



OPERATIONAL RATIONS

CURRENT AND FUTURE OF THE DEPARTMENT OF DEFENSE

JANUARY 1983

US ARMY NATICK
RESEARCH AND DEVELOPMENT
LABORATORIES
NATICK, MASSACHUSETTS 01760

PREFACE

The US Army Natick Research and Development Laboratories (NLABS), located at Natick, Massachusetts, is responsible for research, development, and technical support of rations and subsistence items for all components of the Department of Defense. The operational rations that are now available to meet Military Service needs through NLABS' execution of this responsibility, together with those presently under development, are described in the following pages. Also included is a brief review of past operational rations, most of which were developed at NLABS' predecessor organization, the Quartermaster Food & Container Institute for the Armed Forces (originally, the QM Subsistence Research Laboratory), located in Chicago, Illinois until 1963.

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INTRODUCTION

Since the revision of "Operational Rations Current and Future of the Department of Defense" in 1970, significant changes have been made to match the pace of changing military requirements. These have been accomplished through continuing effort in the field of food and packaging and the continual improvement of existing component items.

As we follow the evolution of the Armed Forces operational rations through the history of the United States, we find that, from the Revolutionary War through the Civil War and on to World War I, the basic military ration was composed of meat, bread, and beans. Changes were few and in the main were inspired by changes in the national food pattern — the increasing use of canned foods, for example. The soldier generally received his allowance of one to four days' rations at one time. These he either prepared by himself or pooled with those of a buddy who assisted in the preparation. That portion not immediately consumed was transported in his rucksack, or saddle bag, until the next meal.

The first of the Army Rations was established by Congressional Resolution on November 4, 1775:

Resolved, that a ration consists of the following kind and quantity of provisions: 1 lb. beef or 3/4 lb. pork, or 1 lb. salt fish per day; 1 lb. bread or flour, per day; 3 pints of peas or beans; 1 pint of milk per

man per day, or at the rate of 1/72 of a dollar; 1 half pint of rice or one pint of Indian meal, per man per day; 1 quart of spruce beer or cider per man per day, or 9 gallons of molasses per company of 100 men per week; 3 lbs. candles to 100 men per week, for guards; 24 lbs. soft or 8 lbs. hard soap, for 100 men per week.

The ration for U.S. troops in the Civil War was little improved over that of the Revolutionary War. Added, however, were coffee, tea, seasonings, and potatoes *when practicable*. This Civil War Ration was estimated to have cost 15 cents per man per day — in contrast to the Field Ration (A Ration) cost of \$3.53 per man per day as of September 1982. Preparation of the food and subsistence of the troops, however, was accomplished for whole companies rather than for individuals. In 1896 an individual Emergency (*Haversack*) Ration was established and subsequently followed by additional special rations. In 1901 the rations consisted of the Garrison, Emergency, Field, and Travel rations. When World War I began, the Field Ration had been replaced by the Reserve Ration. By 1918 the ration structure included the Garrison and Field rations, both with authorized substitutes, as well as the Reserve, Special Reserve, Travel, and Emergency rations.

The Reserve Ration, intended for individual use, provided one pound each of canned meat and hard bread, with coffee, salt, sugar, a cube of soup, and solidified alcohol. Each ration furnished approximately 3,300 calories in a gross weight of 2¾ pounds. The Special Reserve, or *Trench*, Ration was designed to subsist 25 men per day. It was hermetically sealed in galvanized iron containers to protect against gas contamination and weighed 107 pounds. Both were to be supplemented with field ration components whenever possible. The Emergency Ration contained three 3-ounce cakes of beef powder and cooked wheat and three 1-ounce chocolate bars.

The development of operational rations used in World War II, Korea, and (in improved form) today began in 1934 when the Quartermaster Corps undertook the development of a ration to replace the old emergency ration. This replacement, subsequently designated the D Ration, was developed in Chicago by a predecessor agency of the Quartermaster Food and Container Institute for the Armed Forces. During the period 1941–1945, 23 different rations and ration supplements were developed for use by U.S. Armed Forces throughout the world. The most famous were the D Bar, C Ration, and K Ration.

Military nutritional requirements and subsistence situations have not changed basically since the days of Hannibal and Genghis Khan. Essentially, it has always been necessary to supply rations on the basis of (1) the individual, (2) the small group (squad or crews), and (3) the large group (company size or larger).

Conceding these basic situations, it is found that modern concepts of ration design have changed considerably to accommodate increasing demands for greater mobility and dispersion of combat forces and greater acceptability and convenience in military foods. To assure utility under anticipated future combat conditions, all rations must be minimal not only in cube and weight, but also in manpower and equipment requirements associated with their supply, storage, issue, and preparation. Requirements for nutritional adequacy, acceptability, and stability, however, remain relatively unchanged. To fulfill current and future operational ration requirements, off-the-shelf, conventional foods would be quite inadequate. Needed are foods preserved and packaged by new and ingenious methods. Consequently, the resources of modern science and technology are drawn upon all the way from design to finished product. New technologies have been brought to bear on foods for military use — for example, freeze-dehydration, reversible compression, and heat-processing in flexible pouches.

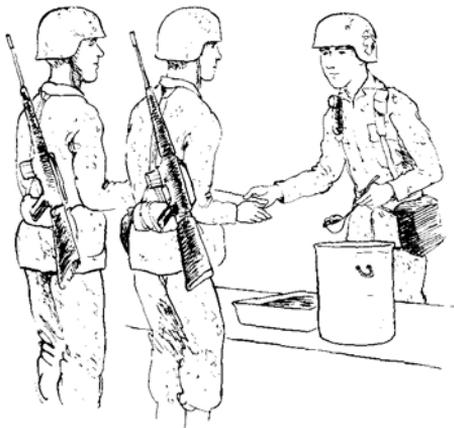
To stay abreast of new concepts and techniques of warfare, rations and feeding systems are under the constant scrutiny of the military analyst. The military and civilian food and packaging and packing research specialists are continually seeking component and design improvements as well as completely new and revolutionary ideas. As new requirements in military subsistence operations become evident, or as advances are made in experimental work leading to new or improved items, rations and/or entire concepts may be changed to reflect these advances. Typical of the ration modernization program designed to improve the individual feeding situation is the development of the Meal, Combat, Individual, followed by the Meal, Ready-to-Eat, Individual, as replacements for the C Ration (Ration, Individual, Combat). The Meal, Ready-to-Eat, Individual more closely fits the requirements of current operational concepts. It has the desired flexibility of use compatible with those concepts and may, in turn, be replaced in the future as technological capabilities increase by a lighter weight, less bulky packaged meal.

To meet food needs under the various conditions imposed by modern land, sea, and air operations, new approaches have been taken to insure feeding systems of greater logistical flexibility and simplicity. This has resulted in the design, for instance, of nutritionally interchangeable meals. To fully understand the advantages accruing from this design, one must first consider the limitations imposed by the use of the ration system.

As noted below, a ration consists of food for one man for one day and therefore must contain a minimum 3,200 calories as well as prescribed levels of the dietary nutrients essential to nutritional balance. An obvious limitation is that the entire ration must be eaten during the course of the day in order to maintain that balance. This means that one ration, if packaged as such, cannot be broken down into three basically interchangeable units as is the case in the system of nutritionally interchangeable meal families. Demands of modern warfare call for greater flexibility.

GENERAL OPERATIONAL RATIONS

STANDARD B RATION



The Standard B Ration is the field ration used for mass feeding where kitchen facilities, except for refrigeration, are available. It consists of approximately 100 so-called *nonperishable* items — mainly canned and dehydrated — and is supplied in bulk. Hot meals furnishing a *minimum* of 3200 calories per day for men and 2200 calories per day for women are prepared using a 10-day cycle of menus. Caloric content may be varied to meet requirements of varying climatic conditions and *degree of physical activity* of the troops as determined by the local medical authority.

The Hospital B Ration is planned for patients in military hospitals during operations in which the Standard B Ration is issued. The plan assumes that 70 percent of the hospitalized patients will subsist on the Standard B Ration, with about half of the remaining patients requiring solid or semi-solid foods and the balance liquid foods.

The Standard B Ration is currently under revision. Because Air Force mission requirements for the Standard B and Hospital B rations differ from those of the other Services, there will be separate Air Force publications for these.

Typical Menus

BREAKFAST

Tomato juice
Hot hominy grits
Scrambled eggs, Western style
Bread
Margarine
Peanut butter
Grape jelly
Coffee
Cocoa

DINNER

Chicken pot pie
w/biscuit topping
Mashed potatoes
Buttered corn
Bread
Margarine
Yellow cake with
chocolate icing
Coffee
Tea
Orange beverage

SUPPER

Tomato vegetable soup
w/crackers
Fried fish squares
Macaroni and cheese
Buttered peas
Bread
Margarine
Fruit cocktail
Sugar cookies
Coffee
Tea
Fruit punch beverage

Gross weight/ration
Net weight/ration
Gross cube/ration
Calories/ration
B Ration described in

3,639 pounds
3,086 pounds
0.1173 cubic feet
3900 approximately
SB 10-495
NAVSUP PUB 274
MCO P10110.25C
(Air Force)
AFR 146-8

Hospital B Ration
described in

SB 10-495-1
NAVSUP PUB 436
MCO P10110.26A
(Air Force)
AFR 166-4



STANDARD B RATION
100 PERSONS/ONE DAY

MEAL, COMBAT, INDIVIDUAL



The Meal, Combat, Individual was the first ration adopted to meet the subsistence concept of supplying nutritionally balanced meals rather than rations. It replaced the Ration, Combat, Individual (C Ration), which had replaced, but was similar to, the World War II C Ration.

The Meal, Combat, Individual was designed for issue as the tactical situation dictates, either in individual units as a meal or in multiples of three as a complete ration. Its characteristics emphasize utility, flexibility of use, and more variety of food components than were included in its predecessor, the Ration, Combat, Individual (C Ration). Twelve different menus are specified. Each contains one canned entree; one canned fruit or dessert; one B unit (with crackers and a cocoa beverage or candy); one can of spread (peanut butter, jam, or cheese); a plastic spoon; and an accessory packet holding coffee, cream substitute, sugar, salt, and chewing gum, along with matches and toilet paper. Each shipping case of 12 menus contains four can openers. Although the meat item can be eaten cold, it is more palatable when heated.

Each meal furnishes approximately one-third of the minimum nutrient intake prescribed by Army regulations.

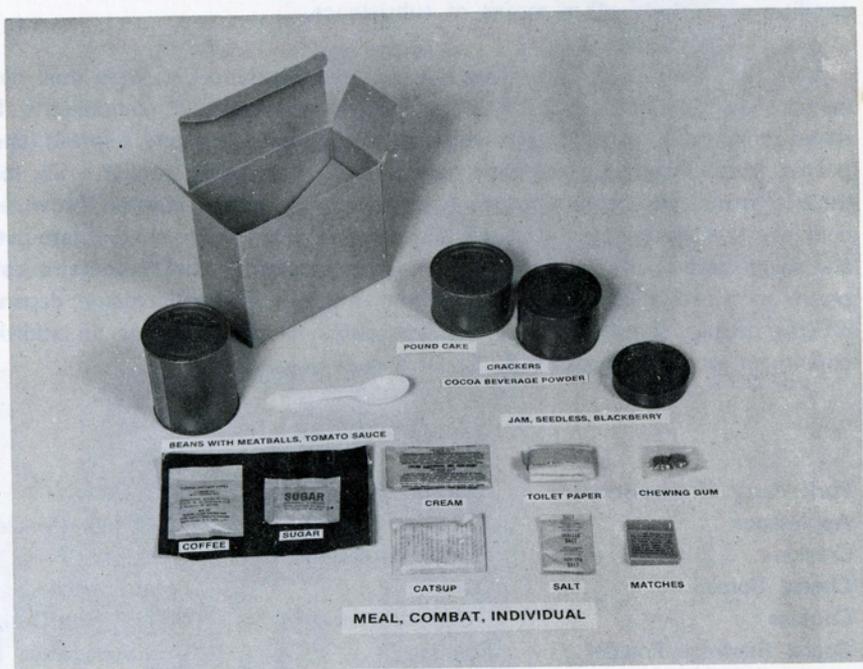
Present stocks will be issued until depleted, when the Meal, Ready-to-Eat, Individual will be used.

Typical Menus

Beef with Spiced Sauce	Beef Slices & Potatoes	Boned Chicken
B-1 Unit	w/Gravy	B-3 Unit
Crackers (4)	Pecan Cake Roll	Crackers (4)
Candy Disc	B-2 Unit	Candy Discs (2)
Pears	Crackers (3)	Cheese Spread
Peanut Butter	Cocoa Beverage Powder	Peaches
Accessory Packet	Jam	Accessory Packet
	Accessory Packet	

Meals/case
 Weight/case
 Weight/meal (less shipping case)
 Cube/case
 Cube/meal
 Calories/meal
 Specification
 NSN

12
 25 pounds
 1.81 pounds
 0.80 cubic feet
 0.055 cubic feet
 1200 average
 MIL-M-35048
 8970-00-577-4513





MEAL, READY-TO-EAT, INDIVIDUAL

The Meal, Ready-to-Eat, Individual provides individual meals containing food components that are ready-to-eat and highly acceptable, even when consumed under conditions precluding preparation, except reconstitution of beverages. The Meal, Ready-to-Eat, Individual is suitable for use in the combat zone and under all circumstances where resupply is established or planned but operational conditions preclude other means of subsistence.

Like the Meal, Combat, Individual, the Meal, Ready-to-Eat, Individual has 12 menus; however the Meal, Ready-to-Eat has a greater variety of components. Each menu provides an entree (two of which are freeze dried), crackers, a spread (cheese, peanut butter, or jelly), a plastic spoon and an accessory packet. Six menus include fruits, six contain cakes; five provide chocolate covered brownies or cookies; three have beans in tomato sauce; two include freeze-dried potato patties; and seven have cocoa beverage powder. Each accessory packet contains coffee, cream substitute, sugar, salt, chewing gum, matches, and toilet tissue; depending on the menu, some accessory packets also include candy or an additional condiment or both (packets B, C, D, and E).

Typical Menus

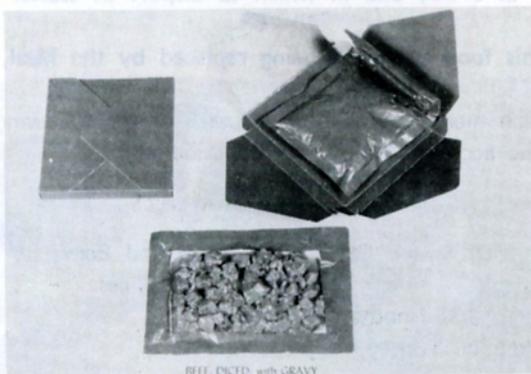
Pork Patty (freeze-dried)
Applesauce
Crackers
Cheese Spread
Cookies
Cocoa Beverage Powder
Accessory Packet D
(catsup)

Beef Slices with
Barbecue sauce
Peaches (freeze-dried)
Crackers
Peanut Butter
Cookies
Accessory Packet C
(candy)

Beef Stew
Fruit Mix (freeze-dried)
Crackers
Peanut Butter
Cherry Nut Cake
Cocoa Beverage Powder
Accessory Packet A

Meals/case 12
 Weight/case 16 pounds
 Weight/meal 1.03 pounds,
 (less shipping case)
 Cube/case 0.9 cubic feet
 Cube/meal 0.052 cubic feet
 Calories/meal 1215 average
 Specification LP/P DES 33-74C
 NSN 8970-00-149-1094

12
 16 pounds
 1.03 pounds,
 approximately
 0.9 cubic feet
 0.052 cubic feet
 1215 average
 LP/P DES 33-74C
 8970-00-149-1094



BEEF, ENDED, with GRAVY

TYPICAL ENTREE



TYPICAL MENU

FOOD PACKET, IN-FLIGHT, INDIVIDUAL



The Food Packet, In-Flight, Individual furnishes food for use in subsisting Armed Forces personnel while on flights extending over one or more meal periods. Requirements for this food packet were established by the Air Force. The food packet consists principally of canned items — a meat, a fruit, juice, and a dessert — and an accessory packet including beverages. Ten menus are available.

On larger aircraft, special equipment is available for heating the meat and dessert items. However, all components can be eaten cold. Hot water is required for coffee and tea. The food is packaged in a telescoping container, which may be used as a tray and in which to dispose of waste.

This food packet is being replaced by the Meal, Ready-to-Eat, Individual.

Each menu contains one of each of the following commodity groups and all of the accessory items are listed below.

MEATS

Beef with Spiced Sauce
Beefsteak
Chicken and Noodles
Chicken or Turkey,
Boned

Ham and Eggs
Ham, Slices

Pork, Sliced
Spaghetti with Beef
Chunks in Sauce
Tuna Fish
Turkey Loaf

FRUITS

Apricots

Peaches

Pears

Fruit Cocktail

DESSERTS

Chocolate Nut Roll
Cookies

Fruitcake
Orange Nut Roll

Pecan Cake Roll
Pound Cake

JUICES

Grape

Grapefruit and Orange

Orange

Tomato

ACCESSORY ITEMS

Instant Coffee
 Instant Tea or Tea
 with lemon and sugar
 Cream Substitute
 Sugar

Gum
 Salt
 Napkins
 Can Opener
 Interdental Stimulator

Spoon
 Instruction Sheet
 Towel, Paper,
 Cleansing, Wet

Packets/case	10
Weight/case	24 pounds (22 pounds net)
Weight/packet	2.2 pounds
Cube/case	0.63 cubic feet
Cube/packet	0.056 cubic feet
Calories/packet	1100 approximately
Specification	MIL-F-3764
NSN	8970-01-060-2899
	(10 packets per shipping box)
	8970-00-163-8871
	(20 packets per shipping box not authorized for future procurement)



EARLY VERSION

FOOD PACKET, LONG-RANGE PATROL



Designed for troops in operations precluding resupply for periods up to ten days, the Food Packet, Long Range Patrol is the first flexibly packaged combat ration to enter the military supply system. In lightness, compaction, ease of carrying and use as well as versatility and utility in extended nonresupply operations, this food packet surpasses any packaged subsistence yet in the supply system. Its development took full advantage of available technological advances to accomplish.

The Food Packet, Long Range Patrol is based on a precooked freeze-dehydrated main dish in a reconstitution package. If conditions permit, the user can prepare a familiar and acceptable hot main course in seconds simply by adding hot water. If he is not in a situation where he can stop to heat water, he can rehydrate the main component in about five minutes in cold water or even eat it dry, like popcorn.

Other components include a plastic spoon, a confection, a cereal or fruitcake bar, coffee, cream, sugar, toilet paper, and matches. Some of the menus include cocoa beverage powder as well. There are eight menus; each furnishes over 1000 calories in an average gross weight of 11.3 ounces and volume of about 79 cubic inches.

Typical Menus

Beef Hash
Corn Flake Bar, Orange
Flavored
Cocoa Beverage Powder
Coffee, Instant
Cream Substitute
Sugar

Chicken Stew
Enriched Sweet Chocolate
Bar with Almonds
Coffee, Instant
Cream Substitute
Sugar

Pork with Escaloped
Potatoes
Fruitcake Bar
Cocoa Beverage Powder
Coffee, Instant
Cream Substitute
Sugar

Packets/case
Weight/case
Weight/packet (less shipping case)
Cube/case
Cube/packet
Calories/packet
NSN

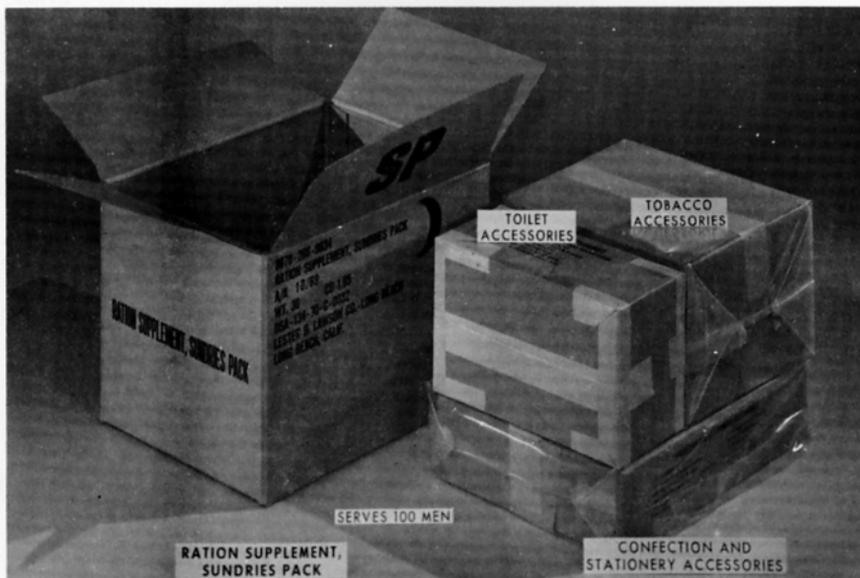
40
36 pounds
0.70 pounds
1.84 cubic feet
0.046 cubic feet
1100 average
8970-00-926-9222





RATION SUPPLEMENT, SUNDRIES PACK

The Ration Supplement, Sundries Pack provides post-exchange-type comfort items to troops in forward areas where post exchange facilities are not available. It contains commercial health and comfort items authorized for gratuitous issue under such conditions and has consisted of a tobacco pack, a toilet article pack, and a confection and stationery pack to meet the requirements of 100 persons for one day. It has normally not been issued with packaged operational rations, meals, or food packets, as these generally provide the accessory items critical to their use. The items listed below are those set forth in the present purchase description for assembly of this ration supplement.



TOBACCO PACK

Cigarettes
Cigars
Chewing tobacco
Safety matches
Lighter flints
Pipe cleaners
Pipe tobacco

TOILET ARTICLE PACK

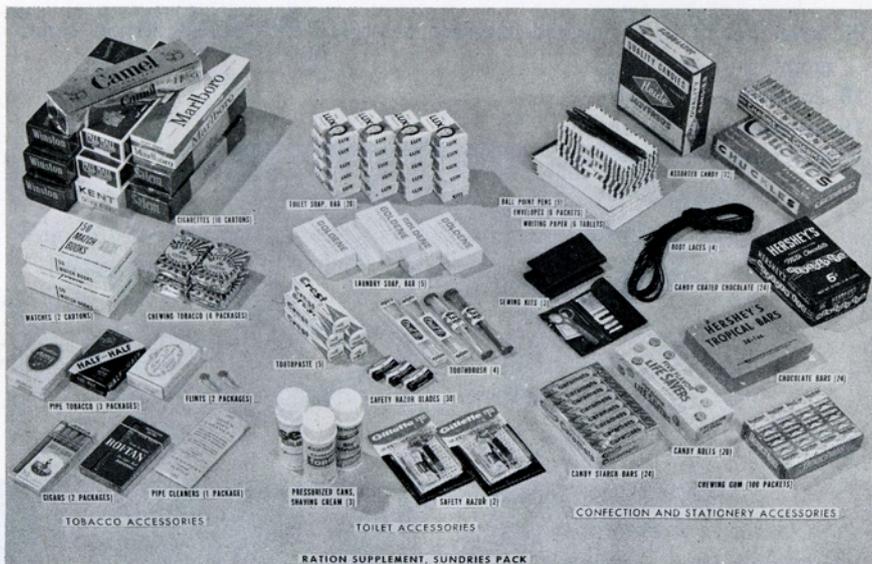
Shaving cream
Safety razors
Razor blades
Tooth paste
Tooth brush
Toilet soap

CONFECTION AND STATIONERY PACK

Hard candy tablets
Coated chocolate discs
Assorted candy
Chewing gum
Ball point pens
Envelopes
Tablet writing paper
Sewing kits
Boot laces

Basis of issue
Weight/pack
Cube/pack
NSN

1 pack/100 persons/day
41 pounds
1.67 cubic feet
8970-00-268-9934



1969 PROTOTYPE

RATION SUPPLEMENT, BEVERAGE PACK

The Ration Supplement, Beverage Pack provides supplemental beverages for personnel subsisting on the Meal, Combat, Individual (or Meal, Ready-to-Eat, Individual) and the Food Packet, Long Range Patrol in hot climates. This supplement was developed in response to a request from the U.S. Army, Vietnam, and provided a means for overcoming the taste of drinking water treated with water purification tablets. It also met a specific climatic need without impairing the suitability of either the MCI or LRP for use in cold climates, where the beverages provided by this supplement would not be equally desirable. Each pack provides beverage supplementation for 100 individuals; two packs are provided in each shipping case.

Each supplement includes:

- 90 envelopes of fruit flavored beverage bases (18 each orange, lemon, lime, grape, and cherry)
- 15 envelopes of sugar
- 15 envelopes of instant tea
- 5 envelopes of lemon flavored instant tea

Basis of issue	1 pack serves 100 men
Weight/shipping case	22 pounds (2 packs)
Cube/case	0.99 cubic feet (2 packs)
Packs/case	2
NSN	8970-01-108-2858
Specification	MIL-R-43650



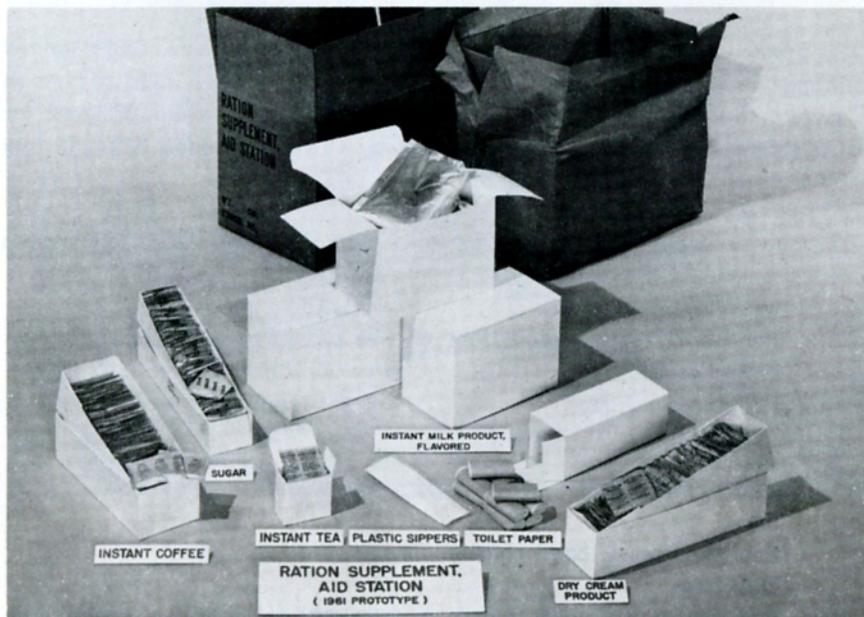
1968 DATE OF PACK

RATION SUPPLEMENT, AID STATION

The Ration Supplement, Aid Station, provides hot, stimulating beverages — coffee, tea, and a high calorie flavored milk product. It is for use at forward aid stations to provide drinks to casualties being evacuated. Preparation requires only the addition of water (hot or cold). The pack (16 pounds) is light enough for hand transport under combat conditions. The supplement provides 100 eight-ounce instant beverages and includes the following components:

Coffee	Toilet Paper	Chocolate — Coffee Flavored	Plastic sippers
Tea	Sugar	Dairy Drink, Dry	Cream Substitute

Number of 8-ounce drinks	100
Weight/pack	16 pounds
Cube/pack	1.01 cubic feet
Specification	MIL-R-1041
NSN	8970-00-128-6404



SURVIVAL SUBSISTENCE

FOOD PACKET, SURVIVAL, GENERAL PURPOSE



The Food Packet, Survival, General Purpose is suitable for use in any survival situation under all environmental conditions, including those where potable water is limited. Four food bars of uniform nutrient content comprise the major constituents of each food packet. The protein content of these bars is rigidly controlled so that the food packet conserves body water yet assures maximum value from protein at any level of consumption. This unique nutritional design allows the adjustment of issue and consumption to anticipated needs. It was adopted by all branches of the Armed Forces as a standard survival ration.

This food packet is the only survival packet designed to support at least limited operational capability for survivors. It replaced other survival food packets in the system (Survival Tropics and Survival Arctic) except for those designed for both specific space constraints and water limitation (i.e., Abandon Ship and Life Raft Aircraft).

The food packet is packaged in a 12-ounce rectangular can (key-opening type) and consists of the following:

Food bars, survival-type (four of five types randomly selected)

Fruitcake	Rice-Cornflakes
Chocolate Fudge	Cereal-Granola mixture
Cornflakes	

Coffee, Instant

Sugar

Soup and gravy base, chicken flavored

Directions

Can opener, key-type (taped to container)

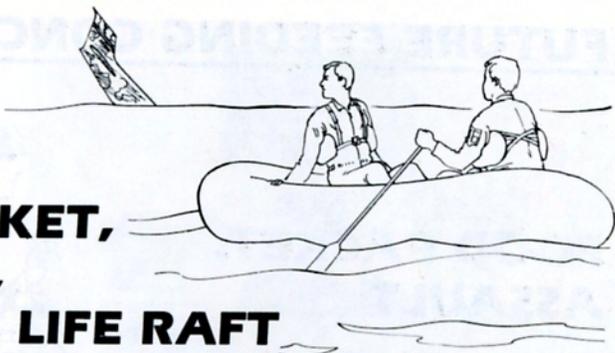
Packets/case	24
Weight/case	20 pounds
Weight/packet	12 ounces
Cube/case	0.43 cubic feet
Cube/packet	26.7 cubic inches
Specification	MIL-F-43231
NSN	8970-00-082-5665



**FOOD PACKET, SURVIVAL,
GENERAL PURPOSE**

FOOD PACKET, SURVIVAL, AIRCRAFT, LIFERAFT

FOOD PACKET, SURVIVAL, AIRCRAFT, LIFE RAFT



Used in survival kits and in life rafts of naval aircraft, the Food Packet, Survival, Aircraft, Life Raft is intended for short term use while awaiting rescue or air-drop of supplies.

User requirements are stringent. The packet must (1) withstand extreme temperature changes, (2) be of minimum cube and weight, and (3) consist of food which will be beneficial even when water supply is critically limited. The kinds of food suitable for use in this packet are therefore severely restricted. As revised to assure maximum stability when exposed to temperatures up to 71°C (160°F), the food packet contains two bars of fruit tablets (ten in each box) and two packets of gum. The fruit tablets are individually wrapped pieces and are provided in a variety of fruit flavors and colors to enhance acceptability. Approximately 300 calories are furnished in this all-carbohydrate food packet.

The ration is packaged in a small flat, aluminum, easy-opening can, or in a heat-sealed laminated bag. When the aluminum can is used, a waterproof bag is provided for storing leftover tablets. An instruction sheet and a piece of twine are also included in each packet.

Packets/case	36
Weight/case	8 pounds (gross)
Weight/packet	2.8 ounces
Cube/case	0.24 cubic feet
Cube/packet	12 cubic inches
Calories/packet	300 approximately
Specification	MIL-F-15381
NSN	8970-01-028-9406



FOOD PACKET, SURVIVAL, AIRCRAFT, LIFERAFT

FUTURE FEEDING CONCEPTS

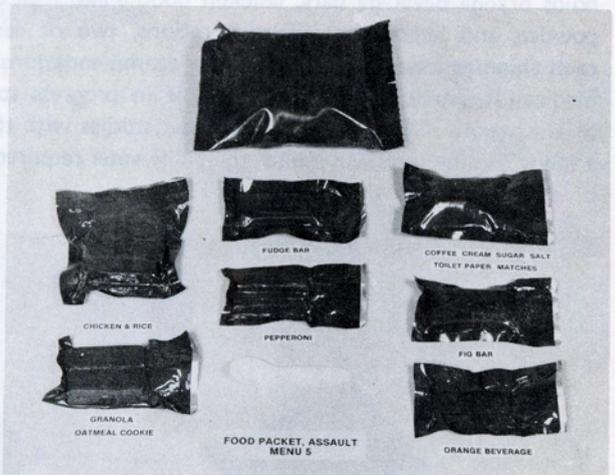
FOOD PACKET, ASSAULT



The Food Packet, Assault will be a compact, lightweight food packet of high nutrient density for individuals in non-resupply situations. It is being designed for use for up to ten days at the rate of one packet per person per day. The new food packet is based on technological advances in freeze drying and compression and is under development to meet a Marine Corps requirement that initially matched the Army's concept of the Food Packet, Individual, Combat (see Historical Summary) against which the Food Packet, Long Range Patrol was adopted as interim. These are being applied to reduce the volume as well as weight of the minimal amount of food required to maintain operational effectiveness. The target has been 1400 calories in a gross weight of one pound.

A 1981 prototype has met this target. It consists of six menus, each providing a variety of food bars. All can be eaten dry; many will rehydrate to give a familiar entree, dessert, or beverage. Each packet also includes a spoon, an entree mixing bag, coffee, cream, sugar, chewing gum, matches, and toilet tissue.

Packets/case	36
Weight/case	39 pounds
Weight/packet	0.98 pound
Cube/case	1.72 cubic feet
Cube/packet	0.043 cubic feet
Calories/packet	1550 average

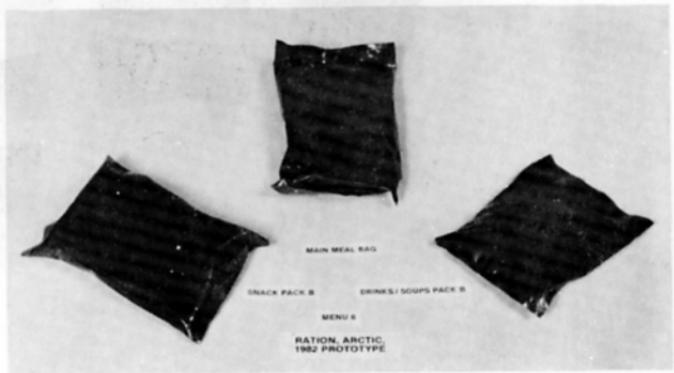


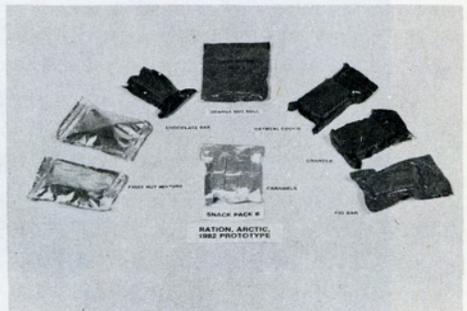
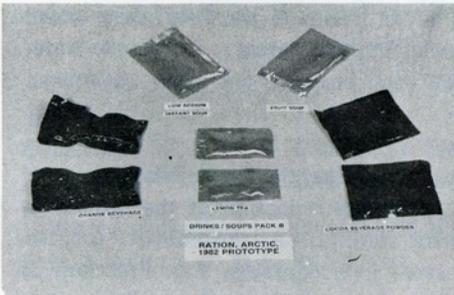
RATION, ARCTIC



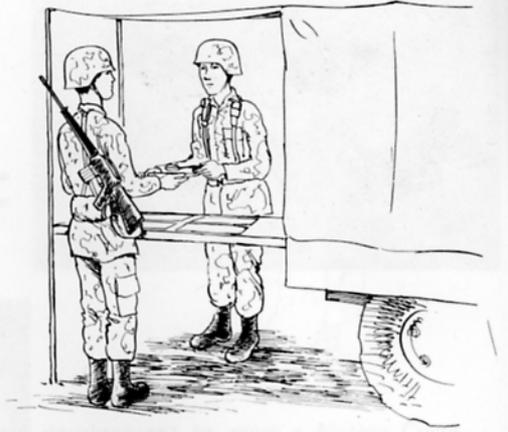
The prototype Arctic Ration is under development to meet a Marine Corps requirement for lightweight, compact, high caloric subsistence for assault, reconnaissance, and other non-resupply operations requiring heavy physical exertion under extreme cold. It is designed to provide approximately 4500 calories.

Six menus, based on dehydrated, compressed, and other low-moisture components that resist freezing, are under development. Initial prototypes, tested in 1981, consisted of two Assault Food Packets with supplemental bakery, soup, beverage, candy, and snacks items. A new design, in which three different packages form one ration, is being developed for further testing. (1) A main meal pack holds two freeze-dried compressed entrees, oatmeal mix, two plastic spoons, with an accessory packet containing coffee, cream, sugar, matches and toilet paper. (2) A snack pack provides cookie bars, fig bars, granola bars, candy, raisin nut mix, and a flexibly packaged brownie or orange nut cake. (3) A drink/soup pack holds orange beverage bars, chicken noodle and fruit soup mixes, cocoa beverage powder, and lemon tea. Twelve rations, two of each menus, are provided in each shipping case. On the basis of recommendations from the Naval Submarine Medical Research Laboratory, work is in progress to limit the sodium content of the ration. Controlled cold chamber studies with the prototype indicated that a lower sodium level will reduce the daily water requirement and prevent symptoms of dehydration in the users.



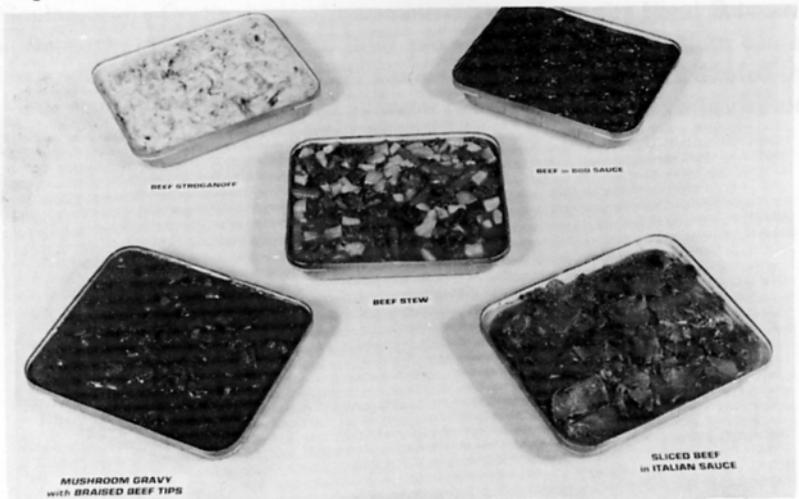


T-RATION (TRAY PACKS)



A variety of entree, vegetable, dessert, starch, bread, and salad items that have been heat-processed in rectangular, multiserving, half-size steam table, metal cans is being developed and introduced in the supply system for a new Army combat field feeding system. In conjunction with a new modular system of combat food service and related equipment, which is also under development, the T Ration (Tray Pack) is expected to increase the Army's capability for providing high quality, nutritionally adequate hot meals to its troops in the field, even where highly mobile, while significantly reducing the manpower, fuel, and water requirements of the present system. Tray Pack products also offer advantages for other Military Services.

The flat tray configuration gives greater quality potential for its heat processed contents than does the round metal can. It allows reduction of the processing time to attain the end point temperature for sterility. At the point of use, the Tray Pack foods are ready to heat and serve in a container that functions as a heating and serving vessel.



TRAY PACK ENTREES

EXAMPLES OF TRAY PACK PRODUCTS

Entrees

Beef Pepper Steak
Canadian Bacon

Cheese Omelet
Pork in Barbecue Sauce

Shrimp Newburg
Swedish Meat Balls
w/Gravy

Vegetables

Glazed Carrots
Mixed Vegetables
Sliced Beets

Potatoes and Starches

Glazed Sweet Potatoes
Escalloped Potatoes
Spanish Rice

Salads

Potato Salad
Three Bean Salad
Macaroni Salad

Breads

Blueberry Muffins
Breakfast Bread Pudding

Desserts

Fruits in Syrup
Cakes
Brownies
Pudding
Pie Fillings

Tray/case	4
Cube/case	0.79 cubic feet*
Cube/tray	0.15 cubic feet

* Military packaging, with liners and dividers or pads. Commercial shipping cases have a volume of 0.72 cubic feet.



SERVING A T-RATION MEAL

HISTORICAL SUMMARY

Air Crew Lunch (Pocket Lunch). Obsolete.

An individually packaged food packet developed during World War II to sustain fliers on bombing missions of one hour or more. This packet provided candies and chewing gum in a carton that facilitated dispensing into a gloved hand or directly into the mouth. Procurement stopped with the close of the war.

Airborne Lifeboat Ration. Obsolete.

This item was developed in 1944 in response to a request from the Army Air Force for food that could be stowed in lifeboats and dropped to survivors located in search and rescue activities over water. It consisted of a two-man breakfast and a two-man supper to provide 1000 to 1500 calories per man per day and included C and K ration components with canned soup, matches, and toilet paper. One Life Raft Ration (see below) was to be stowed in each lifeboat in place of every sixth Lifeboat Ration to give 60 man-days of food.

Assault Lunch. Replaced by Food Packet, Individual, Assault.

Developed late in World War II to maintain the efficiency of troops in initial phases of assault by providing items that could be easily carried by and acceptable to troops under nervous tension, this individual food packet provided candy, nuts, dried fruit, chewing gum, matches, and cigarettes. Although procured in some quantity and considered suitable, at least conceptually, it had not been fully tested when the war ended. Definition of the requirement changed in the postwar period.

Bail-Out Ration. Replaced in 1943 by the Parachute Ration.

The first of several survival food packets developed for fliers to carry on their persons in the event of disaster, this item was produced in 1943 at the request of the Army Air Force. It included D bars, hard candy, chewing gum, bouillon, lemon beverage powder, biscuits, and fruit bars. It was provided in flexible packages and failed to withstand the pressure, temperature, and humidity ranges inherent in its use.

C Ration. Replaced by Ration, Individual, Combat.

The first individually packaged combat ration in recurring procurement, the C Ration was developed, tested and adopted shortly before World War II. It became virtually a staple of that war, during which it underwent many changes, principally to increase its variety, acceptability, and utility.

Combat Lunch. (See Lunch, Flight, AAF)

D Ration. Obsolete.

The first food packet to enter the supply system, the D bar was developed shortly before World War II to be carried by individuals for use only in emergencies when other means of subsistence failed. Consisting of chocolate, oat flour, cocoa fat, sucrose, nonfat milk solids, flavoring, and fortification, it was not designed for acceptability, nor would it meet today's standards for either operational or survival food packets. Its issue in lieu of confection components in other packaged operational rations did not add to its popularity. Procurement ended with the close of the war.

Desert Ration. Eliminated in 1942.

This term was used for early variations of the K Ration: one with a No. 2 can of fruit juice for three persons, and the other with an individual can of juice (5-3/4 oz.). The first was difficult to utilize and the second difficult to obtain.

E Ration. (See Ration, Individual, Combat)

Five-in-One Ration. Replaced by Ten-in-One Ration.

Early World War II ration for five men for one day.

Food Packet, Individual, Assault. Replaced by Food Packet, Long Range Patrol.

Although a continuation of effort on the World War II Assault Lunch, this food packet was at times considered a replacement for the K Ration. Each packet provided a canned meat unit, a B-Unit (crackers and a cookie) and accessories. It was well received in some situations during the Korean War but in others was

misused — either as a full meal in lieu of the Ration, Individual, Combat, which could not be issued on a meal basis, or as a supplement. Although a requirement for the Food Packet, Individual, Combat was established to replace this item, authorization for procurement of the existing item was withdrawn before any replacement was available.

Food Packet, Individual, Combat. Food Packet, Long Range Patrol adopted as interim.

The Army established a requirement in the early 1960's for an extremely compact, lightweight food packet capable of sustaining men in nonresupply operations for ten consecutive days without impairing their performance or causing irreversible physiological damage. The Army subsequently cancelled this requirement shortly after funding became available because it entailed establishment of compaction technology rather than engineering development; however, the Marine Corps had established a counterpart requirement for the Assault Food Packet, for which funding later became available.

Food Packet, Survival, Abandon Aircraft. (SAC PAC) (Ration, Special, Survival). Obsolete.

This food packet was intended for escape and evasion activities after evacuation of long range aircraft and was used in training by the Air Force Survival School. Developed at the request of the Strategic Air Command in 1950, it consisted of the highly concentrated (high fat, high protein, high caloric) food bars SAC stipulated, providing about 3475 calories in the two metal cans that constituted each packet. The packet weighed 34 ounces and occupied a volume of 71.3 cubic inches. Despite its nomenclature, this item was not strictly a survival ration, and its composition made it unsuitable for consumption when drinking water was limited. As one of its major components, meat food product bars, had been produced by only one manufacturer, procurement became virtually impossible when the manufacturer altered his equipment in the 1970's. Procurement authorization was discontinued in 1977.

Food Packet, Survival, Arctic, SA. Replaced by Food Packet, Survival, General Purpose.

Developed in the post World War II period to provide food for one man for one day in emergencies in cold regions, this food packet was based on concentrated

food bars. It included cereal, fruitcake, cheese, sweet chocolate, and starch jelly bars with coffee, tea, cream substitute, sugar, and a polyethylene bag for unused components. It was packaged in a rectangular metal can. Authorization for procurement ended with adoption of the Food Packet, Survival, General Purpose in 1961.

Food Packet, Survival, Tropic, ST. Replaced by Food Packet, Survival, General Purpose.

Developed in the post World War II period to provide food for one man for three days or three men for one day in emergencies in tropical areas, this food packet included starch jelly bars, coffee, tea, and chewing gum in a flat, rectangular can. Authorization for procurement ended with adoption of the Food Packet, Survival, General Purpose in 1961.

Hospital Supplement. (See Ration Supplement, Hospital).

Jungle Ration. Replaced by Ten-in-One Ration.

Early World War II ration for one man for four days.

K Ration. Obsolete.

Under development when World War II began, the K Ration became one of the best remembered rations of that period. It was the first packaged ration assembled so as to allow use on a meal basis, with breakfast, dinner and supper packages. Although modified later in the war to improve acceptability, the earlier versions of the K Ration — which emphasized nutrient density — were the ones best known to the troops. Authorization for procurement was terminated when the war ended.

Kitchen Spice Pack. (See Ration Supplement, Spice Pack, Kitchen).

Life Raft Ration. Obsolete.

Developed in conjunction with the Aero-Medical Laboratory for use in disasters over water, where food and water intake would be limited, this item was stored

in rubber life rafts on aircraft. Initially it was based on hard candy and chewing gum for six men for one day or one man for six days and packaged in a square, hermetically sealed, key-opening can. In 1945 the quantity of components was somewhat reduced, malted milk tablets and an empty plastic bag were added, and a seamless drawn rectangular metal can was used as the ration package.

Lunch, Flight, AAF (Combat Lunch). Obsolete.

This was a World War II subsistence package providing food and extra beverages for three persons in flight. It required preparation aboard the aircraft and failed in acceptability and utility. The need for in flight subsistence during the postwar period was met by the Food Packet, Individual, In-Flight and by perishables, such as sandwich/beverage or cooked, frozen flight meals.

"M" Packet. Prototype failed; requirement cancelled.

In late 1963–64 higher Army echelons perceived the need for a combat food packet as extremely urgent. It was clear that the Food Packet, Individual, Combat, on which work had barely started, would not be available within the time frame envisioned. Although the Food Packet, Long Range Patrol had just been successfully tested and was in limited procurement for this purpose, there was some reluctance to rely on an item based on dehydrated components. In terms of a conceptual 24-hour battle day, need for effort on other packaged rations, such as the Meal, Ready-to-Eat, Individual, was perceived as of secondary importance. NLABS was accordingly directed to place priority on development of an individual food packet based on two prototype MRE retortable pouch components. Six such menus were developed, procured, and subjected to Engineering/Service tests in 1966. As a result of a series of DA reviews following the failure of the "M" Packet prototypes in these tests, the requirement for this packet was terminated, the Food Packet, Long Range Patrol was adopted as Standard pending development of the Food Packet, Individual, Combat, and development of the Meal, Ready-to-Eat, Individual continued.

Meal, Quick-Serve. Prototype succeeded; requirement cancelled.

Twenty-one menus (a 7-day cycle) based on rapidly rehydrating precooked dehydrated foods in multipurpose flexible packages had been successfully

developed and Service tested by the early 1960's. Designed to provide highly acceptable meals to small, mobile combat groups over extended periods without support from food service personnel or equipment, each meal module included expendable food service equipment. An hermetically sealed aluminum insert in each module provided a water heating vessel as well as additional protection to the contents. Canned bread and cakes were among the components. Although assembled in various module sizes during its developmental cycle, a 6-man configuration was considered the most useful and versatile. Four 6-man modules were packed in each shipping case, providing potential for large as well as small group application. This ration was highly successful in its Service tests. DA, however, determined that it added another line item to the system (the Ration, Small Detachment, 5 Persons having been discontinued by that time), and that the need for which it was developed could be met by the developmental Meal, Uncooked, 25-Man (for which the requirement was also subsequently cancelled) and the Meal, Ready-to-Eat, Individual. Work on the Quick-Serve Meal provided the technological and product development base for extremely rapid development and testing of the Food Packet, Long Range Patrol in 1963.

Meal, Small Unit. (See Small Unit Meal).

Meal, Landing Force, 25 Persons. Requirement cancelled.

This item was developed at the request of the Marine Corps for situations that did not require use of individual rations (Ration, Individual, Combat), but where the B Ration could not be made fully available or prepared. There were 21 meal packs: seven breakfasts and 14 lunches or dinners. All consisted of canned foods with dehydrated soups and beverages. Only test quantities were procured. The Marine Corps, as the sole user, withdrew its interest in this item in 1962.

Meal, Uncooked, 25-Man. Requirement cancelled.

Under development from the late 1950's to the early 1960's, this meal was intended to replace the B Ration, particularly in early days of emergencies in situations which permitted limited food preparation, but a balanced B Ration had not yet become available. The Uncooked Meal was to provide a factory assembled,

stable, packaged meal which, when supplemented by bread and cakes, could maintain the performance of combat troops over extended periods without supplementation by perishables. A 6-day cycle based on dehydrated foods in flexible packages had been developed before the requirement was cancelled. This effort provided the technology and product development base for some current dehydrated components of the B Ration (in metal cans, however).

Mountain Ration. Replaced by Ten-in-One Ration.

This was an early World War II ration for four men for one day or one man for four days.

Parachute Emergency Ration (Parachute Emergency Vest Pocket Type). Obsolete.

An individual survival food packet developed during World War II for the Army Air Force, the Parachute Emergency Ration included candies, a cheese and cracker bar, bouillon cubes, sugar, cigarettes, chewing gum, and an empty cellophane bag for unused components after the ration can was opened. The ration container was a seamless drawn metal can, 5-1/2 by 3 by 1-5/16 inches, with a can opener taped to the lid. This ration became obsolete in 1948 and was replaced initially by the Food Packet, Survival, Tropic and the Food Packet, Survival, Arctic until the Food Packet, Survival, General Purpose became available.

Parachute Ration. Replaced in 1944 by the Parachute Emergency Ration.

This item included cheese, crackers, biscuits, chocolate bars, coffee, lemon powder, sugar, and chewing gum in a nonstandard size metal can measuring 6-9/16 by 4-1/16 by 1-7/16 inches. The can, which was not commercially available, occupied excessive space and the unit packaging did not adequately protect against flavor, moisture, and fat transfer. The ration was procured only once.

Quick-Serve Meals. (See Meal, Quick-Serve).

Ration, Individual, Combat. (See also C Ration.) Replaced by Meal, Combat, Individual.

As World War II ended, modifications of the C Ration were already beginning towards improving its nutritional content, acceptability, and utility. Some of these improvements (e.g. inclusion of canned fruit and canned bread) were considered so significant as to warrant new terminology, and the revision was entitled the "E" Ration. The "E" Ration was successful in field testing but further work was required to assure the wholesomeness of the new canned bread component, which thus could not be included in initial postwar procurements. Without this item, the new name was abandoned and the terminology of "C—" followed by a number (C-2 through C-10) used instead, until the nomenclature of Ration, Individual, Combat was adopted. The shipping container showed the letter "C" following this designation and the ration continued to be known as the C Ration, even though it differed considerably from its World War II predecessor by that time, as it included canned cakes as well as bread and fruit, and packed each ration in its own individual carton inside the shipping case to facilitate issue. Even the Meal, Combat, Individual, which bore no letter "C" following its nomenclature and differed even more radically from the World War II ration, continued to be called the C Ration, causing much confusion in the early days of the Vietnam War when the Ration, Individual, Combat was still in the supply system.

Ration, Individual, Trail, Frigid. Obsolete.

Developed during the post World War II period for individual use on the trail under cold conditions, this ration consisted primarily of calorically dense foods such as meat bars, cereal bars, fruitcake bars, canned bacon or ham, and canned processed cheese. Procurement was limited to test purposes.

Ration, Isolated Site, 3 Persons. Obsolete.

Eight menus, each consisting of one breakfast, one dinner and one supper, were developed for three persons at small isolated Air Force sites with minimal food preparation or freezer capability. The ration was based on commercial canned foods, which were not always available; some Meal, Combat, Individual and B Ration components were also included. It was discontinued in the early 1970's.

Ration, Small Detachment, 5 Persons. (See also Ten-in-One Ration.) Obsolete.

This ration was essentially a continuation of Ten-in-One Ration in five person configuration. It was misused during the Korean War in situations for which an individually packaged ration would have been more suitable. Authorization for procurement was withdrawn in 1963 in anticipation of replacement by the Meal, Quick-Serve, 6-Man.

Ration Supplement, Hospital. Obsolete.

This item was procured in 1944 to provide 25 servings of soft and liquid foods to supplement other subsistence available to patients in field hospitals. Although subsequent development work resulted in a small procurement during the Korean War, definition of the concept of use at that time showed that the need could be met without a special supplement pack, as suitable items were already authorized for the B Ration Hospital Supplement in SB 10-495.

Ration Supplement, Spice Pack, Kitchen. Obsolete.

Developed late in World War II to simplify the problems of distribution, breakdown, and issue in obtaining a balanced B Ration in the field, this supplement provided a pre-assembled assortment of spices, leavening agents, condiments and miscellaneous items for 1000 rations. It did not prove to be a satisfactory solution to the problems. For example, components and quantities were not fully compatible with those desired at any specific using unit. Some of the specified components were not available. Procurement of some components in commercial rather than the specified, but unavailable, packaging resulted in severe deterioration of contents. Although the specification was revised for use during the Korean War, procurement ended with World War II. Guidance on units and weight requirements, with conversion factors, is now provided for all B Ration menus and components in SB 10-495/NAVSUP PUB 274 Revision/MCO P10110.25C and (for the Air Force) in AFR 146-8.

Small Unit Meal. Requirement cancelled.

A four-person variation of the Quick-Serve Meal, this item was under development for the Marine Corps in the early 1970's. Prototypes did not include canned foods and took advantage of evolving reversible compression techniques for some components. The aluminum insert for use as a water heating vessel was a commercially available type, with a crimped-on lid. The requirement was cancelled because of a change in the USMC philosophy of field feeding.

Ten-in-One Ration. Replaced by Ration, Small Detachment, 5 Persons.

Developed during World War II for ten persons for one day, the Ten-in-One was intended as a "connecting link" between individually packaged rations and B Ration meals prepared by food service personnel. There were five menus, with canned meats and some dehydrated meat products in metal cans, canned vegetables, canned spread, canned puddings, jam, biscuits, cereal, and beverages for breakfast and supper, and a partial dinner unit of K Ration components for the noon meal. Although radical revision was underway to increase the acceptability of the components and eliminate the partial dinner unit, the war ended before procurement of the redesigned ration was accomplished.

Trail, Frigid. (See Ration, Individual, Trail, Frigid).