

# FEDERAL CIVIL DEFENSE GUIDE

PART D, CHAPTER 2, APPENDIX 6

FALLOUT SHELTER FOOD REQUIREMENTS



DEPARTMENT OF DEFENSE  
OFFICE OF CIVIL DEFENSE

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## FALLOUT SHELTER FOOD REQUIREMENTS

### PROGRAM OBJECTIVE

The purpose of provisioning fallout shelters with food is to provide basic nutritional requirements during the period of confinement so that shelter occupants can resume active and productive lives upon emergence.

### Basic Requirements

Given an adequate amount of drinking water, a human being can survive without food for many days provided physical effort is limited. Body tissues are slowly consumed as sources of energy. Continued deprivation, obviously, will result in serious loss of weight and progressive weakness. The Food and Nutrition Board of the National Academy of Sciences-National Research Council has stated that the provision of 1,500 calories daily, properly distributed among protein, carbohydrate, and fat, will minimize tissue breakdown and permit some physical work. Simulated shelter occupancy experiences have demonstrated that healthy persons can subsist for periods up to the maximum anticipated confinement of 2 weeks under sedentary conditions on a survival ration of 700 calories per day.

Fortification of survival rations with vitamins is not considered necessary. Deficiency of calcium, phosphorus, or potassium also will not lead to deterioration during the limited period of shelter occupancy. The small amount of salt necessary to preserve body water is provided in the survival ration.

The nutritional requirements of infants, young children, pregnant women, the aged, and the ill are somewhat different than those of generally normal adults. Special foods required by these groups should be assembled by the individuals concerned on the basis of their known special needs. These foods should be brought into the shelter to assure their availability.

### Public Fallout Shelter Foods

The basic food ration established by the Office of Civil Defense for provisioning approved public shelters will furnish 10,000 calories per shelter

space. This ration is austere but adequate for the estimated period of occupancy under relatively sedentary conditions.

Basic requirements for shelter food were originally established by a Federal Interdepartmental Advisory Group on Food for Shelters. These requirements are that the food be palatable or at least acceptable to the majority of the shelter occupants; have sufficient storage stability to permit a shelf life of 5 to 10 years; be obtainable at low cost; be widely available or easily produced; have high bulk density to conserve storage space; require little or no preparation; and produce a minimum trash volume.

Specifications were developed by the Armed Forces Food and Container Institute (now the Army Natick Laboratories). The four food items selected for the provisioning program are as follows:

a. *Survival Biscuit*. A wheat flour baked product containing small amounts of corn and soy flour developed by the National Biscuit Co. for the New York State Civil Defense Commission.

b. *Survival Cracker*. A wheat-corn flour baked cracker, similar to the survival biscuit, except that it contains more corn flour and no soy flour, developed by the Midwest Research Institute for the State of Nebraska.

c. *Carbohydrate Supplement*. Adapted from a standard product in accordance with a military specification and contains sucrose, glucose, and flavorings.

d. *Bulgur Wafer*. A wheat-based cereal product developed by the U.S. Department of Agriculture for the Office of Civil Defense. The bulgur is parboiled, puffed, dried, and compacted into wafer form.

The physiological fuel value for the above biscuits, crackers, wafers, and carbohydrates is nearly the same for all products and is approximately 2,000 calories per pound of dry matter. Actual values determined by tests conducted are 2,028, 2,009, 1,950, 1,900, respectively. Nutri-

tional needs require that the carbohydrate be used with the other products in a ratio of not more than one-third by weight of the carbohydrate to two-thirds by weight of cereal products.

The food products are packaged in hermetically sealed cans of 2½-gallon or 5-gallon capacity. The protection afforded by these containers and the special formulation to produce long shelf life may permit use of the food even after a storage period of from 5 to as many as 15 years. Testing now being conducted under a variety of controlled storage conditions is expected to permit a prediction during the next several years of the remaining shelf life of the food at any location if the mean annual temperature and the mean relative humidity at the location are known. Although a firm opinion cannot be stated until the tests have been completed, it appears likely that the stored rations will be adequately nutritious even though staleness and chemical changes may have resulted in some change in taste.

#### Unit Distribution of Public Fallout Shelter Food Items for One Meal

Crackers and biscuits are packaged in unit stacks containing single pieces, two pieces baked together, or four pieces baked together. Bulgur wafers are packed in two-unit stacks of single pieces. A single cracker, biscuit, or wafer constitutes one piece. Since the biscuits and crackers are baked and the wafers are pressed products, and production methods differ, variations in dimensions, and therefore in poundage and quantity of pieces per can exist among the products of various contractors.

The carbohydrate supplement food item also varies dimensionally in size and pieces per pound. This item has been furnished for shelters in a ratio of one-third maximum of the food issue on a net weight basis.

The allowable variations in the size of the food products permit the use of a large number of production facilities, thereby providing the broadest possible procurement base. The net weight and the approximate number of pieces in each container are marked on the outside of the can. The caloric value of each piece may be determined, based on the average value of 2,000 calories per pound. An accurate calculation of calories per meal or the issue of fractional parts of one piece is

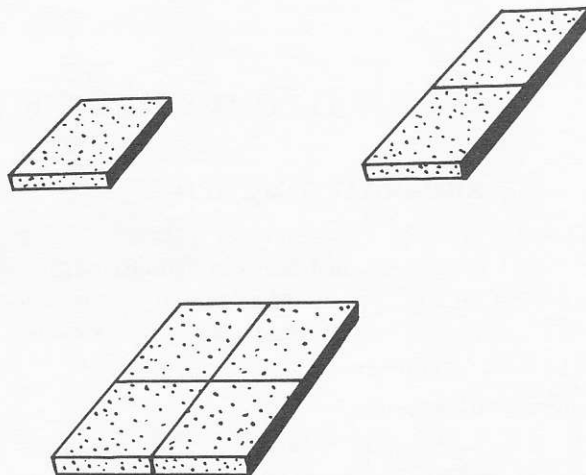


FIGURE 1.—Single, two, and four piece units.

not necessary. Variations in the size and weight of the food products will not greatly affect the quantities issued when estimated on a calorie per meal basis. Using averages for sizes and weights, and disregarding small variation, the following issues will provide approximately 250 calories per meal:

If food consists of (a), (b), or (c):	<i>Number of pieces to issue</i>
(a) Crackers or biscuits from 5-gallon can.....	12
(b) Crackers or biscuits from 2½-gallon can..	8
(c) Bulgur wafers from 5-gallon can.....	3
If food consists of a combination of (a), (b), or (c):	
(a) Crackers or biscuits from 5-gallon can.....	8
and	
Carbohydrate supplement.....	4
(b) Crackers or biscuits from 2½-gallon can..	6
and	
Carbohydrate supplement.....	4
(c) Bulgur wafers from 5-gallon can.....	2
and	
Carbohydrate supplement.....	4

The exact quantity of food to be issued for each meal must be determined by the Shelter Manager on the basis of the anticipated period of occupancy and the actual number of shelter occupants.

#### Qualitative Analysis of Public Fallout Shelter Foods

The foods developed for shelter use have been compounded specifically as survival rations and should not be compared with commercial products of similar appearance.

Palatability and appearance of the foods, while important contributions to shelter morale, are

secondary considerations. Rations sampled by taste panels have been rated from fair to very good. Shelter occupancy tests have not indicated objection to the ration even though it is recognized to be a substantial departure from normal American diets.

The crackers and biscuits are baked to produce a very low moisture content as an essential requirement for long shelf life. The combinations of ingredients in some cases are such that, to achieve low moisture content, the baking produces a darker color. This is sometimes more pronounced than usually found in commercial products where appearance is considered as essential as palatability. This darker color does not reduce the nutritional quality of the cracker or biscuit.

The packaging arrangement has been designed to avoid damage to the rations. Under normal handling, the crackers and biscuits will not break or crumble. Among the millions of pounds of these products which have entered the fallout shelter stocking program, there have been some instances of broken or crumbled products. These have generally been found to have resulted from rough handling during transportation, although occasional damage from malfunctioning of the packaging equipment has been observed. The broken pieces are edible.

The bulgur wafer has a more uniform appearance than the crackers or biscuits because of its processing as a steamed, pressed product. Its texture is not comparable to familiar foods. Shelter tests in which bulgur wafers were the only food provided indicated that acceptability increased with continued use.

The carbohydrate supplement is not suitable as a sole shelter food. For this reason, not more than one-third by weight is specified as a shelter ration. This product, made in two flavors, contributes variety to the ration. The supplement is processed to avoid sticking together, but may be expected to become sticky under conditions of humidity above 55 percent and should be kept covered after opening.

#### Partial Stocking of Public Fallout Shelters Where Equivalent Food Is Available

Public fallout shelters qualifying under the Federal program are provisioned with supplies in

accordance with established standards. The standard amount of food furnished is 5 pounds per space consisting of biscuits, crackers, wafers, and carbohydrate supplement, or combinations of these products.

The State or local Civil Defense Director, or other assigned officials, may reduce the amount of the standard ration to be placed in the shelter, primarily where lack of storage space presents a problem, if equivalent food is available in the shelter area and certain other requirements are met. These requirements are as follows:

- (1) Food available will furnish at least 10,000 calories per rated space.
- (2) Food is expected to be available for use by the shelter occupants when shelter occupancy is required.
- (3) Processing and serving requirements are minimal and required utilities, or substitutes, are available.
- (4) Food is accessible to shelter area and protected from contamination.
- (5) Food is nonperishable over a period of at least 14 days without refrigeration.
- (6) Additional water which might be necessary for preparing or reconstituting foods is available.

A calorie conversion table for a few foods, as examples, is furnished below:

#### CALORIE CONVERSION TABLE

Canned Foods	<i>Approx. calories per lb.</i>
Bacon .....	3,144
Beef, w/gravy.....	880
Beef, w/veg.....	600
Franks, w/beans.....	723
Fish .....	1,318
Peanut butter.....	2,615
Beans .....	83
Carrots .....	128
Corn .....	302
Peas .....	307
Potato, instant.....	1,619
Hominy .....	1,642
Coffee or tea, soluble.....	-----
Packaged Foods	<i>Approx. calories per lb.</i>
Corn Meal.....	1,650
Milk, nonfat, dry.....	1,643
Cheese, processed.....	1,680
Macaroni Products.....	1,712
Margarine .....	3,269
Dessert powder, w/cornstarch.....	1,724
Gelatin .....	1,520
Sugar, granular.....	1,748

When the above requirements have been carefully considered with respect to a specific shelter and it has been determined that substitution, in whole or in part, of licensee held items for standard survival rations is in the best interest of the provisioning program, the responsible official may proceed as follows:

(1) If the requisition has not been submitted to the Defense General Supply Center, complete and annotate the requisition (DGSC Form 2078) as follows:

a. Under section 4, check the main block opposite the words "Initial Issue."

b. Under section 5, check main block opposite title and strike out words "replacement or" in the title. Check block opposite word "other" and enter the following: "Food is available to the shelter; survival rations are required for ----- spaces. Other supplies are required  
(Number)

for ----- spaces."  
(Number)

c. Under section 7, add item "d" as follows: "In my best judgment, the minimal requirements of food are provided for the shelter and only the adjusted quantities of survival rations are required."

When receiving such a requisition, the Defense General Supply Center will process a shipping order for the reduced quantity of survival rations and for the other supplies required for the number of spaces stocked.

(2) If the shipping document has been issued, a certification (in duplicate) should be presented to the warehouse, either at the time of pickup of supplies or before arrangements are completed for shipment by the warehouse, as follows: "In my best judgment, the minimal requirements of food are provided for the shelter and ----- pounds  
(Number)

of survival rations are required in lieu of the quantity listed on shipping document voucher number -----." (*Signed and dated*).

The warehouse will issue or ship, as appropriate, the reduced quantity of survival rations and attach one copy of the certification to the shipping document retained for file and forward the second copy with completed shipping document to DGSC.

(3) If the shelter stocking is completed to less than the rated capacity and a study of available

food indicates that an increase in the quantity of other supplies to stock additional spaces is possible, additional supplies may be requisitioned. The actions described under paragraphs 1b and 1c above will apply.

### Private Fallout Shelter Foods

The food products being supplied by the Office of Civil Defense for public fallout shelters are also suitable for private shelters, but are not generally available on a retail basis. Selection of items for private shelters must be made from normally available foods or from various products being marketed as emergency rations.

Prospective occupants of private shelters are more likely to be known than in the case of the public shelter, particularly where family or neighborhood shelters are planned. Although 10,000 calories may be adequate for normal adults during an inactive shelter occupancy, the special nutritional requirements or preferences of individuals should be considered in the selection of foods. The basic need is that a 2-week supply be constantly available in the shelter to the prospective occupants regardless of close proximity to food stores or other sources of supply.

In planning a supply of commonly available provisions, select familiar foods, as these are more likely to be acceptable during a period of occupancy. Food that will last for several months without refrigeration and can be served without cooking is also advantageous. Suggestions are canned meat, fish, poultry, beans, peas, and fruits; cereals and tinned baked goods; cheese spreads, peanut butter, and jellies with crackers; evaporated or dried milk.

Cans and packages of a size suitable for the occupants' needs for one meal will help avoid spoilage and offer greater daily variety. Keep all foods in their original containers. Those that do not come in cans should be wrapped with plastic film and all seams tape sealed. Write the date of purchase on cans or packages, and periodically use these items in daily meals, replacing with newly purchased items.

An optimum balance of nutrients is not necessary for the duration of the shelter stay. The food supplies must contain sufficient protein of good-quality carbohydrates, fats, and salt to sustain shelter occupants. Protein content of the

food should be between 5 and 10 percent. The maximum calories supplied by fat should not exceed 50 percent of the total calories. Carbohydrates should make up the remainder.

Food selected should be easily digested, palatable and acceptable to children, adults, and the aged alike. It should be entirely edible to minimize garbage disposal and save space.

Food stored indoors not subjected to fallout may be expected to be safe to eat, particularly food in freezers and refrigerators. These should be kept closed as much as possible. Eat the perishable foods first, especially if electricity and gas are not available. Bread is edible even when moldy. Fruits and vegetables with spoiled spots cut out are safe to eat. Canned foods should not be used if bubbles appear in the juices, even though no adverse odor is detected. Most canned and packaged animal foods are satisfactory for use by human beings without harm during an emergency.

Food which has been subjected to fallout may be used if both surface and imbedded fallout particles are removed. This may be accomplished by washing, wiping, scraping, peeling, or removal of

the outer surfaces or wrappings as appropriate. Peeling and other materials eliminated from the food, wash water, and wiping clothes should be removed from the shelter.

The selection of special emergency rations or the preparation of a shelter kit which will maintain the nutritional and palatability qualities of the reserve food supply for much longer periods than would be provided by the commonly available provisions and packages should be guided by the following precautionary measures:

*Select foods known to have long-term storage stability.*

*Select food which is adaptable for use with other ration components to achieve variety.*

The individual packaged food items should be placed in master containers that are moisture proof, water resistant, insect, vermin and rodent proof. Storage temperatures should preferably not exceed 75° to 85° F. The master container should be periodically inspected for corrosion or other evidence of deterioration.