

INCH-POUND

MIL-DTL-32141

5 April 2004

DETAIL SPECIFICATION

SANDWICH, SHELF STABLE, FOR OPERATIONAL RATIONS

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers a shelf stable sandwich in flexible pouches intended for use by the Department of Defense as a component of operational rations.

1.2 Classification. The product will be of the following types as specified (see 6.1):

1.2.1 Types. The types are as follows:

- Type I - Nacho flavored beef
- Type II - Pepperoni
- Type III - Honey barbecue chicken
- Type IV - Honey barbecue beef

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: Commander, US Army Research, Development & Engineering Command, Natick Soldier Center, AMSRD-NSC-CF-F, 15 Kansas Street, Natick, MA 01760-5018 or emailed to Donald.Hamlin@natick.army.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

AMSC N/A

FSC 8940

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2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. None.

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

U.S. DEPARTMENT OF AGRICULTURE (USDA)

Meat and Poultry Inspection Regulations (9 CFR Parts 300-599)

U.S. Standards for Grades of Canned Tomato Paste

(Copies of these documents are available online at www.usda.gov or from Superintendent of Documents, ATTN: New Orders, P. O. Box 371954, Pittsburgh, PA 15250-7954.)

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder (21 CFR Parts 1-199)

(Copies of this document are available online at www.access.gpo.gov/nara or from the Superintendent of Documents, ATTN: New Orders, P.O. Box 371954, Pittsburgh, PA 15250-7954.)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

National Primary Drinking Water Regulations

(Copies of this document are available from www.epa.gov or from the Office of Drinking Water, Environmental Protection Agency, WH550D, 401 M Street, SW, Washington, DC 20460.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AOAC INTERNATIONAL

Official Methods of Analysis of the AOAC International

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(Copies of this document are available from www.aoac.org or AOAC International, 481 North Frederick Avenue, Suite 500, Gaithersburg, MD 20877.)

AMERICAN ASSOCIATION OF CEREAL CHEMISTS (AACC)

Approved Methods of the American Association of Cereal Chemists

(Copies of this document are available from www.aaccnet.org or American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121.)

AMERICAN DEHYDRATED ONION AND GARLIC ASSOCIATION (ADOGA)

Official Standards and Methods of the American Dehydrated Onion and Garlic Association for Dehydrated Onion and Garlic Products

(Copies of this document are available from www.CLFP.com or American Dehydrated Onion and Garlic Association, 980 9th Street Suite 230, Sacramento, CA 95814.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASQCZ1.4 Sampling Procedures and Tables for Inspection by Attributes

(Copies of this document are available from www.asq.org or ASQ, 600 North Plankinton Ave., Milwaukee, WI 53203.)

NATIONAL ACADEMY OF SCIENCES

Food Chemicals Codex

(Copies of this document are available from www.nap.edu or National Academy Press, 2101 Constitution Avenue, N.W. Washington, DC 20418.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Product standard. When specified (see 6.1), a sample shall be subjected to first article (FA) or product demonstration model (PDM) inspection as applicable, in accordance with 4.2. The approved sample shall serve as the product standard. Should the contractor at any time plan to, or actually produce the product using different raw material or process methodologies from

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the approved product standard, which result in a product non comparable to the product standard, the contractor shall arrange for a new or alternate FA or PDM approval. In any event, all product produced must meet all requirements of this document including product standard comparability.

3.2 Ingredients. All ingredients shall be clean, sound, wholesome, and free from foreign material, evidence of rodent or insect infestation, extraneous material, off-flavors, off-odors, and off-colors. All ingredients shall meet and be in accordance with good commercial manufacturing practices.

3.2.1 Ingredients for bread.

3.2.1.1 Flour. The flour shall be matured, bleached, enriched, hard wheat flour, which will produce a product in compliance with 3.5. Alternatively, unenriched flour may be used provided the equivalent enrichments required in the Code of Federal Regulations (CFR) for Standard of Identity for Enriched Flour (21 CFR, Part 137.165) are added at the time of production of the finished product. The flour used for preparation of the dough shall have a protein content of not less than 12.5 percent and a maltose content of not greater than 0.2 percent. Amylolytic enzyme activity, as determined by the "falling number" method, shall not exceed 240 seconds. Flour not meeting protein requirements but otherwise in compliance may be supplemented with vital wheat gluten to the required protein level.

3.2.1.2 Water. Water used for formulation and washing shall conform to the National Primary Drinking Water Regulations.

3.2.1.3 Shortening. The shortening shall be refined, hydrogenated vegetable oil or a combination of refined, hydrogenated vegetable oils which are commonly used by the baking industry and shall have a stability of not less than 100 hours as determined by the active oxygen method (AOM). Shortening used for greasing dough trough, dough pieces, or baking molds shall conform to the above requirements.

3.2.1.4 Glycerol. The glycerol shall comply with the Food Chemicals Codex.

3.2.1.5 Yeast. Yeast shall be good quality commercial active dry baker's yeast. Compressed or crumbled yeast may be used.

3.2.1.6 Salt. Salt shall be noniodized, white, refined sodium chloride with or without anti-caking agents.

3.2.1.7 Emulsifier. The emulsifier shall be sucrose fatty acid esters complying with the 21 CFR, Part 172.859 and shall be limited to sucrose ester stearate having an Hydrophilic-Lipophilic Balance (HLB) number of approximately 16 (see 6.2.1).

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3.2.1.8 Gum arabic. Gum arabic shall comply with the Food Chemicals codex and shall have been produced from a solution of gum arabic which has been sprayed dried.

3.2.1.9 Calcium sulfate. The calcium sulfate shall comply with the Food Chemicals Codex.

3.2.1.10 Xanthan gum. Xanthan gum shall comply with the Food Chemicals Codex.

3.2.1.11 Glucono-delta lactone, encapsulated. Encapsulated glucono-delta-lactone shall comply with the Food Chemicals Codex. The encapsulated glucono-delta-lactone shall consist of 70 ± 2 percent glucono-delta-lactone and 30 ± 2 percent vegetable oil. The vegetable oil shall have a melting point of 141°F to 147°F (60° C to 64°C) (see 6.2.2).

3.2.1.12 Sorbic acid, encapsulated. Encapsulated sorbic acid shall comply with the Food Chemicals Codex. The encapsulated sorbic acid shall consist of 50 ± 2 percent sorbic acid and 50 ± 2 percent vegetable oil. The vegetable oil shall have a melting point of 152°F to 158°F (67°C to 70°C) (see 6.2.3).

3.2.1.13 Potassium sorbate, encapsulated. Encapsulated potassium sorbate shall comply with the Food Chemicals Codex. Encapsulated potassium sorbate shall consist of 50 ± 2 percent potassium sorbate and 50 ± 2 percent partially hydrogenated vegetable oil. The hydrogenated vegetable oil shall have a melting point of 152°F to 158°F (67°C to 70°C) (see 6.2.4).

3.2.1.14 Vital wheat gluten. Vital wheat gluten shall be a cream to tan colored powder produced from wheat flour by drying freshly washed gluten under temperatures sufficiently low to preserve the vital characteristics of gluten. The rehydrated gluten shall absorb 2 times its weight in water and when re-hydrated, it shall be capable of forming cohesive, elastic dough. Vital wheat gluten shall have a protein content (N x 5.7) of not less than 71.0 percent, total carbohydrate content not more than 15.0 percent, a moisture content of not more than 6.5 percent, fat (by hydrolysis) of not more than 6.5 percent, and ash not more than 1.0 percent.

3.2.1.15 Oxidizer/conditioner/mix reducer. Oxidizer/conditioner/mix reducer shall be Control S complying with the 21 CFR, Part 172.859 (see 6.2.5).

3.2.2 Ingredients for meat product used in types I and II filling.

3.2.2.1 Nacho flavored beef stick. The nacho cheese flavored beef stick filling shall be 3.25 inches \pm 0.15 inches (82.550 mm \pm 3.81 mm) long and have a diameter of 0.79 inches \pm 0.04 inches (20 mm \pm 1mm). It shall have an average weight of 0.9 ounces (25.5 grams). It shall have a pH of 4.8 ± 0.2 and a water activity of 0.87 ± 0.02 (see 6.2.6).

3.2.2.2 Pepperoni stick. The pepperoni stick filling shall be 3.25 inches \pm 0.15 inches (82.550 mm \pm 3.81 mm) long and have a diameter of 0.79 inches \pm 0.04 inches (20 mm \pm 1mm).

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It shall have an average weight of 0.9 ounces (25.5 grams). It shall have a pH of 4.8 ± 0.2 and a water activity of 0.87 ± 0.02 (see 6.2.7).

3.2.3 Ingredients for honey barbecue sauce for types III and IV filling.

3.2.3.1 Tomato paste. Tomato paste shall be U.S. Grade A of the U.S. Standards for Grades of Canned Tomato Paste.

3.2.3.2 Sugar, brown, light. Brown sugar shall be refined cane or beet sugar. The sugar shall be light brown in color and shall possess a sweet, molasses-like flavor.

3.2.3.3 Salt. Salt shall be noniodized, white, refined, sodium chloride, with or without anticaking agent.

3.2.3.4 Sauce, Worcestershire. Worcestershire sauce shall be brown to dark brown liquid and shall possess a pleasant, tart, peppery fruit-spice flavor with a typical heavy viscosity. The titratable acidity (as acetic acid) of the sauce shall be not less than 2.8 percent or more than 3.3 percent.

3.2.3.5 Glycerol. The glycerol shall comply with the Food Chemicals Codex.

3.2.3.6 Onion, dehydrated, chopped. Dehydrated chopped onions shall be Fancy Grade of the Official Standards and Methods of the American Dehydrated Onion and Garlic Association for Dehydrated Onion and Garlic Products.

3.2.3.7 Flavoring, smoke. Smoke flavoring shall be an aqueous solution of natural maple and/or oak wood smoke and shall be dark brown-black in color with a clean smoke odor. The smoke flavoring shall have a titratable acidity of 6.2 to 7.2 percent (expressed as acetic acid), a carbonyl level (butanone-2) of 7.0 to 8.0 grams per 100 mL and the smoke flavoring compounds (phenols) shall be 6.0 to 9.0 mg per mL (see 6.2.8).

3.2.3.8 Pepper, red, ground. Ground red pepper shall be derived from red, ripe fruit of *Capsicum frutescens L.* and shall possess the characteristic yellowish-red to red color. The Scoville Pungency Value shall be not less than 30,000 units. The red pepper shall be uniformly ground to allow a minimum of 95 percent, by weight, to pass through a U.S. Standard No. 40 sieve, and not less than 95 percent, by weight, to be retained on a U.S. Standard No. 60 sieve.

3.2.3.9 Garlic powder. Garlic powder shall be Fancy Grade of the Official Standards and methods of the American Dehydrated Onion and Garlic Association for Dehydrated Onion and Garlic Products.

3.2.3.10 Oil, vegetable. Vegetable oil shall process a clean, bland, flavor and shall have a minimum stability of 25 hours (AOM). The oil shall have a free fatty acid value not to exceed

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0.05 percent, a moisture/volatile matter content not to exceed 0.06 percent and pass a cold test of 5.5 hours (minimum).

3.2.3.11 Yellow mustard. The prepared mustard shall be a smooth paste of yellow mustard seed, vinegar, water, tumeric, and seasonings such as salt, clove and coriander.

3.2.3.12 Molasses. Sugarcane molasses shall be what is commonly called dark molasses. The molasses shall have a brix not less than 77 degrees Brix, total sugar not less than 58 percent, ash not more than 9 percent, and total sulfites not more than 250 ppm.

3.2.3.13 Pepper, black, ground. Ground black pepper shall have been ground from the deep brown to black, deep-set wrinkled, immature berries of *Piper nigrum L.* The ground pepper shall have a characteristic, penetrating odor, a hot biting pungent flavor and a light gray to speckled black-gray color. The ground pepper shall contain not less than 2.0 ml of volatile oil per 100 grams of ground black pepper and be of such size that 95 percent shall pass through a U.S. Standard No. 16 sieve.

3.2.3.14 Encapsulated vinegar powder. Encapsulated vinegar powder shall comply with the Food Chemicals Codex. The encapsulated vinegar powder shall consist of 58 to 62 percent vinegar powder and 38-42 percent vegetable oil. The vegetable oil shall have a melting point of 150°F to 158°F (66°C to 70°C). The encapsulated vinegar powder shall have a 5 percent maximum on #14 Mesh Screen (USSS) (see 6.2.9).

3.2.3.15 Honey. The honey shall be pure high commercial grade and shall be free of any off flavor or off odor.

3.2.3.16 Ground mustard. Mustard flour shall be a bright yellow powder from a blend derived from the endosperm of the seed of *Brassicca hirta* and *Brassicca junca*. Mustard flour shall contain not less than 0.4 ml volatile oil per 100 grams of mustard flour and be of such size that not less than 95 percent shall pass through a U.S. Standard No. 60 sieve.

3.2.4 Ingredients for chicken used in type III.

3.2.4.1 Chicken breast. Raw (uncooked), skinless, boneless chicken breast shall be prepared from freshly slaughtered broiler/fryer chickens (2.5 to 3.75 lb range) in accordance with USDA Poultry Products Inspection regulations. The chicken breasts shall be U.S. Grade A. The chicken breasts shall have no bone or bone fragments over 0.3 inch. The chicken breast shipped between plants shall be accompanied by a USDA Poultry Products Grading Certificate to certify quality, class, weight range requirements, and condition of the product and either the initial chilling date or initial freezing (in-storage) date.

3.2.4.2 Chicken thighs. Raw (uncooked), skinless, boneless chicken thighs shall be prepared from freshly slaughtered broiler/fryer chickens in accordance with USDA Poultry Products

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Inspection regulations. The chicken thighs shall be U.S. Grade A. Excess fat must be removed from the meat before use. The chicken thighs shipped between plants shall be accompanied by a USDA Poultry Products Grading Certificate to certify quality, class, weight range requirements, and condition of the product and either the initial chilling date or initial freezing (in-storage) date.

3.2.4.3 Fat. Excess fat must be removed from the meat before use. Excess fat includes: (a) visible fat not integrated in the muscle tissue that exceeds an aggregate area equivalent to the area of a circle with a diameter of 1.50 inches (3.81 cm); and (b) fat deposit not integrated in the muscle that extends more than 0.50 inches (1.27 cm) beyond the meat tissue.

3.2.4.4 Chicken, chilled. Raw (uncooked), skinless, boneless thighs, whole chicken breast or breast halves received in the chilled state shall not have been previously frozen and shall have been held at the internal temperature of 28°F to 40°F (-2°C to 4°C) for a period of time not to exceed 6 days following the initial chilling and prior to preparation and further processing.

3.2.4.5 Chicken, frozen. Raw (uncooked), skinless, boneless thighs, whole chicken breast or breast halves received in the frozen state shall have been held at an internal temperature not to exceed 0°F (-18°C) for a period of time not to exceed 120 days following initial freezing and prior to preparation and further processing.

3.2.5 Ingredients for beef used in type IV.

3.2.5.1 Beef, shaved. The shaved beef shall have been prepared from chilled (not previously frozen) beef (knuckles or bottom round). Thickness shall be between 1/32-2/32 inches. All surface fat shall be removed. The beef shall be free from heavy connective tissue. The beef shall be quick frozen immediately after shaving to 0°F or below for not more than 120 days from date of pack to finished product preparation. The shaved steak shall be certified by a USDA Agricultural Marketing Service (AMS) Certificate to certify condition of the product, the freezing date and processing and packaging requirements.

3.2.6 Ingredients for marinating sauce used in types III and IV.

3.2.6.1 Broth, beef. The canned (thermostabilized) or frozen beef broth shall be produced from USDA inspected beef in accordance with the USDA Meat and Poultry Products Inspection Regulation. The canned or frozen beef broth shall be free from extraneous material and crackling. The broth shall have a characteristic mild-beef broth odor and flavor and may contain flavor enhancer approved by the FDA. The canned beef broth shall be of the latest date of pack. The frozen beef broth shall have been held at 0°F (-18°C) or below for not more than 75 days from date of freezing.

3.2.6.2 Broth, chicken. The canned (thermostabilized) or frozen chicken broth shall be produced from USDA inspected chicken in accordance with the USDA Poultry Products

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Inspection Regulation. The broth shall have a characteristic mild-chicken broth odor and flavor and may contain flavor enhancer approved by the FDA. The canned chicken broth shall be of the latest date of pack. The frozen chicken broth shall have been held at 0°F (-18°C) or below for not more than 75 days from date of freezing.

3.2.6.3 Rice syrup, clarified. The rice syrup should be a clarified low conversion rice syrup. The syrup shall have a sweet taste, and gold to amber color. It shall have a pH of 6.0 to 6.6, a clarity (5 percent, 800 nm) not greater than 85 percent transmission and a minimum brix of 77 degrees Brix. The clarified rice syrup shall have a dextrose equivalent (DE) of 26. (see 6.2.10).

3.2.6.4 Glycerol. The glycerol shall comply with the Food Chemicals Codex.

3.2.6.5 Pepper, black, ground. Ground black pepper shall have been ground from the deep brown to black, deep-set wrinkled, immature berries of *Piper nigrum L.* The ground pepper shall have a characteristic, penetrating odor, a hot biting pungent flavor and a light gray to speckled black-gray color. The ground pepper shall contain not less than 2.0 ml of volatile oil per 100 grams of ground black pepper and be of such size that 95 percent shall pass through a U.S. Standard No. 16 sieve.

3.2.6.6 Sodium tripolyphosphate. The sodium tripolyphosphate shall comply with the Food Chemicals Codex.

3.3 Preparation and processing. Processing shall be on a continuous basis.

3.3.1 Preparation and processing of meat used in Types III and IV. The chicken or beef shall be formulated from the following ingredients in the proportions specified:

<u>Ingredient</u>	<u>Percent by weight</u>
Chicken or beef <u>1/</u>	86.13
Chicken or beef broth	4.71
Rice syrup	3.65
Glycerol	3.65
Salt	1.32
Sodium tripolyphosphate	0.36
Black pepper	0.18

1/ The chicken shall consist of 90 percent skinless, boneless chicken breast and 10 percent skinless, boneless chicken thighs.

a. The chicken mixture shall be prepared as follows:

(1) The tempered 28°F to 40°F (-2°C to 4°C) chicken shall be flaked through a Comitrol head No.66503 or coarse ground thru a 0.50 inch plate.

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(2) Combine the marinade ingredients. The chicken shall be mixed with marinade and marinated for 24 hours under refrigeration 40°F or lower (4°C or lower). An alternative to marinating overnight is to vacuum infuse the marinade with the meat in a vacuum tumbler. Infusion shall take place for 25 minutes at 25 rpms and 27 mmHg.

(3) After marinating or vacuum infusion, the chicken mixture shall be cooked in a steam jacketed kettle to a targeted water activity of 0.94 ± 0.01 . The filling shall be mixed intermittently to ensure chicken pieces are less than 1/2 inch, but not ground. All excess moisture shall be drained from the cooked chicken.

(4) The cooked chicken mixture shall be cooled to a temperature of 72°F (22°C) within 2 hours and to 40°F (4°C) within 4 hours following the cooking process. The cooled, cooked chicken mixture shall be held for not more than 24 hours at a temperature of 28°F to 40°F (-2°C to 4°C) after removal from the cooking process and prior to mixing with barbecue sauce.

b. The beef mixture shall be prepared as follows:

(1) The shaved beef shall be tempered 28°F to 40°F (-2°C to 4°C) prior to marinating.

(2) Combine the marinade ingredients. The beef shall be mixed with marinade and marinated for 24 hours under refrigeration 40°F or lower (4°C or lower). An alternative to marinating overnight is to vacuum infuse the marinade with the meat in a vacuum tumbler. Infusion shall take place for 25 minutes at 25 rpms and 27 mmHg.

(3) After marinating or vacuum infusion, the meat mixture shall be cooked in a steam jacketed kettle to a targeted water activity of 0.94 ± 0.01 . All excess moisture shall be drained from the cooked beef.

(4) The cooked beef mixture shall be cooled to a temperature of 72°F (22°C) within 2 hours and to 40°F (4°C) within 4 hours following the cooking process. The cooled, cooked beef mixture shall be held for not more than 24 hours at a temperature of 28°F to 40°F (-2°C to 4°C) after removal from the cooking process and prior to mixing with barbecue sauce.

3.3.2.1 Preparation of honey barbecue sauce. The honey barbecue sauce shall be formulated with the following ingredients in the proportions specified:

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<u>Ingredient</u>	<u>Percent by weight</u>
Tomato paste	35.94
Brown sugar	14.87
Yellow mustard	11.70
Honey	10.42
Glycerol	7.71
Molasses	5.94
Ground mustard	3.65
Vegetable oil	3.13
Salt	2.03
Worcestershire sauce	1.98
Onions (dehydrated)	1.54
Smoke (liquid base)	0.55
Garlic powder	0.42
Red pepper	0.06
Black pepper	0.06

The sauce ingredients shall be mixed together and heated to a temperature of 140°F to 180°F (60°C to 82°C), and cooked continuously until a targeted water activity of 0.86 ± 0.01 is reached.

3.3.2.2 Preparation of filling (types III and IV). The filling shall be prepared as follows:

<u>Ingredient</u>	<u>Percent by weight</u>
Barbecue sauce	54.15
Marinated/cooked chicken or beef	44.30
Encapsulated vinegar powder	<u>1.55</u>
Total	100.00

a. The cooked chicken or beef shall be mixed with the barbecue sauce and encapsulated vinegar. Temperature shall be less than 135°F (57°C) before adding encapsulated vinegar. The water activity of the final mixture shall be 0.88 to 0.91 and the pH of the mixture shall be 4.6 to 5.0.

b. If the mixture is not going to be used immediately, the meat/barbecue sauce mixture shall be held at 40°F (4°C) or less for not more than 48 hours or frozen to 0°F (-18°C) or below within 72 hours and held for not more than 30 days. The meat/barbecue sauce mixture shall be stored in containers that are adequate to protect from freezer deterioration/damage and maintain the product in excellent condition.

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3.3.3 Preparation of bread.

3.3.3.1 Preparation of bread for types I and II. The bread shall be formulated from the following ingredients in the proportions specified:

<u>Ingredient</u>	<u>Percent by weight</u>
Flour, bread <u>1/</u>	50.98
Water <u>1/</u>	27.35
Shortening	8.79
Glycerol	6.43
Yeast (instant dry) <u>1/ 2/</u>	2.29
Salt	1.31
Sucrose ester	1.00
Control S (ADM)	0.50
Gum arabic <u>1/</u>	0.50
Calcium sulfate	0.25
Xanthan gum <u>1/</u>	0.25
Glucono delta lactone, encapsulated	0.25
Sorbic acid, encapsulated	0.10

1/ The percent by weight of flour, water, yeast, gum arabic and xanthan gum may be adjusted, if necessary, to compensate for in-plant processing equipment, humidity and temperature conditions.

2/ When compressed or crumbled yeast is used, the percent by weight shall be adjusted to assure compliance with finished product requirements.

3.3.3.2 Preparation of bread for types III and IV. The bread shall be formulated from the following ingredients in the proportions specified:

<u>Ingredient</u>	<u>Percent by weight</u>
Flour, bread <u>1/</u>	50.22
Water <u>1/</u>	28.76
Shortening	8.61
Glycerol	6.30
Yeast (instant dry) <u>1/ 2/</u>	2.24
Salt	1.28
Sucrose ester	0.99
Control S (ADM)	0.50
Gum arabic <u>1/</u>	0.50
Calcium sulfate	0.25
Xanthan gum <u>1/</u>	0.25
Sorbic acid, encapsulated	0.10

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1/ The percent by weight of flour, water, yeast, gum arabic and xanthan gum may be adjusted, if necessary, to compensate for in-plant processing equipment, humidity and temperature conditions.

2/ When compressed or crumbled yeast is used, the percent by weight shall be adjusted to assure compliance with finished product requirements.

3.3.3.3 Preparation of dough. The bread shall be manufactured by the sponge and dough method or any other method yielding an equivalent product. Commonly used dough improvers, yeast foods and/or dough relaxers are permitted. The sucrose ester emulsifier shall be dry blended with the flour. All ingredients shall then be combined and sufficiently mixed to develop the dough.

3.3.4 Preparation of sandwich.

3.3.4.1 Sheeting and forming sandwich. The proofed dough shall be sheeted into pieces of sufficient weight and filled to ensure compliance with finished product net weight requirements.

3.3.4.2 Forming of types I and II sandwiches. Types I and II shall have a dough weight of 2.0 ounces (56.7 grams) and meat weight of 0.9 ounces (25.5 grams) to give a product weight of 2.9 ounces (82.2 grams) prior to proofing and baking.

3.3.4.3 Forming of types III and IV sandwiches. Types III and IV shall have a dough weight of 2.6 ounces (73.7 grams) and filling weight of 1.3 ounces (36.8 grams) to give a product weight of 3.9 ounces (110 grams) prior to proofing and baking.

3.3.4.4 Proofing. The formed sandwiches shall be proofed at 90°F (32°C) and 86 percent relative humidity for 1 hour.

3.3.4.5 Baking. The proofed product shall be fully baked to an internal temperature of 185°F (85°C) and until the exterior is a uniform typical bread crust color corresponding to the bread color labeled B in the photographic standard provided to the contractor and inspector, USDA, AMS.

3.4 Packaging methods. Continuous method shall be used. One unit of sandwich and one package of an FDA approved oxygen scavenger shall be placed into the pouch. The internal temperature of the sandwich shall be not less than 80°F (27°C) or greater than 135°F (57°C).

3.4.1 Oxygen scavenger. The oxygen scavenger shall be FDA approved as suitable for use with food. The oxygen scavenger packet shall be resistant to the migration of oil, moisture and scavenger components (see 6.3).

3.5 Finished product requirements. The finished product shall comply with the following requirements:

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- a. There shall be no foreign materials such as, but not limited to dirt, insect parts, hair, wood, glass, metal or mold.
- b. There shall be no foreign odors or flavors such as, but no limited to burnt, scorched, moldy, rancid, sour or stale.
- c. There shall be no color foreign to the product.
- d. For types I and II, no individual pouch shall contain less than 2.5 ounces (70.8 grams).
- e. For types III and IV, no individual pouch shall contain less than 3.5 ounces (99.2 grams).
- f. The shelf stable sandwich and the oxygen scavenger shall both be intact.
- g. The water activity for any individual pouch shall not be greater than 0.89 when measured at 25°C (77° F).
- h. The oxygen content of the filled and sealed pouches shall not exceed 0.30 percent after 48 hours from time of sealing.
- i. For all types, the pH shall not exceed 4.8.
- j. For all types, the texture of the bread shall not be excessively dry, crumbly or excessively moist and gummy. The texture of the bread shall be slightly dense and have a uniform cell structure.
- k. For all types, the crust color shall be uniform and golden brown, without being excessively light or dark. The crumb shall be white to off white. There shall be no evidence of compression streaks. The filling should not appear to be excessively dark.
- l. For types I and II, the meat stick filling shall be moist, slightly chewy and shall not be grainy or excessively dry.
- m. For types I and II, the meat stick filling shall be a reddish brown cured meat color and not appear dry or crumbly.
- n. For types III and IV, the filling shall be moist, very slightly chewy and shall not be pasty or excessively dry.
- o. For type III, the chicken shall be not greater than 1/2 inch pieces.

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p. For type I, the nacho flavored beef shall have a slightly spicy, fermented beef nacho cheese odor and flavor. The product shall have a slight smoked and fermented flavor. The bread shall have a slight nacho cheese odor and flavor.

q. For type II, the pepperoni shall have a slightly spicy pepperoni beef odor and flavor. The product shall have a slight fermented flavor. The bread shall have a slight pepperoni odor and flavor.

r. For types III and IV, the product shall have a slightly sweet barbecue, hickory, honey-like odor and flavor. The bread shall have a slight fermented and smoked odor and flavor.

s. For all types, meat shall be free from skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments.

3.5.1 Overall appearance and palatability. The finished product shall be equal to or better than the approved product standard sample (see 6.1) in palatability and overall appearance.

3.6 Hazard Analysis Critical Control Point (HACCP) Plan. Prior to the first production, the contractor shall provide a written HACCP plan that is specific to each product type produced. The plan will include a process flow diagram, identification of critical control points and critical limits, as well as specific monitoring procedures, corrective actions, documentation and verification procedures. The product pH, water activity (Aw), cooking time/temperature, and oxygen content of packages shall be included as critical control points. Other critical control points specific to the manufacturers processes will also be included. Specification limits shall not be used as critical limits for the HACCP plan. When calculating critical limits for analytical requirements, the contractor shall provide sufficient tolerance to account for the variation inherent to their process. The HACCP plan must be submitted to the applicable government inspection agency for approval, and must be approved prior to production of any product offered for acceptance. Contractors may be required to provide records of process capabilities study or related production evaluation to validate critical limits.

3.7 Plant qualifications. The meat component and the finished product shall originate and be produced, processed, and stored in plants regularly operating under Meat and Poultry Inspection Regulations of the U.S. Department of Agriculture. The product shall be prepared, processed and packaged in establishments meeting the requirements of 21 CFR, Part 110, "Current Good Manufacturing Practice in Manufacturing, Packaging, or Holding of Human Food," and the plant sanitation requirements of the appropriate government inspection agency.

3.8 Federal Food, Drug, and Cosmetic Act. All deliveries shall conform in every respect to the provisions of the Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder.

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4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Product standard inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Product standard inspection. The first article or product demonstration model shall be inspected in accordance with the provisions of this specification and evaluated for overall appearance and palatability. Any failure to conform to the requirements or any appearance or palatability failure, shall be cause for rejection of the lot. The approved product standard shall be used for periodic review evaluations. All food components that are inspected by the USDA shall be subject to periodic review sampling and evaluation. The USDA shall select sample units during production of contracts and submit them to the following address for evaluation:

US Army Research, Development & Engineering Command
Natick Soldier Center
AMSRD-NSC-CF-F
15 Kansas Street
Natick, MA 01760-5018

One lot shall be randomly selected during each calendar month of production. Six (6) sample units of each item produced shall be randomly selected from that one production lot. The six (6) sample units shall be shipped to Natick within five working days from the end of the production month and upon completion of all USDA inspection requirements. The sample units will be evaluated for the characteristics of appearance, odor, flavor, texture and overall quality.

4.2.1 Product examination. The filled and sealed pouches shall be conditioned to 70°F to 80°F (21°C to 27°C) and examined for the defects listed in table I. The lot size shall be expressed pouches. The sample unit shall be the contents of one pouch. Utilizing the double sampling plans indicated in ANSI/ASQC Z1.4 - 1993, the inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 4.0 for minor defects.

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TABLE I. Product defects. 1/ 2/

<u>Category</u>		<u>Defect</u>
<u>Major</u>	<u>Minor</u>	
101		Product not type as specified.
102		Pouch does not contain one intact sandwich and one intact oxygen scavenger packet.
103		Sandwich bread crumb not white to off white color.
104		Sandwich bread shows evidence of compression streaks.
	201	Sandwich crust color not uniform or not golden brown.
	202	Sandwich filling excessively dark.
105		Sandwich bread texture dry, crumbly, or excessively moist or gummy.
106		Sandwich bread texture not slightly dense or not a uniform cell structure.
107		Tear, hole, or open seal in oxygen scavenger packet.
		<u>Type I</u>
	203	Meat stick filling not moist or not slightly chewy.
108		Meat stick filling grainy or excessively dry.
	204	Meat stick filling not reddish brown cured meat color.
109		Meat stick filling appears dry or crumbly.
110		Nacho flavored beef not a slightly spicy, fermented beef nacho cheese odor or flavor.
111		Sandwich does not have a slight smoked and fermented flavor.
112		Sandwich bread does not have a slight nacho cheese odor or flavor.
	205	Total weight of skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments more than 0.09 ounces.

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TABLE I. Product defects. 1/ 2/ (continued)

Category		Defect
<u>Major</u>	<u>Minor</u>	
		<u>Type II</u>
	206	Meat stick filling not moist or not slightly chewy
113		Meat stick filling grainy or excessively dry.
	207	Meat stick filling not reddish brown cured meat color.
114		Meat stick filling appears dry or crumbly.
115		Pepperoni not a slightly spicy pepperoni beef odor or flavor.
116		Sandwich does not have a slight fermented flavor.
117		Sandwich bread does not have a slight pepperoni odor or flavor.
	208	Total weight of skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments more than 0.09 ounces.
		<u>Type III</u>
	209	Chicken pieces in finished sandwich greater than 1/2 inch.
118		Sandwich does not have a slightly sweet barbecue, hickory, honey-like odor or flavor.
119		Sandwich bread does not have a slight fermented and smoked odor or flavor.
120		Sandwich filling not moist or not very slightly chewy.
121		Sandwich filling pasty or excessively dry.
	210	Total weight of skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments more than 0.20 ounces.

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TABLE I. Product defects. 1/ 2/ (continued)

Category	Defect
<u>Major</u>	<u>Minor</u>
	<u>Type IV</u>
122	Beef not shaved or thickness less than 1/32 inches or greater than 2/32 inches.
123	Sandwich does not have a slightly sweet barbecue, hickory, honey-like odor or flavor.
124	Sandwich bread does not have a slight fermented and smoked odor or flavor.
125	Sandwich filling not moist or not very slightly chewy.
126	Sandwich filling pasty or excessively dry.
	211 Total weight of skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments more than 0.35 ounces.
	<u>Weight</u>
	212 Types I or II, net weight of an individual sandwich less than 2.5 ounces (70.8 grams). 3/
	213 Types III or IV, net weight of an individual sandwich less than 3.5 ounces (99.2 grams). 3/

1/ Presence of any foreign materials for example, dirt, insect parts, hair, wood, glass, metal or mold, or any foreign odors or flavors such as, but not limited to burnt, scorched, rancid, sour, or stale or foreign color shall be cause for rejection of the lot.

2/ Product not equal to or better than the approved product standard in palatability or overall appearance shall be cause for rejection of the lot (see 3.5.1).

3/ The net weight of the filled and sealed pouches shall be determined by weighing each sample on a suitable scale tared with a representative empty pouch. Results shall be reported to the nearest 0.1 ounce (2.8 grams).

4.3 Conformance inspection. Conformance inspection shall include the examinations of 4.2.1, 4.3.1, 4.3.2, and the tests of 4.4.1 through 4.4.3.

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4.3.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3.2 Ingredient and component examination. Conformance of ingredients and components to identity, condition, and other requirements specified in 3.2 shall be certified by the ingredient supplier or ingredient manufacturer, and compliance shall be verified by examination of pertinent labels, markings, US Grade Certificates, certificates of analyses, or other such valid documents acceptable to the inspection agency. If necessary, each ingredient shall be examined organoleptically or inspected according to generally recognized test methods such as the standard methods described in the Official Methods of Analysis of the Association of Official Analytical Chemists and in the Approved Methods of the American Association of Cereal Chemists, to determine conformance to the requirements. Any nonconformance to an identity, condition, or other requirement shall be cause for rejection of the ingredient or component lot or of any involved product.

4.4 Tests.

4.4.1 Water activity (Aw) testing. Eight filled and sealed pouches shall be selected at random from the lot regardless of lot size. Water activity shall be determined not less than 4 days but not more than 14 days after baking to allow moisture equilibration in the product. The pouched product shall be individually tested for Aw in accordance with the Official Methods of Analysis of the AOAC method 978.18, using an electric hygrometer system self temperature controlled at 25°C (77° F) or an equivalent instrument. Each individual sample unit shall be ground prior to Aw analysis. The results of each Aw determination shall be reported to the nearest 0.01. Any test result not conforming to the Aw requirement in 3.5 shall be classified as a critical defect and the lot shall be rejected.

4.4.2 Oxygen content testing. Eight filled and sealed pouches shall be randomly selected from one production lot and individually tested for oxygen content in accordance with any USDA approved test method. Testing shall be accomplished after the filled and sealed pouches have been allowed to equilibrate at room temperature for not less than 48 hours from the time of sealing. Test results shall be reported to the nearest 0.01 percent. Any test result not conforming to the oxygen content requirement in 3.5 shall be classified as a major defect and shall be cause for rejection of the lot.

4.4.3 Analytical. The sample to be analyzed shall be a composite of eight filled and sealed pouches which have been selected at random from the lot. The composite sample shall be prepared and analyzed in accordance with the following Official Methods of Analysis of AOAC International (OMA).

<u>Test</u>	<u>Method Number</u>
pH	981.12, 943.02

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Test results of pH value shall be reported to the nearest 0.1. Verification will be conducted through actual testing by a Government laboratory. Any result not conforming to the pH requirement in 3.5 shall be cause for rejection of the lot.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.1). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of product required (see 1.2).
- c. When other than first article or product demonstration model are is required (see 3.1).
- d. Provisions for approved product standard samples (see 3.5.1)
- e. Packaging requirements (see 5.1)

6.2 Ingredient information

6.2.1 Emulsifier. Sucrose fatty acid ester S-1670, supplied by Mitsubishi International Corporation, 520 Madison Avenue, New York, New York, 10022 meets the requirements of 3.2.1.7 and performs satisfactorily in this product.

6.2.2 Glucono-delta-lactone, encapsulated. Encapsulated Glucon-delta-lactone manufactured by Balchem Corporation, Slate Hill, New York, 10973 meets the requirements of 3.2.1.11 and performs satisfactorily in this product.

6.2.3 Sorbic acid, encapsulated. Encapsulated sorbic acid manufactured by Balchem Corporation, Slate Hill, New York, 10973 meets the requirements of 3.2.1.12 and performs satisfactorily in this product.

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6.2.4 Potassium sorbate, encapsulated. Encapsulated potassium sorbate manufactured by Balchem Corporation, Slate Hill, New York, 10973 meets the requirements of 3.2.1.13 and performs satisfactorily in this product.

6.2.5 Oxidizer/conditioner/mix reducer. Control S Manufactured by ADM Arkady, Olathe, Kansas 6606, meets the requirements of 3.2.1.15 and performs satisfactorily in this product.

6.2.6 Nacho flavored beef stick. Nacho flavored beef stick manufactured by Bridgeford Foods Corporation, Superior Division, 9001 Chancellor Row, Dallas, Texas 75247 meets the requirements of 3.2.2.1 and performs satisfactorily in this product.

6.2.7 Pepperoni stick. Pepperoni stick manufactured by Bridgeford Foods Corporation, Superior Division, 9001 Chancellor Row, Dallas, Texas 75247 meets the requirements of 3.2.2.2 and performs satisfactorily in this product.

6.2.8 Flavoring, smoke. Charsol C-6 manufactured by Red Arrow Products Company LLC, 12265 Water Street, Manitowoc, WI 54220 meets the requirements of 3.2.3.7 and performs satisfactorily in this product.

6.2.9 Encapsulated vinegar powder. Flavorshure 114 manufactured by Balchem Corporation, Slate Hill, New York, 10973 meets the requirements of 3.2.3.14 and performs satisfactorily in this product.

6.2.10 Rice syrup, clarified. White rice syrup (WRSRDCL) or partially polished brown rice syrup (PPRSRDCL) manufactured by California Natural Products Larhrop, CA 95330 meets the requirements of 3.2.6.3 and performs satisfactorily in this product.

6.3 Oxygen scavenger. Oxygen scavenger suitable for the purpose may be obtained from the Multiform Desiccants, Inc., Buffalo, New York 14224. Other approved oxygen scavengers may be used.

6.4 Hazard Analysis Critical Control Point Model. Natick Soldier Center - Combat Feeding Directorate has developed a generic Hazard Analysis Critical Control Point (HACCP) Model for Shelf Stable Pocket Sandwiches in order to provide a framework that manufacturers may find helpful as they develop their own plant-process-product specific HACCP plan. Copies of this generic model can be obtained at the following address:

US Army Research, Development & Engineering Command
Natick Soldier Center
AMSRD-NSC-CF-F
15 Kansas Street
Natick, MA 01760-5018

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6.5 Shelf life. This specification covers items where shelf life is a consideration. Specific shelf-life requirements should be specified in the contract or purchase order. The shelf-life codes are contained in the Federal Logistics Information System Total Item Record. Additive information for shelf-life management may be obtained from DoD 4140.27-M; Shelf-life Management Manual, or the designated shelf-life Points of Contact (POC). The POC should be contacted in the following order: (1) the Inventory Control Points (ICPs), and (2) the DoD Service and Agency administrators for the DoD Shelf-Life Program. Appropriate POCs for the DoD Shelf-Life Program can be contacted through the DoD Shelf-Life Management website: [htm://www.shelflife.hg.dla.mil/](http://www.shelflife.hg.dla.mil/).

6.6 Subject term (key word) listing.

Combat field feeding
Pouch bread

Custodians:

Army - GL
Navy - SA
Air Force - 50

Preparing activity:

Army - GL
(Project 8940-0959)

Review activities:

Army - MD, QM
Navy - MC
DLA - SS

Civil agency:

USDA - FV

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at www.dodssp.daps.mil.