 120 degrees Fahrenheit.

J. Standardized Measurements TM 4-41.11, chpt 7, 7-8

Success in cooking always requires accuracy. This includes the proper measurement of ingredients used in food preparation. It also means using the proper conversion factors from one unit of measure to another.

There are two techniques used to standardize the amount of ingredients needed to prepare your recipes.

1. Weight
2. Measure

Both techniques are used; however, weighing is a more accurate method.

When using the weight method in the dining facility use a 10 lb. scale. This is the max amount that can be weighed at one time on this particular type of scale. Prior to use make sure you check the scale for cleanliness, check for balance, and set the dial to zero.

NOTE: Table 1 shows units of measure commonly found in recipes, lists their abbreviations, and shows their equivalents in other units of measure.

NOTE: Table 2 shows you how to convert measurements from one to another. Accuracy results when ingredients are carefully weighed or measured. To ensure accuracy, scales should be properly calibrated. If scales are not available, ingredients can be measured using the procedures below.

Table 1. Measurement Abbreviations

ABBREVIATION	Whole Word	ABBREVIATION	Whole Word
tsp	teaspoon	lbs.	pounds
tbsp	tablespoon	pkg	package
c.	cup(s)	sq	square
pt	pint	cn	can
qt	quart	med	medium
gal	gallon	lg	large
oz.	ounce	min	minute
ep.	Edible Portion	A.P.	As Purchased
lb.	pound	hr.	hours

Table 2. Measurement Equivalents

UNIT	ABBREVIATION	Equivalent
Gallon	Gal	4 quarts
Quart	Qt	2 pints
Pint	Pt.	2 cups
Cup	C	8 fluid ounces
Fluid ounce	Fl oz	1/8 cup, 2 tablespoons
Tablespoon	tbsp	½ fluid ounce, 3 teaspoons
Teaspoon	tsp	1/6 fluid ounce, 1/3 tablespoon

Dry ingredients:

Place dry ingredients, such as flour, granulated sugar, and dried milk, in the measuring utensil.

Level the ingredients with the straight edge of a knife.

If using a recipe that calls for sifted flour or when measuring by volume, sift the flour first. If a sifter is not available, loosen the flour with a hand whip before you measure it.

Stir dried milk and meal lightly with a fork or spoon, but do not sift them.

Sift granulated sugar only if it is lumpy.

Brown sugar: Pack brown sugar firmly into the measuring utensil. If the sugar is lumpy, break lumps with a rolling pin before measuring it.

Baking powder and spices: Stir baking powder and spices lightly before measuring them. First overfill the spoon, and then level the contents of the spoon with the straight edge of a knife.

Solid shortening: Press shortening firmly into the measuring utensil. Level the contents of the spoon with the straight edge of a knife. An alternative method for measuring solid shortening is to use a larger-than-required utensil in which a portion of liquid has been added. Then add the shortening required by the recipe.

Liquids: When measuring liquids, place the measuring utensil on a level surface and fill to the mark which indicates the amount required. Do not overfill this type of utensil.

NOTE: Refer to TM 10-412, section A for more Conversion Charts.

K. Mixing Methods

Use the mixing method given in the recipe. If you substitute one method for another, the results may not be satisfactory. When using a mechanical mixer, always start with the lowest speed and work up to the desired speed. This will help to prevent the ingredients from being thrown from the mixing bowl.

1. Stirring: is moving ingredients in a circle with a utensil such as a spoon or paddle. Use mechanical mixers for mixing large batches. Set the mixer for slow or medium speed so that the speed of the beaters will be equivalent to the speed of hand stirring. Select a low speed for mixing a thin liquid into a thick one.

Also, make sure the mixing container is large enough to prevent spilling.

2. Beating: is making a mixture smooth by moving a utensil in a fast, regular, circular motion to incorporate air into a product. Products can also be beaten in a mixing machine with the beater accessory.

3. Whipping: is combining ingredients rapidly with a wire whip to increase the volume by incorporating air.

4. Folding: is incorporating an ingredient into a mixture by gentle turning the item over without stirring or beating the mixture.

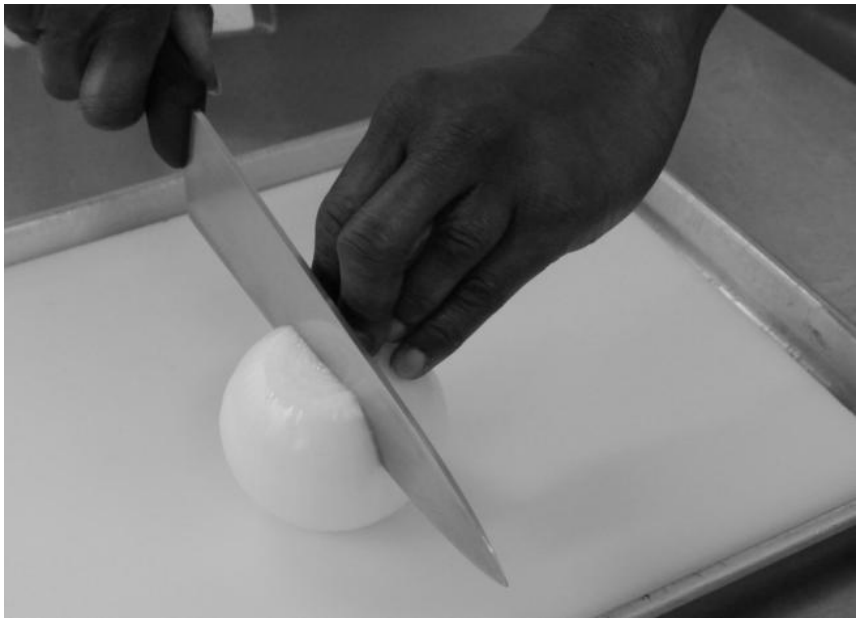
L. Knife Skills

Knives are one of the most dangerous items used by culinary personnel. Knife safety needs to be stressed continuously within the facility. There will typically be fewer accidents when all personnel have been properly trained to identify, use, and care for all dining facility equipment and utensils. A proper cutting board will be used at all times. Ensure you are cutting away from the body in a slow and controlled manner. Correct hand placement is paramount when slicing as shown below.

Knife Safety: There are four main rules of knife safety.

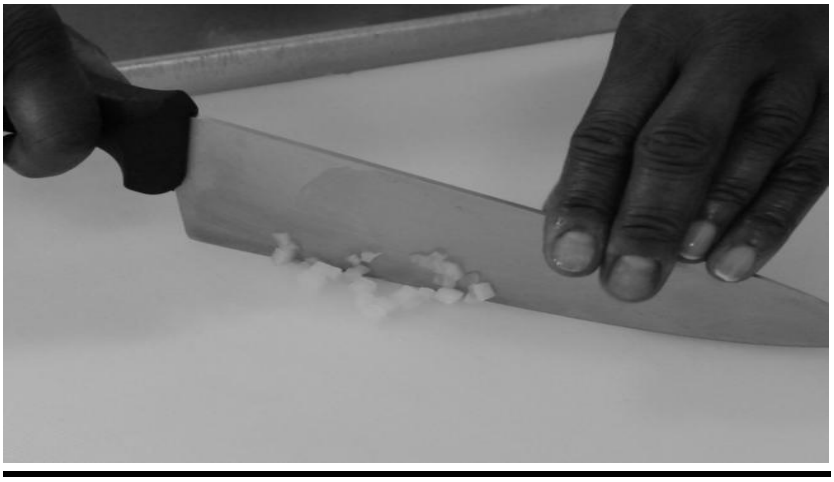
1. **Always carry knifes downward with blade facing to the rear of the body.**
2. **NEVER attempt to catch a falling knife. (Just let it fall).**
3. **Always wash knives separately from other items, (pots, pans, etc.…).**
4. **Never open a container with a knife.**

Claw cutting method.

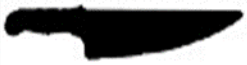


It is almost impossible to cut yourself if you maintain your fingers in the claw grip. If the knife slips while you're in this position, it will go under your fingers and prevent any cuts. After all, this technique ensures that your fingers are out of the way as the knife cuts through the food.

Correct hand placement when chopping.



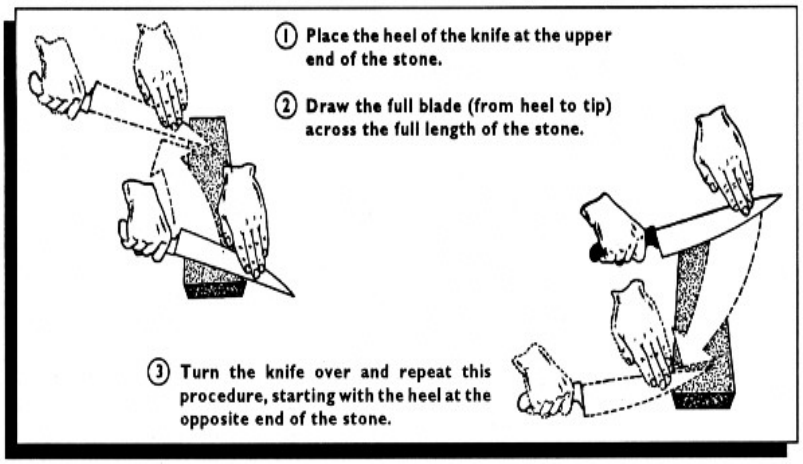
Each knife is designed for a certain job and should be used only for that job. Table 7-4 shows the knives most frequently used.

KNIFE	TYPE	USE	DESCRIPTON
	Boning knife	Cutting through joints. Cutting close around bones to separate the meat from the bones.	Short, narrow, stiff blade; narrow bevel*.
	Steak knife	Cutting steaks and roasts.	Long, wide blade; wide bevel*
	Paring knife	Peeling fruits and vegetables.	Small, narrow blade; narrow bevel*.
	Cooks' knife	Cutting, slicing, dicing, or chopping.	Large, wide blade; wide bevel*.
*The bevel is the part of the blade sharpened to make the cutting edge of the knife.			

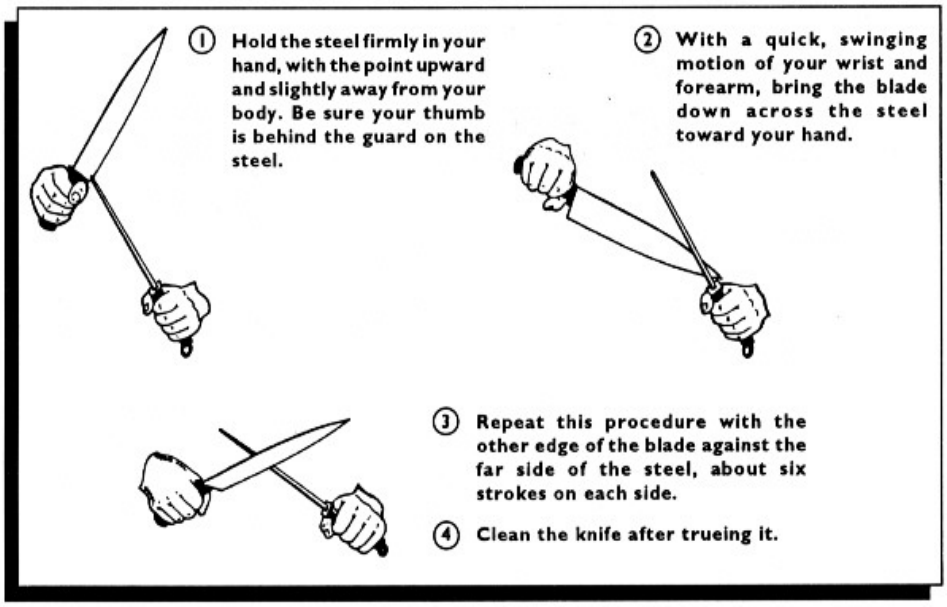
Knives used in a dining facility.

Sharpening

Sharpen knives on a medium-fine-grade carborundum oilstone. Never grind a knife on a power- or hand-driven stone because this treatment will remove the temper from the cutting edge. The correct way to sharpen a knife with a mounted sharpening stone is shown in figure 7-3. If the entire stone is used for sharpening the knife, the stone will not "hollow-out" at a particular spot. Do not use a newly sharpened knife until the blade and handle are thoroughly cleaned.



Steeling: After the knife is sharpened on a stone, the blade must be trued with a butcher's steel. There is a technique to handling the steel, which you can master with practice.



M. Using Recipe Cards

Recipes, found in TM 10-412, provide instructions for preparing food items in the Army. Culinary personnel must consult these recipes for ingredient quantities, mixing methods, cooking times, temperatures, and serving sizes. They should also be proficient in converting measurements for different serving quantities. Many recipes include informative notes on alternative preparation methods or equipment usage, which should be noted in the special instructions column of the production schedule by the Food Service Specialist (FSS). To ensure successful cooking, follow these procedures:

1. **Review the recipe card** and seek assistance for unfamiliar terms or methods.
2. Gather all necessary utensils and accurately measure or weigh ingredients.
3. Preheat cooking equipment to the temperature specified on the recipe card.
4. Set up equipment as directed by the recipe card.
5. Precisely follow the preparation steps outlined on the recipe card for successful results.
6. Adhere to instructions for removing cooked products from cooking utensils, and handle and serve the final product with care.

NOTE: Recipe Cards/ recipe conversion

Armed Forces Recipe Service TM 10-412 Designed to prepare 100 portions.
Broken down into subjects such as meat, vegetables, sauces, and gravies, etc.
Section A gives all guidelines for recipe conversions.
Convert recipes to required amounts on the DA Form 3034/AFMIS printout.
Recipe abbreviations.
Can sizes.
Convert weights and measurements.
Use the chart method.

Sample of a Recipe Card:

VEGETABLES No. Q 105 02						
BROCCOLI (FRESH)						
Yield 100				**Portion: 3 Stalks Portion**		
Calories	**Carbohydrates**	**Protein**	**Fat**	**Cholesterol**	**Sodium**	**Calcium**
38 cal	**7g**	**4g**	**0g**	**0g**	**112mg**	**69mg**

Ingredient	Weight	Measure	Issue
WATER	**37-5/8 lbs**	**4 gal 2 qts**	
SALT	**5/8 oz**	**1 tbsp**	
BROCCOLI, FRESH, CHOPPED	**30 lbs**	**9 gal 2-5/8 qts.**	

Steps

1. **Bring water to a boil in steam-jacketed kettle or stock pot.**
2. **Add salt.**
3. **Add broccoli; bring water back to a boil. Cover; cook for 10 to 15 minutes.**
4. **Place broccoli in serving pans. CCP: Heat to 145 F. or higher for 15 seconds for service. Hold for service at 140 F. or higher.**

N. Production Schedule

The primary tool used for the daily scheduling of meals is DA Form 3034 (Production Schedule) or production schedule report. The production schedule report is used when the dining facility is operating under AFMIS. The production schedule and production schedule report provide all the information a food service specialist needs for preparing a meal including the following:

a. Name of person assigned to prepare each item.
b. Recipe or SOP numbers.
c. Food items to be prepared and served.
d. Time to start preparing or cooking each item to include progressive cooking.
e. Portions to prepare.
f. Portions actually prepared. The quantity of food items used for each meal is documented on the kitchen requisition as discussed in chapter 2, paragraph 2-8.
g. Leftovers to be used in subsequent meals.
h. Leftovers to be discarded.

i. Special instructions for preparing, cooking or serving a particular item. Comments that should be included are food item run-out times, usage of field residuals, how saved leftovers will be used, why leftovers were discarded, or number of seconds served.

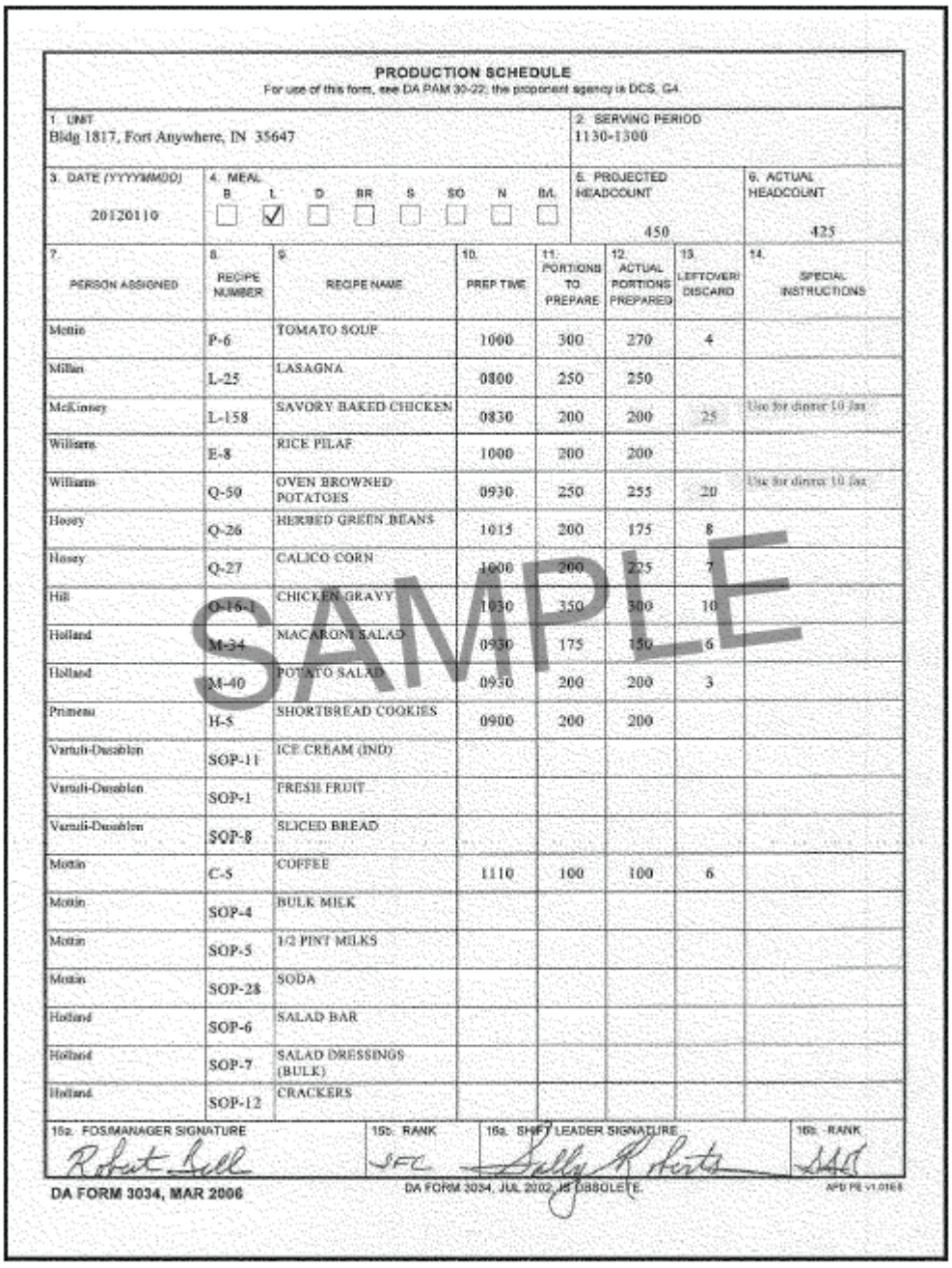
Production Schedule and Production Schedule Report Differences

Preparation instructions for the production schedule are contained in chapter 3 of DA Pam 30-22. Figure 7-1 is a sample production schedule and figure 7-2 is a sample production schedule report. The preparation instructions for the AFMIS production schedule report are generally the same as for the production schedule except for the following key differences:

a. The dining facility clerk should enter the estimated portions to prepare (not 1) for all SOP food items when generating the production schedule report. This procedure ensures the required quantities for each ingredient contained on the SOP recipe is generated for both subsistence orders and meal production.

b. The production schedule report contains a critical control point block. The critical control point from the recipe card should be entered prior to the beginning of meal preparation.

c. The prep time should be entered for SOP recipes prior to the beginning of meal preparation.



PRODUCTION SCHEDULE

For use of this form, see DA PAM 30-22; the proponent agency is DCS, G4.

1. UNIT: Bldg 1817, Fort Anywhere, IN 35647

2. SERVING PERIOD: 1130-1300

3. DATE (YYYYMMDD): 20120110

4. MEAL: B ☐ L ☑ D ☐ BR ☐ S ☐ SO ☐ N ☐ BM ☐

5. PROJECTED HEADCOUNT: 450

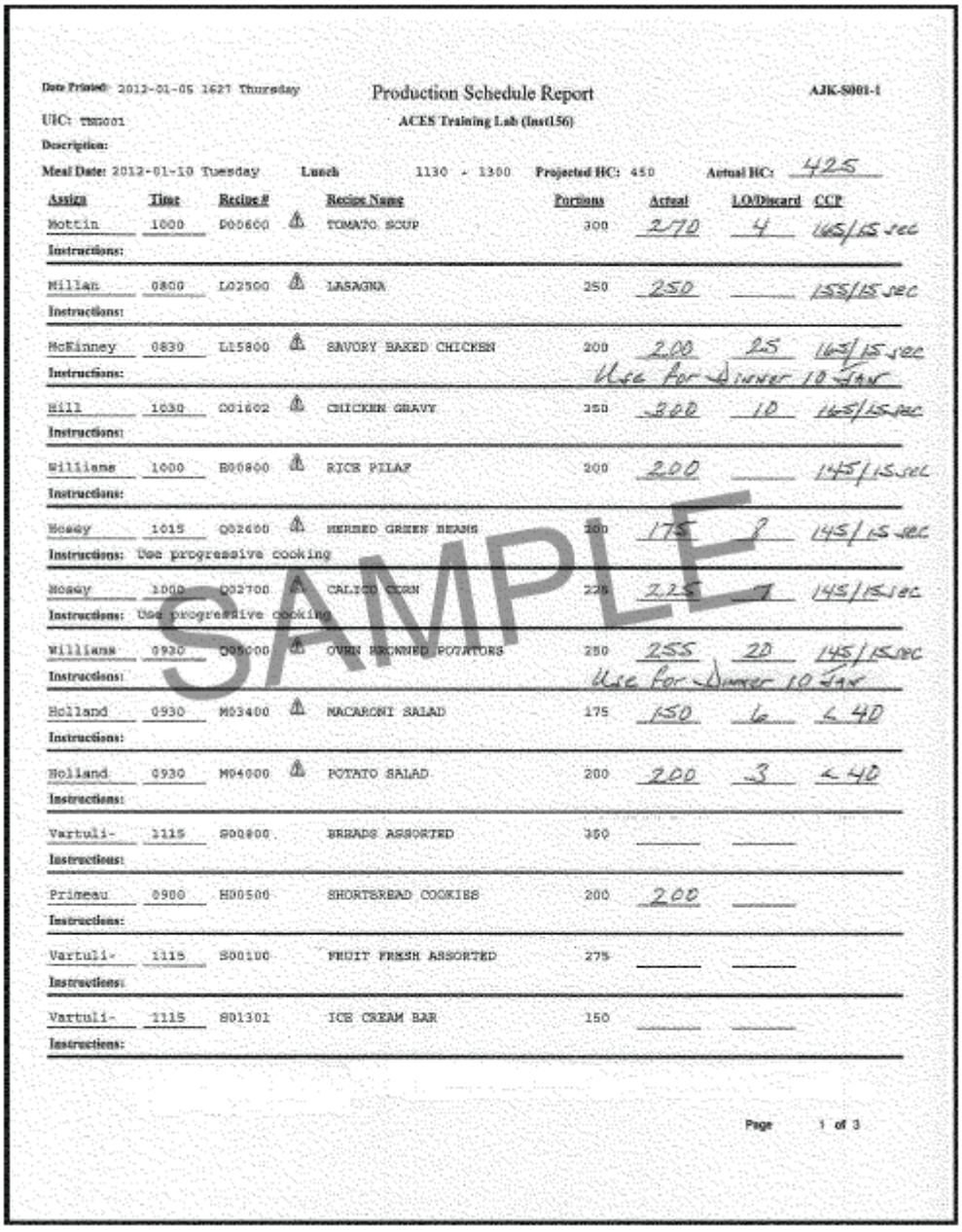
6. ACTUAL HEADCOUNT: 425

7. PERSON ASSIGNED	8. RECIPE NUMBER	9. RECIPE NAME	10. PREP TIME	11. PORTIONS TO PREPARE	12. ACTUAL PORTIONS PREPARED	13. LEFTOVER/ DISCARD	14. SPECIAL INSTRUCTIONS
Mettin	P-6	TOMATO SOUP	1000	300	270	4	
Millan	L-25	LASAGNA	0800	250	250		
McKinney	L-158	SAVORY BAKED CHICKEN	0830	200	200	25	Use for dinner 10 Jan
Williams	E-8	RICE PILAF	1000	200	200		
Williams	Q-50	OVEN BROWNED POTATOES	0930	250	255	20	Use for dinner 10 Jan
Hosey	Q-26	HERBED GREEN BEANS	1015	200	175	8	
Hosey	Q-27	CALICO CORN	1000	200	225	7	
Hill	Q-16-1	CHICKEN GRAVY	1030	350	300	10	
Holland	M-34	MACARONI SALAD	0930	175	150	6	
Holland	M-40	POTATO SALAD	0930	200	200	3	
Primeau	H-5	SHORTBREAD COOKIES	0900	200	200		
Varnali-Dunablen	SOP-11	ICE CREAM (IND)					
Varnali-Dunablen	SOP-1	FRESH FRUIT					
Varnali-Dunablen	SOP-8	SLICED BREAD					
Mettin	C-5	COFFEE	1110	100	100	6	
Mettin	SOP-4	BULK MILK					
Mettin	SOP-5	1/2 PINT MILKS					
Mettin	SOP-28	SODA					
Holland	SOP-6	SALAD BAR					
Holland	SOP-7	SALAD DRESSINGS (BULK)					
Holland	SOP-12	CRACKERS					

15a. FOS/MANAGER SIGNATURE: Robert Hill — 15b. RANK: SFC — 16a. SHIFT LEADER SIGNATURE: Sally R Hurts — 16b. RANK: SSG

DA FORM 3034, MAR 2006 — DA FORM 3034, JUL 2002, IS OBSOLETE. — APD PE v1.01E8

Figure 7-1. Sample production schedule



Date Printed: 2012-01-05 1627 Thursday

Production Schedule Report

AJK-S001-1

UIC: TMM001

ACES Training Lab (Inst156)

Description:

Meal Date: 2012-01-10 Tuesday Lunch 1130 - 1300 Projected HC: 450 Actual HC: 425

Assign	Time	Recipe #	Recipe Name	Portions	Actual	LO/Discard	CCP
Mottin	1000	D00600	TOMATO SOUP	300	270	4	165/15 sec
Instructions:							
Millan	0800	L02500	LASAGNA	250	250		155/15 sec
Instructions:							
McKinney	0830	L15800	SAVORY BAKED CHICKEN	200	200	25	165/15 sec
Instructions:					Use for Dinner 10 Jan		
Hill	1030	G01602	CHICKEN GRAVY	350	300	10	165/15 sec
Instructions:							
Williams	1000	R00800	RICE PILAF	200	200		145/15 sec
Instructions:							
Hosey	1015	Q02600	HERBED GREEN BEANS	200	175	8	145/15 sec
Instructions: Use progressive cooking							
Hosey	1000	Q02700	CALICO CORN	220	225	7	145/15 sec
Instructions: Use progressive cooking							
Williams	0930	P05000	OVEN BROWNED POTATORS	250	255	20	145/15 sec
Instructions:					Use for Dinner 10 Jan		
Holland	0930	M03400	MACARONI SALAD	175	150	6	< 40
Instructions:							
Holland	0930	M04000	POTATO SALAD	200	200	3	< 40
Instructions:							
Vartuli-	1115	B00800	BREADS ASSORTED	350			
Instructions:							
Primeau	0900	H00500	SHORTBREAD COOKIES	200	200		
Instructions:							
Vartuli-	1115	S00100	FRUIT FRESH ASSORTED	275			
Instructions:							
Vartuli-	1115	S01301	ICE CREAM BAR	150			
Instructions:							

SAMPLE

Page 1 of 3

Figure 7-2. Sample production schedule report

O. Kitchen Utensils

Rubber Spatula - Used to scrape cold foods from a container or to fold cold items in mixing bowl.

China Cap Strainer – Use to drain liquid from food.

Metal Spatula – Used to Frost Cakes.

Wire Whip- Used to stir, beat, or mix together ingredients and to increase the volume by incorporating air.

Food Turner – Used to turn food items and to serve certain food items.

Vegetable Peeler – Used to remove skin from hard vegetables, (potatoes, carrots, etc.…).

Serving Spoon – Used to serve solid food items.

Slotted Spoon-Used to serve items retained in juices or liquids such as vegetables and canned fruits.

Ladle – Used to serve and measure liquids.

Measuring Spoon Set – Used to measure ingredients up to 1 Tablespoon (Tbsp).

Measuring cup- used to measure wet or dry ingredients.

Tongs - gripping and lifting tools, of which there are many forms adapted to their specific use.

Hot Pads - used to hold hot kitchen cooking equipment, like pots and pans.

Sheet Pan - For baking sheet cakes, biscuits, rolls, etc…..

Muffin Pan - For muffins and certain hot rolls

9-inch Pie Tin - For baking and serving pies

Mixing Bowls - To mix batter and food items.

Baker's Scraper-For cutting dough and scraping.

 **Sifter - Aerate, remove impurities and lumps from dry ingredients.**

 **Pastry Brush - For egg wash, melted butter, and greasing a pan.**

 **Rolling Pin - For rolling out dough.**

 **Biscuit Cutter - To cut biscuits into precise round portions.**

 **Scale - For weighing ingredients accurately.**

 **Doughnut Cutter - To cut sweet dough in precise round portions.**

 **Oven Thermometer - to give an accurate internal reading of the oven temperature.**

 **Dough Hook - To mix dough batter in mixing bowl.**

Beater Blade - used to beat, scrape, and fold ingredient.

Wire Whip – increase volume in products by incorporating air into it, making the product lighter and fluffier.

Cooling Rack - allows pastries to cool down evenly and quickly.

P. Cooking Methods: Cooking uses moist or dry heat, and sometimes a combination of both. Moist heat methods include simmering, braising, stewing, boiling, and steaming, which are suitable for tougher meats and certain poultry, avoiding boiling to prevent toughness. Dry heat methods, like broiling, roasting, baking, grilling, and frying, are best for tender meats and fish. Lean fish should be fried or basted when baked, while fatty fish can be broiled or baked. Cook fish until it flakes easily but avoid overcooking to prevent it from becoming hard and losing flavor.

Dry Heat

Foods cooked by this method are **broiled, roasted, baked, grilling, pan-fried, deep-fat fried, or pan-broiled**. Dry-heat cooking is achieved when the product is cooked without the addition of an outside liquid. As a rule, cook meat that is tender by dry heat. Usually, fish is cooked by the dry-heat method. Fry lean fish, such as haddock or flounder, and broil or bake fat fish, such as salmon or mackerel. However, lean fish can be baked if it is basted frequently with melted fat or if it is cooked with a sauce. Cook fish so that the required cooking time ends as close to the serving time as possible. When fish is overcooked or kept warm in an oven or warmer after it has been cooked, it becomes hard and dry and loses its flavor. Fish is done when the flesh separates or flakes easily with a fork.

Moist Heat

Foods cooked by this method are **simmering, braising, stewing, boiling, or steaming**. Simmering is cooking in a liquid at a temperature just below the boiling point. Meat cooked by moist heat is simmered, not boiled. Boiling toughens meat and destroys its flavor, food value and shape. This method is used to cook large, non-browned pieces of meat such as corned beef. Moist heat is usually used to cook poultry that is not tender enough to fry or roast.

Degree of Doneness
The desired degree of doneness varies with the type of meat cooked. Beef and lamb can be served rare, medium or well-done; veal can be medium to well-done; and pork and poultry must be well-done. Pork must be cooked well-done to kill the organisms that cause trichinosis. Poultry must be cooked well-done to kill the organisms that cause salmonella. There are three methods of checking the degree of doneness.

Meat Thermometer
Always use a thermometer, if available, to check the internal temperature of the meat. The exact internal temperature for the required time to which you cook each type of meat will depend on the recipe card.

Time-Weight Ratio
If a thermometer is not available, doneness can be determined by cooking the product at the prescribed temperature for a given number of minutes for each pound of meat.

Fork Test
Stick a steel fork into the center of the meat. Note the color of the juices that come out of the meat. Red means the meat is rare and pink means it is medium. Brown means well done. Do not puncture the meat too much or too much juice will be lost. This test is acceptable but is not recommended. It is best used along with the time-weight ratio-method**.**

Section 2. Basic Culinary Baking Methods

A. Guideline for Flours
All quantities in the Measures column of the recipes should be sifted before measuring. If flour weights rather than measures are used, the flour should be sifted after weighing to aerate the flour, to remove any foreign particles, and remove lumps.

1. **BREAD FLOUR** is milled from blends of hard spring wheat and hard winter wheat or from either of these types alone. It is fairly high in protein and slightly granular to the touch. Bread flour is milled chiefly for making bread.
Bread flour also is used in fruit cakes, cream puffs, and similar products which require strength in dough structure. One-pound sifted bread flour measures 1(one) quart.

2. **GENERAL PURPOSE FLOUR** is milled from blends of hard and soft wheat. This flour is used for cookies, pie crust, biscuits, muffins, cakes, sauces, and gravies. One-pound sifted general purpose flour measures 1(one) quart.

B. Sugars and Sweeteners
Sugar is used in baked products mainly as a sweetener. It is also used as a tenderizer because it has a softening effect on flour proteins. Sugar gives a darker color to crust due to lowering the caramelization point of a batter or dough. Sugar also improves the keeping quality of baked products by retaining moisture.

a. There are three types of sugar used in baked products:
   1. Granulated sugar – most common type used.
   2. Powdered sugar – A fine compact sugar used mainly in frostings, icings, glazes.
   3. Brown sugar – Not as refined or as sweet as granulated sugar. Used for distinct color and flavor.

b. There are also other sweeteners:
   1. Molasses – A thick brown liquid obtained in the sugar making process. It contains caramel and is used for color and flavor.
   2. Honey – A liquid used for flavor. Adds color and chewy texture.

C. Leavening
Dough or batters are made to rise by leavening. Leavening agents produce volume and lightness bubbles of gas into the dough or batter. A fault when baking in which too much leavening or the wrong type of leavening is used can cause an off flavored taste.

a. There are three types of leavening:
   1. Physical - Putting air into the batter or dough by mixing. Usually, physical leavening is combined with chemical or biological leavening.
   2. Chemical – Baking powder or baking soda is added to the batter or dough. Under certain conditions, they produce carbon dioxide gas that causes the dough to expand.
   3. Biological – The enzymes in yeast convert sugar to carbon dioxide gas.

b. Examples of leavening:
   1. Physical – Air
   2. Chemical – Baking Powder/ Baking Soda
   3. Biological – Yeast

Note: *Yeast is a froth or sediment consisting of the cells of certain minute fungi.

D. BAKING PROCEDURES: Cooks are responsible for daily baking in the dining facility. Freshly baked items are integral to menu planning, offering diverse choices for customer satisfaction and balanced meals. This guide covers the preparation of pies, cakes, cookies, quick breads, and yeast-raised products. Baking is a precise science, requiring strict adherence to recipe card instructions.

E. BAKING TERMS: Many of these terms are utilized in both cooking and baking, as noted in your small quantity cooking handout. However, some are exclusive to baking. Familiarize yourself with these terms and their meanings to accurately follow recipes and prepare your baked goods.

Bake – To cook by dry heat in any oven, either covered or uncovered.

Batter – A mixture of flour, water or milk, eggs, etc., thin enough to be poured.

Blend - To mix two or more ingredients thoroughly.

Cream - To mix until smooth, so that the mixture is softened and thoroughly blended.

Dobie – A mixture of flour and shortening used to grease cake pans.

Dock - To punch or cut a number of vertical impressions in dough.

Dough – A mixture stiff enough to be kneaded.

Dust - To sprinkle surface lightly with flour or powdered sugar.

Fermentation – Chemical changes caused by yeast reproduction that produces formation of carbon dioxide gas, alcohol, and acids that cause dough to rise.

Fold – To blend two or more ingredients together with a cutting and folding motion.

Glaze – A glossy coat given to foods, as by covering with a sauce or adding a sugary syrup, icing, etc.

Gluten – A tough elastic protein that gives dough its strength and ability to retain gas.

Grease – To spread a light film of shortening or fat over a baking surface.

Knead – To work dough by folding and pressing firmly with palms of hands, turning between folding.

Mix – To combine ingredients to form batters or dough.

Panning – To place made up dough in a pan.

Proof – To cause dough to rise as the final stage of the precooking process performed after make-up.

Punch – To lift and fold dough that has fermented, to force out excess gas.

Wash – A liquid brushed on an unbaked product.

F. BAKING PRODUCTS

1) **QUICK BREADS:** Quick breads are similar to yeast-raised products. However, they are easier to prepare because they are leavened with baking powder or soda instead of yeast. Some quick breads are biscuits, muffins, corn bread, and coffee cake.

Types

Biscuits: Baking powder biscuits are made from flour, milk, baking powder, shortening, and salt, or from biscuit mix. The biscuit dough is rolled out to ½ inch. They are baked in sheet pans and come out round with uniformed golden-brown tops and bottoms.

Muffins: Muffins are made from batter that includes all the ingredients used in biscuits plus sugar and eggs. They are baked in muffin tins. Muffins have rounded tops and are sweeter than biscuits. After preparation the muffin tins are filled ⅔ full. The two fats that are interchangeable in preparing a muffin batter are melted shortening and salad oil.

Corn bread: Corn bread is made from batter which contains cornmeal. It may be baked in a sheet pan or in muffin tins. Corn bread is yellow, with a granular texture.

Coffee cake: Many varieties of coffee cake are made with baking powder or biscuit mix. Coffee cake is made from dough which contains a high percentage of sugar. It is baked in a cake pan.

Mixing Procedures

You may make quick breads from scratch or from mixes. Biscuit mix can be used to make coffee cake as well as biscuits. You can make muffins from cake mix. There is also a mix to make corn bread. TM 10-412 tells how to prepare dough or batter for each type of quick bread. Mix the batter or dough only long enough to moisten dry ingredients and distribute liquid evenly. Even if the batter looks lumpy, you have mixed it properly when no dry ingredients are showing. A common fault in preparing quick breads is over mixing.

Make up: and pan quick breads are described in recipes. Be sure that your biscuit cutter is sharp. A dull cutter will pinch the edges of the dough and leave an uneven product. Place biscuits on an ungreased sheet pan. Add leftover dough to fresh dough before you knead it. Biscuits may be made up early and refrigerated until you are ready to bake them.

Baking Procedures

Follow baking time and temperature given in the recipe or on the box. Serve quick breads hot.

Table 23-8: lists common faults found in quick breads and their causes.

	CAUSES	FAULTS
BISCUITS	Tough crumb	Too little shortening, too little baking powder, or too much liquid. Dough too cold or overmixed. Baking temperature too low.
	Coarse crumb	Too little liquid or too much baking powder. Dough too warm or improperly mixed.
	Dry	Too little sugar or shortening. Dough too stiff. Biscuits overbaked or oven was not hot enough.
	Flat and heavy	Wrong ingredient proportions. Dough too stiff, too cold, or not mixed properly. Oven temperature too low.
	Hard crust	Biscuits overbaked or oven too hot.
	Crumbly texture	Too much sugar or baking powder, or not enough liquid.
	Pale crust	Not enough sugar. Dough too stiff. Oven temperature too low.
MUFFINS	Tough crumb	Wrong ingredient proportions. Batter overmixed.
	Dry	Too much baking powder or too little sugar or shortening. Batter too stiff. Muffins overbaked.
	Holes or tunnels	Not enough liquid or shortening. Batter overmixed.
	Heavy uneven grain	Not enough leavening. Not enough shortening.
	Muffins peak	Batter too stiff. Batter overmixed. Pans too full. Oven too hot.
	Unevenly browned	Wrong ingredient proportion. Batter not mixed thoroughly. Oven temperature uneven or too high.
	Poor flavor	Too much soda. Batter mixed improperly.

2) **Cookies:** There are three basic types of cookies. They are drop cookies (Chocolate Chip cookies), sliced cookies (Sugar cookies), and bar cookies (Brownies). All may be made from cookie mixes or from scratch.

Makeup: Cookies are made up in different ways depending on the final form you want them to take.

Drop: Drop soft dough from a spoon or ice cream scoop onto a sheet pan. You can also use a pastry bag to drop the dough.

Sliced: Handle the dough as little as possible and use a minimum amount of dusting powder. Roll the dough into a long cylinder and slice it with a sharp knife or a baker's scraper. Use a marked stick as a cutting guide.

Figure 23-7 shows how to make up sugar cookies. This type of cookie can also be rolled out and cut with a cookie cutter, but this takes longer and results in leftover dough. Some cookies must be refrigerated before they are cut. When the recipe calls for refrigeration, remove the roll from the refrigerator about 5 to 10 minutes before slicing so that the dough will not crumble.

Bar: Form bar cookies from rolls of dough flattened in a sheet pan (Figure 23-8). Brownies and gingerbread, which are made from dough spread into a sheet pan before baking, are also classified as bar cookies. They are usually cut while warm to keep them from breaking.

Baking Procedures

Preheat ovens to required temperature. Turn out brownies like a layer cake, score lightly, and then cut when they are cool. Do not stack warm cookies or they will stick together. Frost cookies when they have cooled or leave them plain. You may use a dusting of powdered sugar instead of frosting.

General rules for cookies:

a. When finished baking cookies, always loosen cookies while the pan is warm.

b. The 2 methods of preparing cookies: Mix or from scratch.

c. When using baking soda as a leavening agent, you must always use and edible acid. Carbon dioxide gas is released during the chemical leavening process.

d. The finer the granulation of sugar the less spread the cookie will have.

e. Cookies are determined done by sight.

f. Eggs contribute moisture to your cookies.

Faults in cookies, causes, and corrections.

FAULT	CAUSES	REMARKS
Off-flavored	Ingredients faulty. Pan dirty. Overbaked. Too much or wrong type leavening.	Store ingredients properly. Pan grease becomes rancid and is absorbed by the cookies.
Poor keeping qualities	Not enough moisture retaining ingredients. Dough aerated too much. Cookies stored improperly.	Add ingredients such as honey, molasses, and brown sugar to prolong keeping time. Opened-grained cookies tend to dry out and become stale quickly. Store in clean, dry, well-ventilated place.

3) Pie Preparation

Pie Crust:

- You can mix pie dough by hand or machine.
- Start by blending dry ingredients with shortening until lumps form.
- Lumps get smaller with continued blending.
- Two types of pie crust: one crust and two crusts.
- To achieve a flaky crust, aim for lumps between ½ and ¼ inch wide.
- For mealy crust, use oil or hydrogenated shortening and blend until crumbs form.
- The amount of water varies for flaky and mealy crusts.
- Refrigerate dough cylinders for at least an hour before use.
- Roll out crusts to the desired thickness.

Pie Wash:

- A liquid brushed on top of a two-crust pie for a golden-brown color.
- Liquid options include water, milk, starch solution, or thin syrup.
- Apply the wash before baking or 10 minutes before finishing.
- If applied before baking, allow it to dry before placing the pie in the oven.
- Use a small amount to avoid a varnished or soggy appearance.

Pie Fillings:

- Two-crust and lattice-crust pies typically contain fruit combined with water or juice, sugar, and other ingredients.
- Starch is added to thicken the filling.
- Pre-gelatinized or cornstarch can be used as thickeners for fruit fillings.
- One-crust pies may have various fillings, such as cream, chiffon, lemon, meringue, pecan, walnut, custard, pumpkin, sweet potato, or mincemeat.
- Fillings can be made from scratch or with pudding mixes.
- Heat-treated fillings must cool before pouring into the crust.
- Highly perishable fillings containing milk and eggs should follow TB MED 530 guidelines.

Meringue:

- Used with one-crust pies in prebaked pie shells.
- Made from egg whites or meringue powder.
- Avoid greasy bowls as even a slight trace can affect whipping.
- Beat meringue until it forms peaks.
- Spread it evenly over the filling, covering to the crust's edge to prevent shrinking during baking.

Table 23-1. Types of Pie Crust

TYPE	METHOD OF COMBINING DRY INGREDIENTS WITH SHORTENING	AMOUNT OF WATER TO USE *(Percentage of flour weight)*
Long flake	Mix until particles are 1/2 inch in diameter.	42
Short flake	Mix until particles are 1/4 inch in diameter.	36
Mealy	Mix thoroughly.	28

Pie Preparation Cont.

Each type of pie or related pastry is prepared differently:

One-crust pies: After you have made the pie crust, pan it as shown in Figure 23-2. Then, add the desired fillings, such as pecan, walnut, pumpkin, sweet potato, or mincemeat, to the unbaked pie shell. With these pies, you bake the filling and shell together. However, with cream, chiffon, and lemon fillings, you bake the shell before you add the filling.

Fruit pies/two crust pies: Pan the bottom crust. Then pour the fruit filling into the unbaked shell. Dock the top crust and place it over the filling. Bake crust and filling together. For a two-crust pie, the top crust is a solid layer of dough. For a lattice-crust pie, the top crust is formed by laying strips of dough across the filling in a crisis-cross pattern. Figure 23-3 shows the process with a two-crust pie.

Cobblers: Bake a fruit filling between two large pieces of pie dough in a sheet pan. Figure 23-4 shows the process.

Turnovers: Fold small squares of pie dough over a fruit filling. Seal the edges and bake the crust and filling together.

Yeast-Raised Products

Recipe Source: Find yeast-raised product recipes in TM 10-412, including bread, rolls, biscuits, English muffins, coffee cakes, and Danish pastries. Precise timing and scheduling are essential due to fermentation, and having available oven space is crucial.

Dough Preparation:

- Use active dry yeast following these steps (skip for instant yeast).
- For active dry yeast, dissolve it in water heated to 105°F-110°F; stir and let stand for five minutes.
- Control water temperature to achieve an 80°F dough temperature.
- Mix ingredients with a dough hook until smooth and elastic.
- Proper mixing ensures even yeast distribution, removal of lumps, and gluten formation.
- Stop when the dough reaches the desired consistency, based on the type of product.
- Place the dough in a lightly greased bowl for fermentation, cover with a damp cloth.

Fermentation:

- Allow dough to ferment in a warm place (about 80°F) per the recipe's time.
- Test readiness by pressing fingers into the dough; it should sink slowly.
- If the dough springs back or sinks rapidly, adjust fermentation accordingly.
- Punch the dough if needed, then let it rest according to the recipe.
- Danish pastry dough is created by rolling fat into the dough; no punching is required.

Makeup:

- Makeup techniques vary based on the type of yeast-raised product.
- For plain rolls, divide the dough and shape it into various forms like cloverleaf, frankfurter, hamburger, pan or cluster, or Parker house rolls.
- Sweet rolls and Danish pastries offer multiple shapes, fillings, and toppings. Shape the dough into round sweet rolls, folded dough rolls, or wedge roll-ups after dough preparation.

Six Step Process

1. **Mix** – Gluten is being developed.
2. **Fermentation** – Leavens and Matures
3. **Punch** – Release excess gas.
4. **Make up** – Produce individual items from a mass of dough.
5. **Proof** – at 90f until its doubled in size
6. **Bake** – Apply dry heat.

Types of Cakes

Cake Basics: Cake is a baked batter made from flour, sugar, salt, leavening, shortening, milk, eggs, and flavoring. TM 10-412 features recipes for two cake types: batter cakes and foam cakes.

- Batter Cakes: These include white, yellow, spice, fruitcake, and gingerbread. They contain shortening and can use either general-purpose or bakery emulsifier shortening as specified in the recipe.

- Foam Cakes: Foam cakes like jelly roll and applesauce cake are shortening-free, featuring lower baking powder content. They primarily rise through beating.

- Cake Mixes: Cake mixes are available for angel food, banana, cheese, devil's food, pound, white, yellow cakes, and gingerbread through TISA. Customization is possible by adding extra ingredients or combining two mixes, as suggested in TM 10-412.

- Cake Forms: Both batter and foam cakes can be prepared as sheet cakes, layer cakes, or cupcakes. Sheet cakes are flat, single-layer cakes baked in a sheet pan. Layer cakes are created by stacking 9-inch layers with frosting in between, using either two sheet cakes or one cut in half. Cupcakes are baked in lined muffin tins for easy removal.

Other Cakes:

- Upside-Down Cake: Made by pouring batter over fruit, and when inverted, the fruit becomes the topping.
- Jelly Roll: A thin cake layer coated with jelly and rolled into a spiral, which can be customized with chocolate or vanilla cream.
- Boston Cream Pie: Consists of a split layer with a cream filling in the center, topped with chocolate frosting or powdered sugar.

PREPARATION OF BATTER

Batter Preparation Tips:

- Cake Mix Batter: Follow the directions on the mix container.
- From-Scratch Batter: Follow the provided recipe instructions.
- Ingredient Temperature: Maintain the right ingredient temperatures:
- Shortening should be workable, not too cold or liquefied.
- Generally, ingredients should be at room temperature unless the recipe states otherwise.
- Use cool water, and let eggs sit at room temperature for 30 minutes before use.
- Accurate Measurement: Weigh or measure all ingredients accurately.
- Mixing Procedure: Follow the recipe's mixing procedure closely.
- Avoid overbeating or under beating the batter.
- Adhere to the recommended beating times at each stage as indicated on the recipe card.

Preparation of Pans: For most cakes, the cake pans must be greased before the batter is poured in. Each recipe tells how to prepare pans. If a cake is to be served from the pan, coat the pan with Dobie, a mixture of two parts shortening and one part flour. If the cake is to be removed from the pan, coat the pan with grease and line it with paper.

Procedures for Panning Batter: The recipe tells you what size cake pan to use and how much batter to pour into it. If you use a different size pan, you will have to use a different amount of batter.

Pan batter as follows:

a. Pour amount specified in recipe into the pan.

b. Spread batter evenly with a spatula.

c. Remove air bubbles by tapping pan lightly on a table or by cutting through batter with a knife.

d. Place batter-filled pan into preheated oven immediately.

BAKING PROCEDURES

REMOVAL OF CAKES FROM PANS: Jelly rolls and upside-down cakes must be removed from the pans while they are still hot. Allow other kinds of cake to cool in the pans for 10 minutes before you turn them out. Place pans on racks to let air circulate freely around them but keep them out of drafts. Layer cakes should be turned out onto paper dusted lightly with cornstarch or powdered sugar. Sheet cakes may be turned out or frosted in the pans. Turn them out onto an inverted pan covered with paper that has been dusted with cornstarch or powdered sugar. Allow cakes to cool thoroughly before frosting.

Frostings come in two classifications: cooked and uncooked. They serve to enhance the appearance and taste of cakes, as well as prolong their freshness by retaining moisture. TM 10-412 provides instructions for various frosting types, so choose one that complements your cake, such as using mildly flavored, fluffy frostings for light cakes like sponge or angel food cakes. The finished frosting should be smooth and easily spreadable. To color white frosting, add food coloring to a small portion and gradually mix it into the plain frosting until the desired color is achieved. Avoid excessive food coloring, as deeply colored frostings may lack visual appeal.

TM 10-412 also offers recipes for banana cream, chocolate cream, lemon cream, pineapple cream, vanilla cream, and pineapple fillings, which can be made from pudding mixes or from scratch. Cream fillings should either be served immediately or refrigerated promptly due to the rapid growth of bacteria. Safe keeping times at different temperatures can be found in Table 23-4, with additional information available in TB MED 530.

Finishing procedures vary for different types of cakes. Figure 23-5 demonstrates how to finish a layer cake, while Figure 23-6 outlines the preparation of a Boston cream pie. Sheet cakes can be left in the pan and frosted on top or finished with toppings like nuts, coconut, chocolate chips, or cherries. Frosting the cake soon after it cools helps retain its moisture.

CAKE FAULTS: Baking is as much an art as it is a science. Cakes and frostings are subject to numerous faults with even more numerous causes. Table 23-5 lists common faults in cakes along with their possible causes and suggested remedies. Table 23-6 lists frosting faults, causes, and remedies.

Section 3. ARMY FIELD FEEDING OPERATIONS

REFERENCES

- AR 30-22, The Army Food Program, 24 Jul 2012
- DA PAM 30-22, Operating Procedures for the Army Food Program, 06 Feb 2007
- ATP 4-41, Army Field Feeding and Class I Operations, 31 Dec 2015
- Tri-Service Food Code (TB MED 530), 30 Apr 2014
- TC 4-02.3 Field Hygiene and Sanitation, 6 May 2015
- Operational Ration Handbook, Defense Supply Center Philadelphia (DSCP), Jan 2007
- NATICK PAM, 30-25, Operational Rations of the Defense Department, Nov 2006

A. THE ARMY FIELD FEEDING SYSTEM (AFFS)

The Army Field Feeding System (AFFS) is a comprehensive system designed for flexible feeding methods aligned with doctrine. Its primary objective is to sustain tactical feeding according to METT-TC factors. AFFS enhances the Commander's support capabilities in adverse conditions, prioritizing mobility, responsiveness, and reducing administrative burdens. It aims to deliver the right meals to Soldiers at the right place and time. The standard for AFFS is three quality meals per day, achieved through a mix of individual and group operational rations. Logistical staff planners determine ration combinations based on ongoing operations and provide guidance to Commanders for daily field feeding needs in various battlefield situations.

B. The Army Family of Rations

Rations are categorized by their operational purpose and are known as individual meals, group meals, or special meals. Individual operational ration meals, like the MRE, consist of pre-packaged, ready-to-eat food for a single Soldier's complete meal. They are used when group operational rations are not suitable. Group rations, as the name suggests, serve multiple Soldiers, and come in 18 or 50 person modules. Special operational rations and commercial food sources are available for unique situations like training, survival, religious requirements, and humanitarian assistance. Mandatory supplements like milk, along with additional meal components like bread, salad, vegetables, and fruit, ensure a well-rounded dining experience.

1) INDIVIDUAL FIELD FEEDING

The Meal, Ready-To-Eat (MRE), Tailored Operational Training Meal (TOTM), meal cold weather (MCW), Long Range Patrol (LRP) and First Strike Ration (FSR) are the only four individual operational rations. They are used when mission conditions dictate, and group operational rations cannot be issued or prepared.

a) Meal, Ready-to-Eat (MRE)

The MRE is the primary and most familiar individual operational ration. It is continually reviewed, and new menus are added annually to avoid menu boredom. MREs are packaged meals designed for consumption either as an individual meal or in multiples of three as a complete day's ration.

b) First Strike Ration (FSR)

The FSR is a restricted ration designed to be eaten on the move during initial periods of highly mobility.

c) Tailored Operational Training Meal (TOTM)

The purpose of the tailored operational training meal is to provide an alternative operational training meal that addresses limited training and budget concerns of the reserve component. The TOTM is used in lieu of commercial sack lunches and catered commercial meals for reserve component organizations that engage in inactive duty training. The TOTMs are used in situations where employment of traditional operational ration meals is not mandated. The TOTM is designed to be a just-in-time direct vendor delivery item with a seven-to-ten-day delivery time. Orders by individual Reserve Component units should be accomplished using established requesting procedures. The TOTM is currently only available within continental United States.

d) Meal, Cold Weather (MCW), Long Range Patrol (LRP)

The Meal Cold Weather and Long-Range Patrol rations provide an operational ration for two separate operational scenarios. The MCW is intended for cold weather feeding and the long-range patrol is intended for special operations.

e) Meal, Religious, KOSHER/HALAL

The Meal, Religious, Kosher/Halal is used to serve those individuals in Military Services who maintain a strict religious diet.

f) Meal, Religious, KOSHER for Passover

The Meal, Religious, Kosher for Passover is used to feed those individuals in Military Services who maintain a Kosher for Passover diet by providing three meals per day for not more than eight days during their observance of Passover.

Commercial Meal Kits

Commercial meal kits are compact, self-contained meals that offer opportunities for cold or hot dining. These are meal alternatives for activities, convoys, or range training. The meals offer a wide variety, such as cold cut sandwiches or stews, with drinks and snacks. These kits fit the “niche” when standard operational rations are not used.

2) GROUP FIELD FEEDING

Group field feeding is accomplished using three types of unitized rations. The Unitized Group Ration – Heat and Serve (UGR-H&S) and Unitized Group Ration – A (UGR-A) modules each feed up to 50 Soldiers and the Unitized Group Ration – Express (UGR-E) module feeds up to 18 Soldiers. The UGR is a modularized ration that reduces the number of line items handled by class I sustainment activities and provides commanders the condition based (METT-TC) flexibility to serve group meals in a variety of situations.

a. Unitized Group Ration - A (UGR-A)

The UGR-A includes perishable and semi-perishable items that require refrigeration, increased transportation, fuel, equipment, and potable water requirements. Perishable items in the ration modules may be frozen precooked or frozen raw commodities. Concurrent with the introduction of perishable rations into the field or the AO, refrigerated transportation and storage assets are mandatory. Sources of refrigeration include existing TOE assets.

b) Operational Considerations and Characteristics

The Unitized Group Ration - A (UGR-A) Each UGR-A module provides all menu components required to serve 50 Soldiers a high-quality meal. Milk is a mandatory supplement to the UGR-A. Enhancements such as bread, fresh fruits and vegetables, and cereal to compliment the meal should be ordered. UGR-As are not stocked by DLA and are assembled and delivered by commercial contracts only when they are requested by units to meet feeding requirements.

c) Unitized Group Ration – Heat & Serve (UGR-H&S)

The UGR-H&S ration has been designed to sustain the Army during highly mobile field situations when refrigeration is restricted or absent, yet there is field kitchen equipment and food service personnel.

d) Unitized Group Ration - Express (UGR-E)

The UGR-E provides an alternative to individually packaged operational ration meals as the only available method for small group remote feeding when Culinary Specialists and field kitchen equipment are not available. Army combat and support units that benefit the most from this ration include those which operate in remote locations for accomplishment of their mission.

3) ENHANCEMENTS AND SUPPLEMENTS

All UGR menus must be supplemented by milk to meet The Surgeon General (TSG) nutrition requirements. The UGR may also be enhanced with the following items to increase meal variety and Soldier acceptance.

a. Fresh fruits can be made available for all UGR meals. Two different fruit varieties per meal are authorized.

1. The fruits listed below have an issue factor of 18 lb. per 50 persons.

(a) Apples.

(b) Bananas.

(c) Oranges.

(d) Pears.

(e) Plums.

2. Summer seasonal fresh fruit is allowed, and amounts are based on 50 persons.

(a) Cantaloupes, 21 lb.

(b) Honeydew, 21 lb.

(c) Nectarines, 18 lb.

(d) Watermelons, 26 lb.

b. For the breakfast meal, assorted dry cereal (bowl packs) are authorized. Issue 50 individual bowl packs per 50 persons. When dry cereal is served, an additional 1/2 pint of UHT or fresh milk per person is required.

c. A salad option is also available with the authorized enhancement grouping. A 5-pound mixed salad bag is authorized per 50 persons. Other optional salad items may be ordered when salad option is selected.

(1) Cucumbers, 2 lb.

(2) Onions, yellow dry, 2 lb.

(3) Radishes, fresh, red, 1/2 lb.

(4) Spinach, fresh, ready-to-use, 2 lb.

(5) Tomatoes, 6 lb.

(6) Lemons, fresh, 2 lb.

(7) Salad dressing, assorted, light or regular (blue cheese, French, Italian, ranch, and thousand island) issue, 150 individual 7/16 oz. packages. Two different salad dressings are authorized per meal.

d. When a hamburger meal is served, the following fresh items may be authorized. These menu items and issue factors are per 50 persons.

(1) Tomatoes, fresh - issue 6 lb.

(2) Onion, yellow dry - issue 3 lb.

(3) Lettuce, fresh - issue 4 lb.

(4) Cheese, American, sliced - issue 5 lb.

e. Commercial bread (rye, white, wheat, or raisin) - 6 lb. per 50 persons. Shelf stable bread is available when there is a requirement for bread and commercial bread cannot be provided.

4) WARMING AND COOLING BEVERAGES

Beverages are used to provide additional beverage consumption in cold or hot training environments. Subsistence items considered warming beverages are coffee, hot tea, hot chocolate, and soup. Enhancements offered with warming beverages may be available. Cooling beverages are cool water with flavored beverage base items.

5) RATION STORAGE

The field kitchen must have enough dry and refrigerated storage space to prevent spoilage and cross contamination of Class I (Rations). Improper storage causes loss in form of possible spoilage and contamination of rations. Semi-perishable and Perishable storage racks or containers must be at least four (4) inches above the ground or floor.

- Cover bulk food items to prevent contamination from dust and other debris.
- Leave and store items like flour, sugar (packets) and rice in their original containers, placing them in metal containers with tightly fitted lids to protect from excessive heat, moisture, and infestation.
- Store fruits and vegetables in dry, open container to permit air to circulate around them, slowing decay and spoilage. Highly perishable vegetables such as bagged salad or lettuce should be placed in an ice chest, if possible.

C. Army Field Feeding Equipment

The Army's inventory of field feeding equipment ranges from heating devices used by the Soldier to heat individual rations to major end items of equipment used to operate mobile field kitchens capable of feeding hundreds of meals daily.

EQUIPMENT CATEGORIES

There are two equipment categories for Field Feeding Equipment.

1. COMPONENTS OF MAJOR END ITEMS
2. MAJOR END ITEMS

COMPONENTS OF MAJOR END ITEMS

1. Modern Burner Unit (MBU)
2. Battery Pack
3. 59 Range: Accessory Outfit
4. 2kW Generator
5. Insulated Food Container (IFC)
6. Insulated Liquid Dispenser

a) Modern Burner Unit (MBU)

1. The primary heat source for the kitchen and sanitation equipment found within most AFFS equipment (MKT, CK, KCLFF, and FSC).
2. It features an automated ignition and uses JP-8 or alternate diesel fuel for operation.
3. Its electronically control components also reduce hazardous combustion emissions.
4. Eight MBU-V3s may be powered through one power converter.
5. The air and fuel filters will be replaced after 300 hours of use.
6. The MBU must be cleaned with hot soapy water and a rag.

Note: CK and MKT must be 50 ft. from any fuel storage area.

b) 2 kW Generator

The generator is a self-contained, skid-mounted commercial diesel system with a capacity of 2 kW, providing 120 VAC at 60 Hz. It is designed to withstand various environmental conditions, including rain and snow, and can operate in temperatures ranging from -51°F to 122°F. The generator's robust design allows it to continue functioning under impact and vibration conditions, making it suitable for use in vehicles navigating challenging terrain to meet mission requirements. With a fuel tank capacity of 1.6 gallons for JP-8 fuel, it can run for approximately 4.8 hours. Notably, the 2-KW generator serves as the primary power source for the MBU (Modern Burner Unit).

c) The Insulated Food Container

The Insulated Food Container (IFC) plays a critical role in maintaining food temperatures during transport and storage, adhering to the Tri-Service Food Code's recommendations for keeping hot foods hot and cold foods cold for up to five hours. Each IFC has three inserts with tight-fitting covers, accommodating 5 2/3 quarts of food and requiring separate containers for hot and cold items. It can also transport UGR tray packs with provided divider bars to support them when heated. Proper cleaning and sanitization are essential before and after each use, with care taken not to fully submerge the IFC to prevent mold growth.

To prepare the IFC for potentially hazardous foods (PHF), it should be pre-chilled or pre-heated for 30 minutes according to ATP 4-41 guidelines. An affixed label on the IFC lid must include menu items, serving quantity, date and time of storage, and a reminder to consume or discard the food within four hours from filling. Ensure that hot PHF items reach 135 degrees or above and cold PHF items are at 41 degrees or below before placing them inside the IFC. These practices ensure the IFC's safe and effective use for food storage and transportation.

MAJOR END ITEMS

1. Kitchen Company Level Field Feeding (KCLFF) / Kitchen Company Level Field Feeding - Enhanced (KCLFF-E)

2. Mobile Kitchen Trailer (MKT)

3. Containerized Kitchen (CK)

4. Assault Kitchen (AK)

5. Food Sanitation Center (FSC)

(a) FSC-90

(b) FSC-2

6. Multi-Temperature Refrigerated Container System (MTRCS)

7. Unit Water Pod System (Camel II)

a) Kitchen, Company Level Field Feeding (KCLFF)

The Kitchen, Company Level Field Feeding (KCLFF) is designed to feed company-sized units deployed in forward locations and is authorized for specific brigade combat teams, Fires, maneuver enhancement brigade, and battlefield surveillance brigades. Units with authorization may have either the standard KCLFF or the enhanced version (KCLFF-E). The KCLFF is operated by two Soldiers and can provide one Unitized Group Ration – H&S per day for up to 250 Soldiers. Additionally, when equipped with the range outfit, griddle assembly, and ice chest from the KCLFF-E, Culinary Specialists can prepare limited quantities of UGR-A rations to serve up to 150 Soldiers.

b) Mobile Kitchen Trailer (MKT)

The kitchen, known as the MKT (Mobile Kitchen Trailer), is a complete kitchen unit mounted on a trailer chassis that can be towed by various military trucks, including the 2½-ton truck, Light Medium Tactical Vehicle (LMTV), 5-ton truck, or Medium Tactical Vehicle. In Chapter 10 of TM 10-7360-206-23P, you can find information about the MKT's components, their usage, and maintenance procedures. The MKT features a metal roof that can be lowered for storage and transport or raised for food preparation and service. To keep insects out, mosquito netting can be attached when the roof is raised. Additionally, detachable fabric sides are available to shield Soldiers from adverse weather conditions. Figure 8-3 illustrates the MKT set up in various environments.

c) Containerized Kitchen (CK) W/ Trailer

The CK (Containerized Kitchen) is a mobile self-contained field kitchen, housed within an 8 x 8 x 20 ft. container. It can be deployed independently or mounted on a trailer. To set up the CK, a minimum site of 50 feet by 30 feet of level, open space is required for maneuvering. A team of four trained Culinary Specialists, along with a supervisor, can have the CK operational in about 45 minutes. It can cater to around 800 Soldiers per meal using various group rations from the Army's ration offerings, with an average meal preparation time of approximately three hours.

d) Assault Kitchen (AK)

The Assault Kitchen (AK) is being deployed to Brigade Combat Teams that do not have the KCLFF and units with specific small group remote site feeding needs. Similar to the KCLFF, it can serve 150 personnel with UGR-A rations in static locations, and 250 with UGR-H&S, even while on the move. Setup takes as little as 10 minutes with two trained Culinary Specialists using a cargo HMMWV and trailer equipped with food preparation equipment. The Tray Ration Heater (TRH) can operate for up to 10 hours on 5 gallons of fuel, while a portable stainless steel water tank can heat 18 UGR-H&S tray packs in just 30 to 45 minutes.

e) Food Sanitation Center (FSC)

The Food Sanitation Center (FSC) provides cleaning sanitizing services for the field kitchen supporting up to 800 Soldiers. The FSC requires water, JP-8 fuel and a generator. One FSC is authorized for each MKT and CK. It can be set-up on site within one hour by four trained Culinary Specialists. It can be prepared for movement within 30 minutes. The FSC is fielded in two models, the FSC-90 and the FSC-2.

f) Multi-Temperature Refrigerated Container System (MTRCS)

The Multi-Temperature Refrigerated Container System (MTRCS) is a highly mobile, 8-ft by 8-ft by 20-ft refrigerated container system that can transport and store frozen, chilled, and semi-perishable ration components in one platform. Its advanced vacuum insulation maintains initially frozen rations for at least 12 hours. The MTRCS is authorized to support the Containerized Kitchen and Mobile Kitchen Trailer, holding three days' worth of operational rations for 800 personnel or six days' worth for 300 personnel. Field feeding with the MTRCS follows a "drop and swap" approach for efficiency.

g) Unit Water Pod System (CAMEL II)

The Camel II water tank assembly is mounted on the M1095 Series Modified 5-Ton Medium Tactical Vehicle Trailer (MTVT) bed. It's purpose-built to receive, store, and dispense up to 800 gallons of potable water while providing integrated freeze protection. It can operate effectively in temperatures ranging from -25°F to 130°F. The Camel II offers single point dispensing for cold environments and six filling positions for canteens and five-gallon water cans during normal operations.

D. Preventive Maintenance Checks and Service (PMCS)

Note: Refer to TM 750-8, 3-10 for instructions on how to fill out the forms.
Note: Refer to TM 750-8, Figures 3-24 & 3-25 to view sample DA 2404 and 5988-E.

Daily maintenance must be conducted on all military vehicles and equipment. The DA Form 2404 and Form DA 5988-E (Equipment Inspection Maintenance Worksheet) are the documents used by the Army to indicate any deficiencies before, during and after use of equipment.

E. SITE SELECTION

The unit commander or FSO specifies the general location of the field kitchen site; however, the culinary management NCO must advise the commander on the characteristics of a good field site, as shown in table 6-1. The following should also be considered in selecting and setting up the field kitchen: Site should be as level as possible to level MKT & CK (slopes cause damage to leveling jacks). Tactical or non-tactical operation, Force protection considerations, Extent of time area will be occupied, Method of solid waste disposal (burn, bury, or backhaul), Resupply operations. Availability and accessibility of roads (water for water trailer and FSC, fuel, subsistence, and nonfood supplies), Use of CK, MKTs, FSC, KCLFFs, AKs, tents, and buildings, Location of unit billeting area, Available equipment and space for proper arrangement, Location away from latrines or any source of contaminants, Sufficient refrigeration requirements for ration mix supported (unit assets or contracted), Force protection measures.

Table 6-1. Characteristics of a good field kitchen site

Characteristic	***Importance***
Good natural cover	Shields troops from the enemy and protects them from sun, heat, and cold winds. Improves force protection measures.
Good access roads	Ensures supply trucks can move freely.
High and dry level ground near a protected slope	Ensures good drainage and protection from the wind.
Enough space	Eliminates crowding of the troops and facilities spreading out the equipment so that personnel can work efficiently. Improves survivability.
Near source of potable water	Used in preparation of foods and beverages.
Sandy loam or gravelly soil	Allows excess water to seep away and helps soakage pits and trenches to work well.

F. SITE LAYOUT

Figure 6-1 shows a site setup showing recommended distances for the sanitary and safe operation of the field kitchen. The field kitchen area should be camouflaged to hinder detection by enemy aircraft, ground forces, or infrared sensors. Passive measures should include dispersion, camouflage, cover and concealment, and light and noise discipline. Survivability such as covering vehicle tracks into the field kitchen site and staggering ration distribution to eliminate congestion of the site should always be included as considerations for site layout and operations. The following are some precautions that leaders must enforce:

- Do not let the troops gather in large groups to eat.
- Make sure the area and equipment cannot be seen from the air.
- Screen the dining area from ground observation if it is set up near the front lines.
- Bury or retrograde disposable dishes and utensils, tin cans, and litter from packaged rations.
- Camouflage the area where refuse is buried.
- Field kitchen and unit field sanitation team members must be aware of the policy on garbage.
- disposal in their AO.
- Camouflage equipment and other things that might reflect light and keep them out of sunlight.

Note: Specifics about using camouflage are contained in ATP 3-37.34

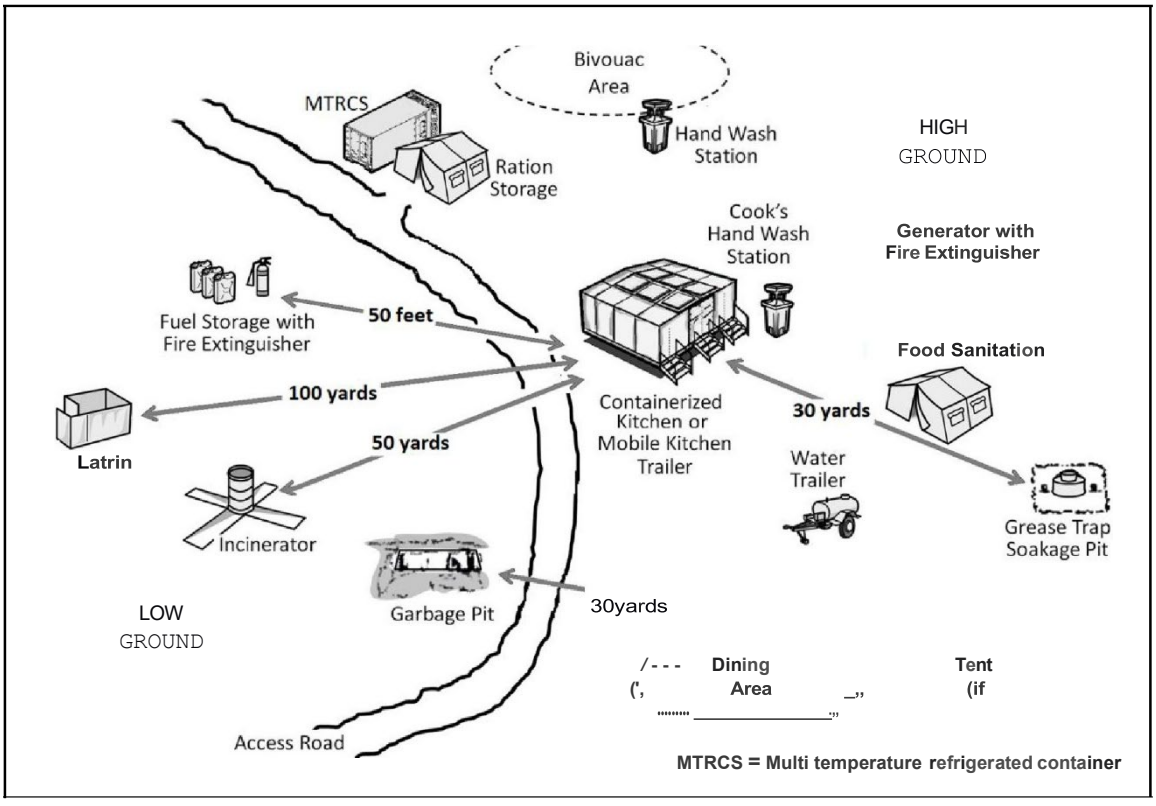


Figure 6-1. Recommended field kitchen site layout.

Culinary Definitions:

Bake - to cook by dry heat in an oven, either covered or uncovered.

Barbecue - to roast or cook slowly, basting with a highly seasoned sauce.

Baste - to moisten food with liquid or melted fat during cooking to prevent drying of the surface and to add flavor.

Batch Preparation - A predetermined quantity or number of servings of food that is to be prepared at selected time intervals in progressive cookery for a given meal period to ensure fresh, high quality cooked food to customers.

Beat - to make a mixture smooth by using a fast regular circular and lifting motion which incorporates air into a product.

Blanch - to partially cook in deep fat, boiling water, or steam.

Blend - to mix two or more ingredients thoroughly.

Boil - to cook in liquid at boiling point (212° F.) in which bubbles rise and break at the surface.

Braise - o brown in small amount of fat, then to cook slowly in small amount of liquid below the boiling point in a covered utensil.

Bread - o cover with crumbs or other suitable dry coating ingredient; or to dredge in a mixture of flour seasonings, and/or condiments, dip in a mixture of milk and slightly beaten eggs and then dredge in crumbs.

Broil - to cook by direct exposure to heat.

Brown - to produce a brown color on the surface of food by subjecting it to heat.

Chop - to cut food into irregular small pieces.

Combine - o bring together two or more ingredients by sifting, blending, mixing, or tossing.

Cream - to mix until smooth, so that the resulting mixture is softened and thoroughly blended.

Crimp - to pinch together in order to seal.

Cube - to cut any food into square-shaped pieces (½ inch).

Dice - to cut into small cubes or pieces (¼ inch).

Dredge - to coat with crumbs, flour, sugar, or corn meal.

Flake - to break lightly into small pieces.

Fold - to blend two or more ingredients together with a cutting and folding motion.

Fry - to cook in hot fat.

Garnish - to decorate with small pieces of colorful food.

Glaze - a glossy coat given to foods, as by covering with a sauce or by adding a sugary syrup, icing, etc.

Gluten - a tough elastic protein that gives dough its strength and ability to retain gas.

Grate - to rub food on a grater and thus break it into tiny pieces.

Grill - to cook, uncovered, on a griddle, removing grease as it accumulates. No liquid is added.

Knead - to work dough by folding and pressing firmly with palms of hands, turning between folding.

Marinade - a preparation containing spices, condiments, vegetables, and aromatic herbs, and a liquid (acid or oil or combination of these) in which a food is placed for a period of time to enhance its flavor or to increase its tenderness.

Marinate - allow food to stand in marinade to add flavor and improve or tenderize the food.

Mince - to cut or chop into very small pieces.

Pan-broil - to cook uncovered in a hot frying pan, pouring off fat as it accumulates.

Pare - to cut away outer covering.

Peel - to remove the outer layer of skin of a vegetable or fruit, etc.

Progressive Cookery - the continuous preparation of food in successive steps during the entire serving period (i.e... Continuous preparation of vegetables, cook-to-order hamburgers, steaks, fried eggs, pancakes). This procedure ensures fresh, high quality cooked food to customers on a continuous basis. See Batch Preparation.

Proof - to allow shaped and panned yeast products like bread and rolls to double in size under controlled atmospheric conditions.

Reconstitute - to restore to liquid state by adding water. Also, to reheat frozen prepared foods.

Re-hydrate - to soak, cook, or use other procedures with dehydrated foods to restore water lost during drying.

Roast - to cook by dry heat; usually uncovered, in an oven.

Roux - a French word for a mixture of flour and fat, cooked to eliminate the raw, uncooked taste of flour.

Sauté - to brown or cook in small amount of fat.

Scald - to heat a liquid over hot water or direct heat to a temperature just below the boiling point.

Scale - to measure a portion of food by weighing.

Scant - not quite up to stated measure.

Score - to make shallow cuts across top of a food item.

Seasoned Flour or Crumbs - a mixture of flour or crumbs with seasonings.

Shred - to cut or tear into thin strips or pieces using a knife or a shredder attachment.

Sift - to put dry ingredients through a sieve.

Simmer - to cook gently in a liquid just below the boiling point (190° F. - 210° F.); bubbles will form slowly and break at the surface.

Slurry - a lump-free mixture made by whipping cornstarch or flour into cold water or other liquids.

Steam - to cook over or surrounded by steam.

Stew - to simmer in enough liquid to cover solid foods.

Stir - to mix two or more ingredients with a circular motion.

Temper - to remove from freezer and place under refrigeration for a period of time sufficient to facilitate separation and handling of frozen product. Internal temperature of the food should be approximately 26° F. to 28° F.

Thaw - to remove from freezer and place under refrigeration approximately 18-48 hours. Internal temperature should be above 30° F.

Toss - to mix ingredients lightly.

Trim - Means to cut or tear away wilted or damaged portions from vegetables and fruits.

Wash - The liquid brushed on the surface of unbaked pies or turnovers to give a golden-brown color to the crust or on the surface of proofed breads and rolls before baking and on baked bread and rolls to give a shine to the crust.

Whip - to beat rapidly with wire whip to increase volume by incorporating air.

Stock - he liquid or broth prepared by boiling meat, fish, or vegetables and used especially for soups, sauces, and gravies.

LINK

A cook’s mount checklist for evaluating dining facility personnel for possible health and appearance hazards when they report for duty can be found on the JCCoE website, http://www.quartermaster.army.mil/jccoe/jccoe_main.html, on the Standard Operating Procedures page.