

INCH-POUND

MIL-DTL-32541

30 November 2015

DETAIL SPECIFICATION

PIZZA SLICE, 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 pizza slice in a flexible pouch intended for use by the Department of Defense as a component of operational rations.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: DEPARTMENT OF THE ARMY, RDNS-SEC-EMR, NATICK SOLDIER SYSTEMS CENTER, 10 GENERAL GREENE AVENUE, NATICK, MA 01760 or emailed to elizabeth.r.painter2.civ@mail.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

AMSC N/A

FSC 8920

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-DTL-32541

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)

Institutional Meat Purchase Specifications (IMPS) for Sausage Products Series 800

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

U.S. Standards for Grades of Canned Tomato Paste

U.S. Standards for Grades of Olive Oil and Olive-Pomace Oil

(Copies of these documents are available online from 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.gpo.gov/ 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 online at 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.

MIL-DTL-32541

AOAC INTERNATIONAL

Official Methods of Analysis (OMA) of AOAC International

(Copies of this document are available from www.aoac.org/ or AOAC International, 2275 Research Boulevard, Suite 300, Rockville, MD 20850-3250.)

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/ASQ Z1.4 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.)

NORTH AMERICAN MEAT PROCESSORS ASSOCIATION (NAMP)

Meat Buyers Guide

(Copies of this document are available from www.namp.com or North American Meat Processors Association, 1910 Association Drive, Reston, VA 20191.)

MIL-DTL-32541

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 the approved product standard, which result in a product noncomparable to the product standard, the contractor shall submit a replacement FA or PDM for 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 pizza crust.

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. Amylolytic enzyme activity, as determined by the “falling number” method shall not be less than 225. 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. Solid non-hydrogenated shortening shall be made from refined, bleached, deodorized palm oil commonly used by the baking industry and shall have a free fatty acid content of less than or equal to 0.1 percent, a Peroxide Value of less than or equal to 1 meq/kg, and a Mettler Dropping Point between 106°F to 114°F (41°C to 46°C). The shortening shall be a creamy, opaque white oil that possesses a bland clean odor and flavor. The shortening may contain regulated additives/ingredients. Shortening used for greasing dough trough, dough pieces, or baking molds shall conform to the above requirements.

MIL-DTL-32541

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

3.2.1.5 Yeast. The yeast shall be commercial compressed or crumbled yeast. Commercial active dry baker's yeast may be used.

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

3.2.1.7 Emulsifier. The emulsifier shall be sodium stearoyl lactylate complying with the 21 CFR, Part 172.846.

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

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

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

3.2.1.11 Sorbic acid, encapsulated. The encapsulated sorbic acid shall comply with the Food Chemicals Codex (see 6.2.1). The encapsulated sorbic acid shall consist of 50 ± 2.0 percent sorbic acid and 50 ± 2.0 percent vegetable oil. The vegetable oil shall have a melting point of 152°F to 158°F (67°C to 70°C).

3.2.1.12 Glucono-delta-lactone (GDL), encapsulated. The encapsulated glucono-delta-lactone shall comply with the Food Chemicals Codex (see 6.2.2). The encapsulated glucono-delta-lactone shall consist of 70 ± 2.0 percent glucono-delta-lactone and 30 ± 2.0 percent vegetable oil. The vegetable oil shall have a melting point of 141°F to 147°F (60°C to 64°C).

3.2.1.13 Vital wheat gluten. The vital wheat gluten shall be a cream to tan colored powder produced from wheat flour by drying freshly washed gluten under temperatures sufficiently low enough 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 ($N \times 5.7$) of not less than 71.0 percent, total carbohydrate content not more than 15.0 percent, a moisture content of not more than 7.0 percent, fat (by hydrolysis) of not more than 6.5 percent, and ash not more than 1.0 percent.

3.2.1.14 Dough strengthener. The dough strengthener shall comply with the Food Chemicals Codex (see 6.2.3).

3.2.1.15 Water dispersable monoglyceride. The water dispersable monoglyceride shall comply with the Food Chemicals Codex (see 6.2.4).

MIL-DTL-32541

3.2.1.16 Sugar, white, granulated. The sugar shall be white, refined, granulated cane or beet sugar, or a combination thereof.

3.2.1.17 Alpha amylase. The alpha amylase shall comply with 21 CFR 184.1012 (see 6.2.5).

3.2.2 Ingredients for pizza sauce.

3.2.2.1 Tomatoes, crushed, concentrated, canned. Canned tomatoes shall be peeled, cored, mature, crushed concentrated tomatoes. The use of Generally Recognized as Safe (GRAS) firming and acidification ingredients and salt is permitted. The canned tomatoes shall have not less than 8.0 percent tomato soluble solids and shall possess a red flesh color, and a distinct sweet tomato odor and flavor. The crushed tomatoes shall be free of extraneous vegetable material, core material and skins (peel). The canned, crushed concentrated tomatoes shall be of the latest season's pack.

3.2.2.2 Tomato paste. Tomato paste shall be U.S. Grade A or U.S. Fancy of the U.S. Standards for Grades of Canned Tomato Paste. The tomato paste shall be of the latest season's pack.

3.2.2.3 Salt. Salt shall be iodized, white, refined, sodium chloride, with or without anti-caking agent.

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

3.2.2.5 Rice syrup, clarified. The rice syrup shall be clarified low conversion rice syrup. The syrup shall have a gold to amber color and a sweet flavor. It shall have a pH of not less than 6.0 and not greater than 6.6, a clarity (5.0 percent, 800 nm) not greater than 85.0 percent transmission and a minimum of 77 degrees Brix (°Bx). The clarified rice syrup shall have a dextrose equivalent (DE) of 26.

3.2.2.6 Sugar, white, granulated. The sugar shall be white, refined, granulated cane or beet sugar, or a combination thereof.

3.2.2.7 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.

3.2.2.8 Pepper, red (cayenne), ground. Ground red (cayenne) pepper shall be derived from red, ripe fruit of *Capsicum frutescens L.* or *Capsicum annuum L.* and shall possess the characteristic red to reddish-brown color. The Scoville Pungency Value shall be not less than 30,000 units. The red (cayenne) pepper shall be uniformly ground to allow a minimum of 95.0

MIL-DTL-32541

percent, by weight, to pass through a U.S. Standard No. 40 sieve, and not less than 95.0 percent, by weight, to be retained on a U.S. Standard No. 60 sieve.

3.2.2.9 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.

3.2.2.10 Cheese, blend, Parmesan/Romano, grated. The grated Parmesan/Romano cheese blend shall comply with 21 CFR Part 133; section 133.146 Grated cheeses, section 133.165 Parmesan and Reggiano cheese, and section 133.183 Romano cheese.

3.2.2.11 Olive oil. Olive oil shall be U.S. Extra Virgin Olive Oil of the U.S. Standards for Grades of Olive Oil and Olive-Pomace Oil.

3.2.2.12 Basil, ground. Ground basil shall be derived from dried leaves of *Ocimum basilicum* L. and shall possess a sweet anise-like odor and aromatic, warm slightly pungent flavor. The volatile oil content shall not be less than 0.4ml per 100 grams of ground basil. A minimum of 95.0 percent by weight shall pass through a U.S. Standard No. 35 sieve.

3.2.2.13 Pepper, white, ground. The ground white pepper shall have been ground from immature berries of *Piper nigrum* L. from which the outer covering or the outer and inner coverings have been removed, shall be a cream white color and shall possess a characteristic, penetrating odor, and a hot biting pungent flavor.

3.2.2.14 Oregano, ground. Ground oregano shall be derived from the dried leaves of *Origanum vulgare* L. and shall have a strong camphoraceous odor and a pungent, slightly bitter flavor. Volatile oil content shall not be less than 2.0 ml per 100 grams and the oregano shall be of such a size that not less than 95.0 percent shall pass through a U.S. Standard No. 30 sieve.

3.2.3 Ingredients for pizza toppings.

3.2.3.1 Mozzarella cheese, low moisture, part skim (LMPS). The LMPS mozzarella cheese shall have a mild cheese flavor with a natural white to light cream, uniform bright color. The cheese shall be a standard shred size and have a height and width not greater than 3/16 inch and a length not greater than 1.5 inches. The cheese shall be free from foreign and extraneous material. The cheese shall be smooth and pliable. The cheese shall be free-flowing, not matted and not clumped. The cheese may possess slight acid and feed flavors. The cheese shall comply with all applicable Federal regulations including those contained in 21 CFR 133. 155 for mozzarella cheese, 21 CFR 101.56, 21 CFR 101.13 and 21 CFR 133.46. The cheese shall have a moisture content of not less than 45.0 percent and not greater than 52.0 percent. The cheese shall have a fat content not less than 30.0 percent and not greater than 45.0 percent on a dry basis. The cheese

MIL-DTL-32541

shall have a salt content not less than 1.2 percent and not greater than 1.8 percent. The cheese shall have a pH value not less than 5.0 and not greater than 5.4.

3.2.3.2 Mozzarella cheese product, processed, pasteurized, low water activity (a_w), shelf stable (SS). The SS mozzarella cheese product shall have a mild cheese flavor with a natural white to light cream, uniform bright color. The cheese shall be a standard shred size and have a height and width not greater than 3/16 inch and a length not greater than 1.5 inches. The cheese shall be free from foreign and extraneous material. The cheese shall be smooth and pliable. The cheese shall be free flowing, not matted and not clumped. The cheese shall have a moisture content not less than 34.0 percent and not greater than 39.0 percent. The cheese shall have a fat content not less than 20.0 percent and not greater than 29.0 percent on a solids basis. The cheese shall have a salt content not less than 2.3 percent and not greater than 3.3 percent. The cheese shall have a pH value not less than 5.1 and not greater than 5.7. The cheese shall have a a_w not greater than 0.86.

3.2.3.3 Mozzarella cheese product, processed, pasteurized, low water activity (a_w). The mozzarella cheese product shall have a mild cheese flavor with a natural white to light cream, uniform bright color. The cheese shall be a standard shred size and have a height and width not greater than 3/16 inch and a length not greater than 1.5 inches. The cheese shall be free from foreign and extraneous material. The cheese shall be smooth and pliable. The cheese shall be free flowing, not matted and not clumped. The cheese shall have a moisture content not less than 34.0 percent and not greater than 39.0 percent. The cheese shall have a fat content not less than 20.0 percent and not greater than 29.0 percent on a solids basis. The cheese shall have a salt content not less than 2.3 percent and not greater than 3.3 percent. The cheese shall have a pH value not less than 5.1 and not greater than 5.7. The cheese shall have a a_w not greater than 0.89.

3.2.3.4 Pepperoni, diced. The diced pepperoni shall comply with the Institutional Meat Purchase Specifications (IMPS) Item No. 821 Pepperoni, Formula B. The pepperoni shall be irregularly diced pepperoni with the majority of the pieces falling between 5-10 mm in size. The pepperoni interior cut surface shall have a moderately coarse texture with a uniform reddish-brown color. The pepperoni shall have a pH value not less than 4.5 and not greater than 5.0. The pepperoni shall have a a_w not less than 0.85 and not greater than 0.89. The pepperoni shall have a fat content not less than 35.0 percent and not greater than 41.0 percent. The pepperoni shall have a moisture content not less than 30.0 percent and not greater than 40.0 percent. The pepperoni shall be practically free from bone, cartilage, coarse connective tissue, sections of tendon or ligaments and glandular material.

3.3 Preparation and processing.

3.3.1 Preparation of pizza crust dough. The pizza crust dough shall be formulated from the following ingredients in the proportions specified:

MIL-DTL-32541

<u>Ingredients</u>	<u>Percent by weight</u>
Flour <u>1/</u>	54.1
Water <u>1/</u>	22.7
Yeast (compressed or crumbled) <u>1/</u> <u>2/</u>	7.0
Glycerol	6.5
Shortening	5.6
Salt	1.3
Emulsifier	0.7
Sugar	0.4
Water dispersable monoglyceride	0.4
Gum arabic	0.3
Xanthan gum	0.2
Calcium sulfate	0.2
Dough strengthener	0.2
Encapsulated GDL	0.2
Alpha amylase	0.1
Sorbic acid, encapsulated	0.1

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

2/ When commercial active dry baker's yeast is used, the percent by weight shall be adjusted to assure compliance with finished product requirements.

The pizza crust dough shall be manufactured by the straight dough method. The following procedure has been shown to produce product meeting the end item requirements:

- a. Begin with lowest mixing speed.
- b. Mix all dry ingredients.
- c. Add shortening and mix to crumble consistency.
- d. Add water and mix until incorporated.
- e. Add glycerol and mix until dough forms ball.
- f. Increase speed and continue mixing until dough develops.
- g. Allow the bulk dough a brief period of rest of 10 to 15 minutes before sheeting.

3.3.2 Preparation of pizza sauce and toppings.

3.3.2.1 Preparation of pizza sauce. The pizza sauce shall be formulated and prepared from the following ingredients in the proportions specified:

MIL-DTL-32541

<u>Ingredients</u>	<u>Percent by weight</u>
Tomatoes, crushed (concentrated)	52.00
Tomato paste	19.60
Glycerol	7.40
Rice syrup, clarified	5.10
Olive oil	4.10
Parmesan/Romano cheese blend	2.09
Garlic powder <u>1/</u>	2.07
Onion, dehydrated, chopped	1.80
Sugar	1.70
Salt	1.70
Basil, ground <u>1/</u>	1.24
Oregano, ground <u>1/</u>	1.04
Pepper, white, ground <u>1/</u>	0.11
Pepper, red (cayenne), ground <u>1/</u>	0.05

1/ Spices shall be weighed to the one-hundredth decimal place.

The following procedural steps have been shown to produce end items meeting the requirements:

- a. Mix all dry ingredients to eliminate clumping.
- b. Mix all liquid ingredients and blend completely.
- c. Add dry ingredients to liquid ingredients slowly, stirring constantly.
- d. Heat mixture between 140°F to 180°F (60°C to 82°C).
- e. Cook pizza sauce mixture continuously until a a_w of 0.89 is reached.

If the process is continuous, the pizza sauce mixture shall be cooled at room temperature. If the process is not continuous, the mixture shall be held at 40°F (4°C) or less for not more than 120 hours or frozen to 0°F (-18°C) or below within 120 hours and held for not more than 180 days. A Certificate of Conformance (CoC) will be required. The mixture shall be stored in containers that are adequate to protect from freezer deterioration/damage and maintain the product in excellent condition. The sauce mixture shall have a a_w not greater than 0.89. A Certificate of Analysis (CoA) will be required.

3.3.2.2 Preparation of cheese topping. The cheese topping shall be a mixture of 50.0 percent mozzarella cheese, LMPS, and 50.0 percent mozzarella cheese product, processed, pasteurized, low a_w , SS; or 100.0 percent mozzarella cheese product, processed, pasteurized, low a_w .

3.3.2.3 Preparation of diced pepperoni topping. The diced pepperoni topping shall be irregularly diced pieces ranging between 5-10 mm in size (1/4 to 1/2 inch).

MIL-DTL-32541

3.3.3 Preparation of pizza slice.

3.3.3.1 Sheeting. The bulk dough shall be sheeted into pieces of sufficient weight to ensure compliance with finished product net weight requirements. Product made with a dough weight of 56.4 ounces (1600 grams) and sheeted to fit an 18 by 26 inch full sheet pan has been shown to meet end item requirements.

3.3.3.2 Docking. The sheeted dough shall be docked prior to par-baking.

3.3.3.3 Par-baking. The dough shall be par-baked to an internal temperature between 190°F to 200°F (88°C to 93°C).

3.3.3.4 Assembling par-baked dough, sauce, cheese and pepperoni toppings in a full sheet pan. Product made with a par-baked dough weight of 52.9 ounces (1500 grams); a pizza sauce weight of 14.1 ounces (400 grams); a cheese topping weight of 14.1 ounces (400 grams); and a diced pepperoni topping weight of 9.5 ounces (270 grams) prior to baking has been shown to meet end item requirements.

3.3.3.5 Baking. The par-baked dough with sauce, cheese and pepperoni toppings shall be fully baked to a minimum internal temperature of 200°F (93°C).

3.4 Packaging methods. A continuous method shall be used. One unit of a pizza slice and one oxygen scavenger shall be placed into the pouch. The internal temperature of the product 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 constructed of materials that are safe for direct and indirect food contact, and shall be suitable for use with edible products. The oxygen scavenger packaging material shall be suitably formulated to remain heat stable when exposed to temperatures up to 212°F (100°C). The oxygen scavenger shall be in compliance with all applicable FDA regulations.

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

- a. There shall be no foreign materials such as, but not limited to dirt, insect parts, hair, glass, wood, or metal.
- b. There shall be no foreign odors or flavors such as, but not limited to burnt, scorched, rancid, sour, stale, musty or moldy.
- c. There shall be no foreign color to the product.

MIL-DTL-32541

- d. The water activity (a_w) for any individual pouch shall be not less than 0.85 and not greater than 0.88 when measured at 77°F (25°C).
- e. The oxygen content of the filled and sealed pouch shall not exceed 0.30 percent.
- f. The pH shall be not less than 4.8 and not greater than 5.2.
- g. Each pouch shall contain one intact unit of pizza slice and one intact oxygen scavenger.
- h. The pizza slice shall be a square or rectangular shape and may have a crust edge(s).
- i. The pizza slice shall contain an even distribution of visible sauce, cheese shreds and pepperoni dices.
- j. The pizza slice shall have a cooked tomato, cheese, pepperoni and Italian seasoning odor and flavor and may impart a mild heat.
- k. The pizza crust shall show no evidence of excessive flour dusting.
- l. The pizza crust bottom surface shall have dock holes.
- m. The pizza crust bottom surface shall be an off-white to golden-brown color and may have a reddish-orange color from partial sauce absorption.
- n. The pizza crust interior crumb shall be an off-white color and may have a reddish-orange color from partial sauce absorption.
- o. The pizza crust shall have a slightly sweet and sourdough flavor.
- p. The pizza crust shall be slightly dense and have a uniform cell structure.
- q. The pizza crust shall show no evidence of compression streaks.
- r. The pizza crust texture shall not be excessively dry and crumbly or excessively moist and gummy.
- s. The pizza sauce shall be a reddish-orange color and may contain visible flecks of herbs and spices.
- t. The pizza sauce shall have a tomato paste-like consistency.
- u. The cheese shreds shall have a partially melted appearance.

MIL-DTL-32541

- v. The cheese shreds shall have an off-white to light golden-tan color.
- w. The cheese shreds shall have a mild mozzarella cheese odor and flavor.
- x. The cheese shreds shall have a slightly soft to slightly firm texture.
- y. The pepperoni shall be a reddish-brown color.
- z. The pepperoni shall have a slightly spicy pepperoni beef odor and flavor.
- aa. The pepperoni shall have a slightly soft to slightly firm texture.
- bb. The average net weight shall be not less than 3.1 ounces (88 grams). The net weight of an individual pouch shall be not less than 2.8 ounces (79 grams).

3.5.1 Palatability and overall appearance. 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 following are considered by the product developer to be critical control points: pH, a_w , baking time and temperature, oxygen content of the end-packaged product. If any of these are not addressed in the producers HACCP plan, they will be established and documented as manufacturing process controls in their quality system plan. 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, Processing, Packaging, or Holding of Human Food", and the plant sanitation requirements of the appropriate Government inspection agency.

MIL-DTL-32541

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.

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 document and evaluated for appearance, odor, flavor, and texture. Any failure to conform to the performance requirements or any appearance or palatability failure shall be cause for rejection of the lot.

4.2.1 Periodic review evaluation. The approved first article or product demonstration model shall be used as the product standard 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:

DEPARTMENT OF THE ARMY
RDNS-SEC-EMR
NATICK SOLDIER SYSTEMS CENTER
10 GENERAL GREENE AVENUE
NATICK, MA 01760

One lot shall be randomly selected during each calendar month of production or as otherwise specified in the contract. Three (3) sample units of each item produced shall be randomly selected from that one production lot. The three (3) sample units shall be shipped to Natick within five (5) working days from the end of the production month from which they are randomly selected and upon completion of all USDA inspection requirements. The sample units will be evaluated for overall quality against the current first article or product demonstration model.

4.2.2 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 in pouches. The sample unit shall be the contents of one pouch. Utilizing the double sampling plans indicated in ANSI/ASQ Z1.4, the inspection level shall be S-3 and the acceptable quality

MIL-DTL-32541

level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 4.0 for minor defects.

4.3 Conformance inspection. Conformance inspection shall include the examinations of 4.2.1, 4.2.2, 4.3.1, 4.3.2, and the tests of 4.4.1 through 4.4.3.

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 (CoA), 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 (OMA) of AOAC International 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.

TABLE I. Product defects 1/ 2/

Category		Defect
<u>Major</u>	<u>Minor</u>	<u>General</u>
101		Product not pizza slice.
102		Pouch does not contain one intact pizza slice or does not contain one intact oxygen scavenger. <u>3/</u>
103		Tear or hole or open seal in oxygen scavenger.
	201	Pizza slice not a square or not a rectangular shape as specified.
	202	Pizza slice does not have an even distribution of visible sauce or cheese shreds or pepperoni dices.
104		Pizza slice does not have a cooked tomato or cheese or pepperoni or Italian seasoning odor or flavor.

MIL-DTL-32541

TABLE I. Product defects 1/ 2/ - Continued

Category		Defect
<u>Major</u>	<u>Minor</u>	
		<u>Pizza crust</u>
	203	Pizza crust shows evidence of excessive flour dusting.
	204	Pizza crust bottom surface does not have docker holes.
	205	Pizza crust bottom surface color not off-white to golden-brown color. <u>4/</u>
	206	Pizza crust interior crumb not an off-white color. <u>4/</u>
105		Pizza crust does not have a slightly sweet or does not have a sourdough flavor.
	207	Pizza crust not slightly dense or not a uniform cell structure.
	208	Pizza crust shows evidence of compression streaks.
106		Pizza crust texture excessively dry or crumbly or excessively moist or gummy.
		<u>Pizza sauce</u>
	209	Pizza sauce not a reddish-orange color.
	210	Pizza sauce does not have a tomato paste-like consistency.
		<u>Cheese</u>
	211	Cheese shreds do not have a partially melted appearance.
	212	Cheese shreds do not have an off-white to light golden-tan color.
107		Cheese shreds do not have a mild mozzarella cheese odor or flavor.
	213	Cheese shreds do not have a slightly soft to slightly firm texture.
		<u>Pepperoni</u>
	214	Pepperoni not a reddish-brown color.

MIL-DTL-32541

TABLE I. Product defects 1/ 2/ - Continued

Category		Defect
<u>Major</u>	<u>Minor</u>	
108		Pepperoni not a slightly spicy pepperoni beef odor or flavor.
	215	Pepperoni not a slightly soft to slightly firm texture.
	216	Total weight of skin, cartilage, coarse connective tissue, tendons or ligaments, glandular material, discolored meat, and bone or bone fragments more than 0.1 ounces.
		<u>Net weight</u>
	217	The net weight of an individual pouch less than 2.8 ounces (79 grams). <u>5/</u> <u>6/</u>

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

2/ Finished 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/ Construction of the oxygen scavenger and compliance with FDA regulations will be verified by CoC.

4/ Reddish-orange color from partial sauce absorption shall not be scored as a defect.

5/ Sample average net weight less than 3.1 ounces (88 grams) shall be cause for rejection of the lot.

6/ 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 and one oxygen scavenger. Results shall be reported to the nearest 0.1 ounce or to the nearest 1 gram.

4.4 Tests. A CoA for the pizza sauce a_w is required (see 3.3.2.1). A CoC for the pizza sauce storage time and temperature is required (see 3.3.2.1).

4.4.1 Water activity (a_w) testing. Eight filled and sealed pouches shall be randomly selected from one production lot and tested for a_w in accordance with the latest edition of the Official Methods of Analysis (OMA) of AOAC International, method 978.18, using an electric hygrometer system self temperature controlled at 77°F (25°C) or an equivalent instrument. Water

MIL-DTL-32541

activity shall be determined not less than 4 days but not more than 14 days after baking to allow moisture equilibration in the product. Each individual sample unit shall be homogenized prior to a_w analysis. Test results shall be reported to the nearest 0.01. Government verification will be conducted through actual testing by a Government laboratory. Any nonconforming a_w result shall be cause for rejection of the lot (see 3.5).

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. 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 individual result not conforming to the oxygen content requirement in 3.5e. 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 (OMA) of AOAC International.

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

The sample shall be homogenized. Weigh 100 grams of sample into a beaker and add 100 mL of CO₂ free water. Mix well with a stirring rod. Let sample rest for 15 - 30 minutes and measure the pH. Test results of pH value shall be reported to the nearest 0.1. Government 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). 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:

MIL-DTL-32541

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

6.2 Ingredient information.

6.2.1 Sorbic acid, encapsulated. Bakeshure 250 manufactured by Balchem Corporation, New Hampton, NY 01958 meets the requirements of 3.2.1.11 and performs satisfactorily in this product.

6.2.2 Glucono-delta-lactone (GDL), encapsulated. Meatshure 496 manufactured by Balchem Corporation, New Hampton, NY 01958 meets the requirements of 3.2.1.12 and performs satisfactorily in this product.

6.2.3 Dough strengthener. ABM 50 full dough concentrate manufactured by AB Mauri, Chesterfield, MO 63110 meet the requirements of 3.2.1.14 and performs satisfactorily in this product.

6.2.4 Water dispersable monoglyceride. Starplex 90 manufactured by Corbion Caravan, Lexna, KS 66215 meet the requirements of 3.2.1.15 and performs satisfactorily in this product.

6.2.5 Alpha amylase. Ultra Fresh Supreme 400 manufactured by Corbion Caravan Ingredients, Lenexa, KS 66215 meets the requirements of 3.2.1.17 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, NY 14224. Other approved oxygen scavengers may be used.

6.4 Hazard Analysis Critical Control Point Model. Natick Soldier Research, Development and Engineering Center - Combat Feeding Directorate has developed a generic Hazard Analysis Critical Control Point (HACCP) Model for Shelf Stable Pizza Slice 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:

DEPARTMENT OF THE ARMY
RDNS-SEC-EMR
NATICK SOLDIER SYSTEMS CENTER
10 GENERAL GREENE AVENUE
NATICK, MA 01760

MIL-DTL-32541

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: <http://www.shelflife.hq.dla.mil/>.

6.6 Subject term (key word) listing.

Combat field feeding

Custodians:

Army - GL
Navy - SA
Air Force – 35

Preparing activity:

Army - GL

(Project 8920-2015-003)

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 <https://assist.dla.mil>.