INCH-POUND

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MILITARY SPECIFICATION

BAKERY MIXES, PREPARED

This specification is approved for use in all Departments and agencies of the Department of Defense.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the classes and styles of bakery mixes specially prepared for extended shelf life and use at all altitudes by the Department of Defense as items of general issue.

1.2 Classification.

1.2.1 Classes and styles. Prepared bakery mixes shall be of the following classes and styles, as specified (see 6.1).

Class 1 - Cake mixes

Style A - White
Style B - Yellow
Style C - Devil's food
Style D - Gingerbread

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5018 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8920

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

Class 2 - Quick bread mixes

Style A - Yellow corn bread
Style B - Biscuit
Style C - Pancake and waffle, regular

Class 3 - Cake doughnut mix

Class 4 - Yeast-leavened mixes

Style A - Roll
Style B - Sweet dough

Class 5 - Chocolate brownie mix

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.1).

SPECIFICATIONS

FEDERAL

PPP-C-29 - Canned Subsistence Items, Packaging of

MILITARY

MIL-L-1497 - Labeling of Metal Cans for Subsistence Items
MIL-L-35078 - Loads, Unit: Preparation of Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; General Specification For

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 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 are those cited in the solicitation.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

National Primary Drinking Water Regulations

(Copies are available from the Office of Drinking Water, Environmental Protection Agency, WH550D, 401 M Street, S.W., Washington, DC 20460.)

U.S. DEPARTMENT OF AGRICULTURE (USDA)

Regulations Governing the Inspection of Eggs and Egg Products (7 CFR Part 59)

(Copies are available from the Chief, Standardization Branch, Poultry Division, Agricultural Marketing Service, U.S. Department of Agriculture, Room 3944, South Building, P.O. Box 96456, Washington, DC 20090-6456.)

United States Standards for Grades of Nonfat Dry Milk (Spray Process)

United States Standards for Dry Whey

(Copies are available from the Dairy Standardization Branch, Dairy Division, Agricultural Marketing Service, U.S. Department of Agriculture, Room 2750, South Building, P.O. Box 96456, Washington, DC 20090-6456.)

United States Standards for Condition of Food Containers

(Copies are available from the Chairperson, Condition of Container Committee, Agricultural Marketing Service, U.S. Department of Agriculture, Room 2506, South Building, P.O. Box 96456, Washington, DC 20090-6456.)

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

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

(Copies are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.1).

AMERICAN ASSOCIATION OF CEREAL CHEMISTS (AACC)

Approved Methods of the American Association of Cereal Chemists

(Application for copies should be addressed to the American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121.)

AMERICAN INSTITUTE OF BAKING

Yeast Fermentation in Bread Making, Research Technical Bulletin, Volume V, Issued 12 December 1983

(Application for copies should be addressed to the American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.)

AOAC INTERNATIONAL

Official Methods of Analysis of the AOAC

(Application for copies should be addressed to the AOAC International, 2200 Wilson Boulevard, Suite 400-CD, Arlington, VA 22201-3301.)

NATIONAL ACADEMY OF SCIENCES

Food Chemicals Codex

(Application for copies should be addressed to the National Academy Press, 2101 Constitution Avenue, N.W., Washington, DC 20418.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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 First article. When specified (see 6.1), a sample shall be subjected to first article inspection (see 6.2) in accordance with 4.4.

3.2 Ingredients. All ingredients shall be clean, sound, wholesome, and free from foreign material, evidence of rodent or insect infestation, extraneous material, off-odors, off-flavors, and off-colors.

3.2.1 Anhydrous monocalcium phosphate. Anhydrous monocalcium phosphate shall comply with the Food Chemicals Codex.

3.2.2 Caramel color. Caramel color shall be full strength, powdered caramel color and shall comply with the Food Chemicals Codex.

3.2.3 Chemical leavening agents. Chemical leavening agents shall comply with the purity standards of the Food Chemicals Codex. Permitted ingredients shall be sodium bicarbonate, sodium aluminum phosphate, and coated monocalcium phosphate. The coating shall be a hard fat or other suitable material which will slow the solubility of the salt. The above ingredients shall be powdered and free flowing.

3.2.4 Cocoa. Cocoa shall be medium fat Dutch process cocoa of the commercial type known as "medium Dutched." Neither sodium carbonate nor sodium bicarbonate shall be used in the Dutching (alkali treatment) process. Alkalization shall be on the nib or prior to the press cake. The cocoa shall conform to the Definition and Standards for cocoa products under the Federal Food, Drug, and Cosmetic Act (FDA) and regulations promulgated thereunder.

3.2.5 Color, yellow No. 5. Yellow No. 5 color shall be in the powdered form and shall be FDA approved.

3.2.6 Corn syrup solids. Corn syrup solids shall be of the commercial type known as low dextrose equivalent. The manufacturer's description of the product shall indicate a dextrose equivalent in a range from 15 to 30.

3.2.7 Dextrose. Dextrose shall be a white crystalline sugar commercially obtained by complete hydrolysis of starch. It shall be powdered and free flowing.

3.2.8 Egg products, dried. Dried egg products shall be dried egg yolks, dried egg whites, or dried whole eggs, as applicable, to produce the required product. The dried egg products shall be processed and labeled in accordance with the Regulations Governing the Inspection of Eggs and Egg Products (7 CFR Part 59) as evidenced by the USDA egg products inspection shield on the label. Dried egg products shall not exceed 6 months of age at the time of their incorporation.

3.2.9 Egg whites, dried, with whipping aid. The dried egg whites shall meet the requirements of 3.2.8 and shall contain not more than 0.1 percent of sodium lauryl sulfate as a whipping aid. The dried egg white shall be the type(s) used in white cake mix.

3.2.10 Lecithin. Lecithin shall be a concentrate manufactured from soybeans and shall comply with the Food Chemicals Codex.

3.2.11 Milk, nonfat, dry, high heat. Nonfat dry milk shall be U.S. Extra Grade, High Heat of the U.S. Standards for Grades of Nonfat Dry Milk (Spray Process).

3.2.12 Molasses, dried. Dried molasses shall be a free flowing product made from dark molasses and suitable carrying material such as sugar, cornstarch, flour and other carrying ingredients. It may contain free flow agents such as silicon dioxide. The molasses solids content shall be 62 to 66 percent.

3.2.13 Mono- and diglycerides. Mono- and diglycerides shall be a combination of monoglycerides and diglycerides. The manufacturer's description of the product shall indicate an alpha monoglyceride content in a range from 40 to 55 percent.

3.2.14 Monoglycerides. Monoglycerides shall be essentially pure distilled monoglycerides, either hard or plastic as specified.

3.2.15 Salt. Salt shall be noniodized, white, refined sodium chloride with or without anticaking agents, and shall comply with the purity standards for sodium chloride of the Food Chemicals Codex.

3.2.16 Shortening. The shortening shall be refined, hydrogenated vegetable oil and shall have a stability of 100 hours or greater as determined by the Active Oxygen Method (AOM). In addition, the shortening shall contain FDA approved antioxidants at levels not to exceed regulatory guidelines. The free fatty acids shall not exceed 0.08 percent. If an emulsified shortening is used, it shall comply with the above AOM stability but the free fatty acids shall not exceed 0.50 percent.

3.2.17 Sodium silicoaluminate. The sodium silicoaluminate shall comply with the Food Chemicals Codex.

3.2.18 Sodium stearoyl-2-lactylate and sodium or calcium propionate. Sodium stearoyl-2-lactylate and sodium or calcium propionate shall be powdered and free flowing and shall comply with the Food Chemicals Codex.

3.2.19 Soluble spice flavoring. Soluble spice flavoring shall be the flavoring constituents of the natural spices incorporated in a soluble dry carrier, such as corn syrup solids or dextrose, in such a ratio that the spice flavoring is equivalent to an equal weight of natural spice.

3.2.20 Soy flour (defatted). Soy flour (defatted) shall be the finely milled free flowing powder obtained from the processing of soy beans.

3.2.21 Soy flour (lecithinated). Soy flour (3 to 6 percent lecithin) shall be made from soy flour with a 70 PDI (protein dispersibility index) and shall have a minimum protein content of 50 percent and shall contain 4.5 $\pm$ 1.5 percent lecithin.

3.2.22 Sugar. Sugar shall be a white, refined cane or beet sugar, or a combination thereof. The sugar shall be of a particle size known as "Baker's Special" which passes through a U.S. Standard No. 40 sieve, but not more than 20.0 percent, by weight, shall pass through a U.S. Standard No. 140 sieve.

3.2.23 Wheat flour. Wheat flour shall be enriched flour of the nominal type specified for each product and shall be of such quality as to provide the required characteristics of the end item.

3.2.24 Whey, dry (sweet-type). Dry, sweet-type whey shall be U.S. Extra Grade of the U.S. Standards for Dry Whey.

3.2.25 Yeast, active, dry. Active, dry yeast shall be in accordance with the American Institute of Baking Research Technical Bulletin, Volume V, Issued 12 December 1983.

3.2.26 Yellow corn flour. Yellow corn flour shall be finely powdered yellow corn resembling cornstarch, except for color. It shall not impart grittiness to the baked products in which it is used.

3.2.27 Yellow corn meal. Yellow corn meal shall be degermed yellow corn, of a granulation which will impart the characteristic grittiness in corn bread.

3.2.28 Water. Water used for batter preparation and washing shall conform to the National Primary Drinking Water Regulations.

3.3 Preparation of mixes and prepared product requirements.

3.3.1 Extended shelf life mixes. Sodium silicoaluminate may be substituted for up to 1.0 percent, by weight, of the formulation for equal parts of flour and sugar for class 1, styles A, B, C, and D cakes mixes, and class 5, chocolate brownie mix, and for an equal amount of flour for class 2, styles A and B quick bread mixes.

3.3.1.1 Class 1, cakes mixes. Styles A, B, and C products shall have a moisture content of not more than 5.5 percent by weight. Style D product shall have a moisture content of not more than 7.0 percent by weight. Sodium bicarbonate, when required, shall be packaged separately as specified in 5.1. The individual cake shall have a pleasing flavor and aroma typical of the product as formulated.

3.3.1.1.1 Style A, white cake mix. The baked product, when prepared according to 4.6.1.1, shall produce a cake with a golden brown crust having a slightly convex top surface free of cracks. The crumb shall be characteristically moist, white and evenly fine textured approaching the texture of an angel food cake. When bisected horizontally with a sharp saw-toothed knife, the cake shall have no large gas pockets or tunnels. Two hours after baking, the entire cake shall separate easily from the pan by inverting the pan and tapping one edge lightly on a hard surface. The cake shall not break or crack when examined in accordance with 4.6.3. The cake shall have a specific volume of 2.9 or greater immediately after cooling when examined in accordance with 4.6.2. The formulation for white cake mix shall be as follows:

White cake mix 1/ 2/

Ingredients	Percent by weight
Sugar	43.00
Wheat flour, cake type	40.80
Shortening	9.00
Egg whites, dried, with whipping aid	2.00
Soy flour (lecithinated)	1.00
Whey, dry (sweet-type)	1.00
Mono- and diglycerides 3/ 4/	0.90
Salt	0.80
Sodium aluminum phosphate	0.50
Sodium bicarbonate (see 5.1.1)	0.50
Sodium stearoyl-2-lactylate 4/	0.40
Lecithin 4/	0.10

1/ The batter shall be able to withstand a 30 minute setting period in a round pan, at a temperature of 78°F to 84°F without exhibiting a crusty foam-like top after baking.

2/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

3/ Mono- and diglycerides shall be incorporated into the shortening by the shortening manufacturer.

4/ An emulsifier system which produces equivalent results may be substituted, provided the resultant cake meets all other requirements of this document. Lecithin must be used in either case.

3.3.1.1.2 Style B, yellow cake mix. The baked product, when prepared according to 4.6.1.1, shall produce a cake with a golden brown crust having a slightly convex top surface free of cracks. The crumb shall be characteristically moist, light yellow and slightly open textured. When bisected horizontally with a sharp saw-toothed knife, the cake shall have no large gas pockets or tunnels. Two hours after baking, the entire cake shall separate easily from the pan by inverting the pan and tapping one edge lightly on a hard surface. The cake shall not break or crack when examined in accordance with 4.6.3. The cake shall have a specific volume of 3.0 or greater immediately after cooling when examined in accordance with 4.6.2. The formulation for yellow cake mix shall be as follows:

Yellow cake mix 1/ 2/

Ingredients 3/	Percent by weight
Sugar	40.90
Wheat flour, cake type	40.00
Shortening	8.70

Yellow cake mix 1/ 2/ (cont'd)

Ingredients 3/	Percent by weight
Eggs, dried, whole	5.00
Milk, nonfat, dry, high heat	2.00
Salt	0.90
Mono- and diglycerides 4/ 5/	0.90
Sodium aluminum phosphate	0.55
Sodium bicarbonate (see 5.1.1)	0.55
Sodium stearoyl-2-lactylate 5/	0.40
Lecithin 5/	0.10

1/ The batter shall be able to withstand a 30 minute setting period in a round pan, at a temperature of 78°F to 84°F without exhibiting a crusty foam-like top after baking.

2/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

3/ To each 1,000 pounds of mix add 16.75 grams of FD&C yellow No. 5 color.

4/ Mono- and diglycerides shall be incorporated into the shortening by the shortening manufacturer.

5/ An emulsifier system which produces equivalent results may be substituted, provided the resultant cake meets all other requirements of this document. Lecithin must be used in either case.

3.3.1.1.3 Style C, devil's food cake mix. The baked product, when prepared according to 4.6.1.1, shall produce a cake with a reddish to brownish black crust having a slightly convex top surface free of cracks. The crumb shall be characteristically moist, reddish-black and slightly open textured. When bisected horizontally with a sharp saw-toothed knife, the cake shall have no large gas pockets or tunnels. Two hours after baking, the entire cake shall separate easily from the pan by inverting the pan and tapping one edge lightly on a hard surface. The cake shall not break or crack when examined in accordance with 4.6.3. The cake shall have a specific volume of 2.7 or greater immediately after cooling when examined in accordance with 4.6.2. The pH of the baked product shall be 9.0 or greater. The formulation for devil's food cake mix shall be as follows:

Devil's food cake mix 1/ 2/

Ingredients	Percent by weight
Sugar	41.80
Wheat flour, cake type 3/	36.50
Shortening	9.00
Cocoa	4.00

Devil's food cake mix 1/ 2/ (cont'd)

Ingredients	Percent by weight
Eggs, dried, whole	3.00
Soy flour (lecithinated)	2.00
Sodium bicarbonate (see 5.1.1)	1.15
Salt	0.75
Milk, nonfat, dry, high heat	0.70
Sorbitan monostearate 4/ 5/	0.40
Hard monoglycerides 4/ 5/	0.25
Plastic monoglycerides 4/ 5/	0.25
Polysorbate 60 4/ 5/	0.10
Lecithin 5/	0.10

1/ The batter shall be able to withstand a 30 minute setting period in a round pan, at a temperature of 78°F to 84°F without exhibiting a crusty foam-like top after baking.

2/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

3/ Not to exceed 13.5 percent moisture.

4/ Monoglycerides and emulsifiers shall be incorporated into the shortening by the shortening manufacturer.

5/ An emulsifier system which produces equivalent results may be substituted, provided the resultant cake meets all other requirements of this document. Lecithin must be used in either case.

3.3.1.1.4 Style D, gingerbread cake mix. The baked product, when prepared according to 4.6.1.1, shall produce a cake with a brown crust having a slightly convex top surface free of cracks. The crumb shall be characteristically moist, brownish yellow, and of a texture midway between a yellow cake texture and a chewy high gluten, low specific volume bread. When bisected horizontally with a sharp saw-toothed knife, the cake shall have no large gas pockets or tunnels. Two hours after baking, the entire cake shall separate easily from the pan by inverting the pan and tapping one edge lightly on a hard surface. The cake shall not break or crack when examined in accordance with 4.6.3. The cake shall have a specific volume of 2.2 or greater immediately after cooling when examined in accordance with 4.6.2. The pH of the baked gingerbread shall be not less than 8.0. The formulation for gingerbread cake mix shall be as follows:

Gingerbread cake mix 1/

Ingredients	Percent by weight
Wheat flour	45.40
Sugar	30.50
Molasses, dried	10.00
Shortening	9.00
Soluble spice flavoring 2/	2.00
Sodium bicarbonate (see 5.1.1)	1.00
Salt	0.70
Soy flour (lecithinated)	0.65
Whey, dry (sweet-type)	0.65
Caramel color	0.10

1/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

2/ The soluble spice flavoring shall be in a ratio of 5 parts ginger, 4 parts cinnamon, and 2 parts allspice by weight.

3.3.1.2 Class 2, quick bread mixes.

3.3.1.2.1 Style A, yellow corn bread mix. The baked product, when prepared according to 4.6.1.2, shall produce an even grained bread having a slightly convex top surface without any dips or cracks one hour after baking. The corn bread shall have a specific volume of not less than 2.0 immediately after cooling, when examined in accordance with 4.6.2. The moisture content of the dry mix shall be not more than 9.5 percent by weight. The formulation for yellow corn bread mix shall be as follows:

Yellow corn bread mix

Ingredients	Percent by weight
Wheat flour, bread type	41.00
Yellow corn meal	32.00
Shortening	11.00
Milk, nonfat, dry, high heat	5.00
Eggs, dried, whole	5.00
Sugar	2.50
Salt	1.00
Sodium aluminum phosphate	1.00
Sodium bicarbonate (see 5.1.1)	1.00
Sodium stearoyl-2-lactylate	0.50

3.3.1.2.2 Style B, biscuit mix. The baked product, when prepared according to 4.6.1.3, shall produce a symmetrical biscuit with a uniform light brown crust. The crumb shall be characteristically tender, white, and

composed primarily of small, thin walled cells, and shall not be soggy or gritty. The biscuit shall have a specific volume of not less than 2.4 immediately after cooling when examined in accordance with 4.6.2. The moisture content of the mix shall be not more than 10.0 percent by weight. The formulation for biscuit mix shall be as follows:

Biscuit mix

Ingredients	Percent by weight
Wheat flour, bread type 1/	73.20
Shortening	15.00
Whey, dry (sweet-type)	3.20
Sugar	2.60
Salt	1.70
Soy flour (lecithinated)	1.60
Sodium aluminum phosphate (see 5.1.1)	1.35
Sodium bicarbonate (see 5.1.1)	1.35

1/ Not to exceed 13.5 percent moisture.

3.3.1.2.3 Style C, pancake and waffle mix, regular. The fried product, when prepared according to 4.6.1.4, shall produce a pancake and waffle with a light brown crust having a height at the center of not less than 3/8 inch nor more than 5/8 inch. The crumb shall be characteristically light yellow, small celled, and shall not be tough, doughy, or harsh flavored. The flour used for the pancake mix may be bleached. The moisture content of the dry mix shall be not more than 10.0 percent by weight. The formulation for regular pancake and waffle mix shall be as follows:

Pancake and waffle mix, regular

Ingredients	Percent by weight
Wheat flour, pastry type	60.00
Yellow corn flour	15.50
Sugar	6.00
Whey, dry (sweet-type)	4.15
Eggs, dried, whole	3.85
Shortening	3.00
Soy flour (lecithinated)	2.00
Sodium aluminum phosphate	2.00
Sodium bicarbonate (see 5.1.1)	2.00
Salt	1.50

3.3.1.3 Class 3, cake doughnut mix all-purpose. The fried product, when prepared according to 4.6.1.5, shall produce a cake doughnut with a uniform brown color having no major bulges, blisters, or cracks. The grain shall be fine and uniform without large holes or tunnels, and the depth of grease penetration shall not exceed 1/16 inch. The can label's instructions shall

include water requirements for hand-cut and machine-cut doughnuts. The doughnut shall have a specific volume of not less than 2.4 immediately after cooling when examined in accordance with 4.6.2. The moisture content of the dry mix shall be not more than 9.0 percent by weight. The formulation for cake doughnut mix shall be as follows:

Cake doughnut mix

Ingredients	Percent by weight
Doughnut flour 1/	62.90
Sugar	21.00
Shortening	3.25
Milk, nonfat, dry, high heat	3.00
Eggs, dried, whole	2.50
Soy flour (defatted)	2.50
Dextrose	1.50
Salt	1.00
Sodium bicarbonate (see 5.1.1)	0.94
Sodium aluminum phosphate	0.80
Egg whites, dried, with whipping aid	0.30
Anhydrous monocalcium phosphate	0.16
Lecithin	0.15

1/ Flour shall be a blend of wheat flour, with little or no bleaching, specifically milled for cake doughnuts.

3.3.1.4 Class 4, yeast-leavened mixes.

3.3.1.4.1 Style A, roll mix. The baked product, when prepared according to 4.6.1.6, shall produce a loaf with a smooth surface free from wide breaks. The crumb shall be characteristically free from large holes and shall have a smooth, soft, and velvety texture. When bisected vertically with a sharp saw-toothed knife, the grain shall be fine and uniform, and the air cells shall be slightly elliptical with thin walls. The baked roll shall have a loaf volume of not less than 2,400 mL immediately after cooling when examined in accordance with 4.6.2. The moisture content of the dry mix shall be not more than 12.0 percent by weight. The formulation for roll mix shall be as follows:

Roll mix 1/

Ingredients 2/	Percent by weight
Wheat flour, bread type	84.00
Shortening	4.25
Sugar	4.20
Whey, dry (sweet-type)	2.25
Soy flour (lecithinated)	2.00
Salt	2.00

Roll mix 1/ (cont'd)

Ingredients 2/	Percent by weight
Mono- and diglycerides 3/ 4/	0.55
Sodium stearoyl-2-lactylate 4/	0.50
Calcium propionate	0.25

1/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

2/ The amount of active, dry yeast to be used is specified in 5.4.1.2 under the applicable product's directions for use.

3/ Mono- and diglycerides shall be incorporated into the shortening by the shortening manufacturer.

4/ An emulsifier system which produces equivalent results may be substituted, provided the resultant roll meets all other requirements of this document.

3.3.1.4.2 Style B, sweet dough mix. The baked product, when prepared according to 4.6.1.7, shall produce a loaf with a smooth surface free from wide breaks. The crumb shall be characteristically free from large holes and shall have a smooth, soft, and velvety texture. When bisected vertically with a sharp saw-toothed knife, the grain shall be fine and uniform, and the air cells shall be slightly elliptical with thin walls. The baked sweet dough shall have a loaf volume of not less than 2,050 mL immediately after cooling when examined in accordance with 4.6.2. The moisture content of the dry mix shall be not more than 9.5 percent by weight. The formulation for sweet dough mix shall be as follows:

Sweet dough mix 1/

Ingredients 2/	Percent by weight
Wheat flour, bread type 3/	66.50
Sugar	12.00
Shortening	12.00
Milk, nonfat, dry, high heat	3.50
Eggs, dried, whole	3.25
Salt	1.25
Mono- and diglycerides 4/ 5/	1.00
Sodium stearoyl-2-lactylate 5/	0.50

1/ Mixing of ingredients shall be by methods which ensure uniform distribution. Use of a turbulizer (impact mill) or equivalent equipment is recommended.

2/ The amount of active, dry yeast to be used is specified in 5.4.1.2 under the applicable product's directions for use.

3/ Not to exceed 13.5 percent moisture.

4/ Mono- and diglycerides shall be incorporated into the shortening by the shortening manufacturer.

5/ An emulsifier system which produces equivalent results may be substituted, provided the resultant sweet dough meets all other requirements of this document.

3.3.1.5 Class 5, chocolate brownie mix. The baked product, when prepared according to 4.6.1.8, shall produce a brownie with a texture that is chewy, but not gummy. The product shall be capable of being cut into squares which are easily handled without crumbling or breaking. The mix shall have a flavor which is unmistakably chocolate, but shall not be harsh or bitter. The moisture content of the dry mix shall be not more than 4.0 percent by weight. The formulation for chocolate brownie mix shall be as follows:

Chocolate brownie mix

Ingredients	Percent by weight
Sugar	47.50
Wheat flour, bread type	25.00
Shortening	9.00
Cocoa	7.00
Corn syrup solids	4.00
Egg whites, dried, with whipping aid	3.00
Milk, nonfat, dry, high heat	3.00
Salt	0.90
Sodium aluminum phosphate	0.30
Sodium bicarbonate (see 5.1.1)	0.30

3.4 Finished product requirements.

3.4.1 Bakery mix. The dry bakery mixes shall comply with the following requirements:

a. There shall be no foreign material such as, but not limited to, dirt, insect parts, hair, wood, glass, or metal.

b. There shall be no foreign odor or flavor such as, but not limited to, burnt, scorched, stale, sour, rancid, or moldy.

c. There shall be no color foreign to the product.

d. The mix shall be uniformly blended, free flowing, and homogeneous.

e. The dry mix shall be free from lumps other than those that disintegrate readily upon application of finger pressure.

3.4.2 Baked product. The prepared bakery mix, when hydrated, mixed with sodium bicarbonate, and baked in accordance with the directions for use specified in 5.4.1.2 for each applicable product, shall meet the requirements specified in 3.3.1 for each applicable product. Additionally, the following finished product requirements shall be applicable:

a. There shall be no foreign material such as, but not limited to, dirt, insect parts, hair, wood, glass, or metal.

b. There shall be no foreign odor or flavor such as, but not limited to, burnt, scorched, stale, sour, rancid, or moldy.

c. There shall be no color foreign to the product.

3.4.3 Palatability. The finished product shall be equal to or better than the approved preproduction sample (see 6.1) in palatability and overall appearance.

3.5 Plant qualification. The product shall be prepared, processed, and packaged in establishments meeting the requirements of 21 CFR, Part 110, "Current Good Manufacturing Practice in Manufacturing, Packing or Holding Human Food," and the plant sanitation requirements of the appropriate Government inspection agency.

3.6 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. QUALITY ASSURANCE PROVISIONS

4.1 Contractor's responsibility. Inspection and acceptance by the USDA shall not relieve the contractor of obligation and responsibility to deliver a product complying with all the requirements of this specification. The contractor shall ensure product compliance prior to submitting the product to the USDA for any inspection.

4.2 Inspection and certification. Product acceptability shall be determined by the USDA. The USDA will determine the degree of inspection and supervision necessary to ensure compliance with the requirements of this specification.

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

a. First article inspection (see 4.4).
b. Quality conformance inspection (see 4.5).

4.4 First article inspection. When a first article is required (see 6.1), it shall be inspected in accordance with the quality assurance provisions of this specification and evaluated for overall appearance and palatability.

Any failure to conform to the quality assurance provisions of this specification or any appearance or palatability failure shall be cause for rejection of the first article.

4.5 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.5.1 Component and material examination. In accordance with 4.1, components and materials shall be examined in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.5.1.1 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, U.S. 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 AOAC 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.

4.5.1.2 Pouch material examination. Conformance of pouch material to 5.1.1 shall be ascertained by examination of pertinent invoices, labels, or other valid documents from suppliers of pouches or pouch material. Nonconformance shall indicate unacceptable pouches or pouch material and use of such shall be cause for rejection of the involved end item.

4.5.2 In-process examination. In-process examination shall be performed to determine conformance to the preparation, processing, filling, sealing and packaging requirements. Any nonconformance revealed by actual examination or by review of records of time, temperature, and formulation, or of other valid documents shall be cause for rejection of the involved product.

4.5.3 Net weight examination. The filled and sealed cans shall be examined for the defects listed in table I. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5. In addition, the lot shall be rejected if the sample data indicates that the lot average net weight is less than the specified net weight.

TABLE I. Net weight defects 1/

Category	Defect
Minor	
201	Net weight more than 5 percent under specified net weight for containers required to have 1 pound or less
202	Net weight more than 2 percent under specified net weight for containers required to have more than 1 pound but less than 10 pounds
203	Net weight more than 1 percent under specified net weight for containers required to have 10 pounds or more

1/ Weigh to nearest 1/8 ounce for containers required to have 1 pound or less, nearest 1/2 ounce for containers required to have more than 1 pound but less than 10 pounds, and nearest 1 ounce for containers required to have 10 pounds or more.

4.5.4 Product examination. The bakery mix and the sodium bicarbonate and the sodium aluminum phosphate pouch, when applicable, shall be examined for the defects listed in table II. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 1.5 for major defects and 6.5 for minor defects.

TABLE II. Product defects 1/

Category		Defect
Major	Minor	
		Bakery mix
101		Lumps that do not disintegrate upon finger pressure
	201	Mix not well blended or not uniform color
		Sodium bicarbonate and sodium aluminum phosphate pouch 2/
102		Pouch missing

TABLE II. Product defects 1/ (cont'd)

Category	Defect
	Sodium bicarbonate and sodium aluminum phosphate pouch 2/ (cont'd)
103	Tear, hole, or open seal
104	Not clean
105	Required labeling or marking missing, incorrect, illegible, or smudged
106	Not fabricated as specified (see 5.1)
107	Pouch leaks (see 4.6.4)
108	Quantity of sodium bicarbonate more than 10 percent below or more than 20 percent above (the specific formulation requirement) by weight 3/
109	Evidence of delamination or seal separation (see 4.6.4)
202	Not placed as specified

1/ The presence of foreign material, (for example, dirt, insect parts, hair, wood, glass, metal), foreign odor or flavor (for example, burnt, scorched, moldy, rancid, sour, stale), or foreign color shall be cause for rejection of the lot.

2/ Any evidence of insect or rodent infestation shall be cause for rejection of the lot.

3/ Weigh to the nearest 0.1 gram and calculate the percent deviation from the required weight.

4.5.5 Moisture content testing. The bakery mix (exclusive of sodium aluminum phosphate or sodium bicarbonate pouches) shall be individually tested for moisture content in accordance with the Official Methods of AOAC, method 920.175. The sample for testing shall be a 1 pound composite of product derived from the number of cans indicated by inspection level S-2. The lot size shall be expressed in cans. Test results shall be reported to the nearest 0.1 percent. Test failure for moisture shall be classified as a major defect and shall be cause for rejection of the lot.

4.5.6 Baked product examination. The bakery mixes shall be prepared to form a ready-to-eat item in accordance with the can label instructions, except as otherwise directed in table III. The baked product shall be examined for the applicable defects listed in table IV. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-1 and the AQL, expressed in terms of defects per hundred units, shall be 1.5 for major defects and 10.0 for minor defects.

TABLE III. Preparation of baked product

Class	Style	Requirement paragraph	Preparation acceptance paragraph
1	A	3.3.1.1.1	4.6.1.1
1	B	3.3.1.1.2	4.6.1.1
1	C	3.3.1.1.3	4.6.1.1
1	D	3.3.1.1.4	4.6.1.1
2	A	3.3.1.2.1	4.6.1.2
2	B	3.3.1.2.2	4.6.1.3
2	C	3.3.1.2.3	4.6.1.4
3	-	3.3.1.3	4.6.1.5
4	A	3.3.1.4.1	4.6.1.6
4	B	3.3.1.4.2	4.6.1.7
5	-	3.3.1.5	4.6.1.8

TABLE IV. Baked product defects 1/ 2/ 3/ 4/

Category		Defect
Major	Minor	
101		Product (class 1, styles A, B, C, and D) breaks (see 4.6.3)
102		Lumps that do not dissolve in the baking process
	201	Product not symmetrical or nearly symmetrical, as required
	202	Color of crust or surface of product not as specified
	203	Contour of top of product not as required

TABLE IV. Baked product defects 1/ 2/ 3/ 4/ (cont'd)

Category		Defect
Major	Minor	
	204	Doughnut hole not small and puckered
	205	Specific or loaf volume of product not as specified
	206	Height of product not as specified 5/
	207	Condition of crust or surface of product not as specified
	208	Cake does not separate easily from pan or liner (for example, sticks, cracks, breaks, or crumbles)
	209	Product breaks, cracks, or crumbles when handled
	210	Breaks or cracks (major or otherwise as specified) in product
	211	Product cannot be easily sliced
	212	Color or structure of crumb or grain not as specified
	213	Texture of crumb not as specified
	214	Large holes, tunnels, or gas pockets in product
	215	Corn bread or muffin cannot easily be broken into large distinct intact pieces by hand
	216	Top and bottom of biscuit not easily separated by hand
	217	Grease penetration or doughnut more than 1/16 inch in depth 5/
	218	Batter setting sample (class 1, styles A, B, and C only) exhibits crusty foam-like top after baking
	219	Flavor or odor not typical of product as required by formulation, but not objectionable
	220	Product (class 2, style C only) does not conform to specified dimensions)

1/ The presence of foreign material (for example, dirt, insect parts, hair, wood, glass, metal), foreign odor or flavor (for example, burnt, scorched,

moldy, rancid, sour, stale), or foreign color shall be cause for rejection of the lot.

2/ Product not equal to or better than the approved preproduction sample in palatability and overall appearance shall be cause for rejection of the lot (see 3.4.3).

3/ Examine one cake of class 1 cake mixes, all styles; one loaf of class 2, style A, and class 4, styles A and B; and three units of class 2, styles B and C, class 3, and class 5 from each sample unit.

4/ No defect shall be scored more than once per sample unit.

5/ Measuring device shall be calibrated in 1/16 inch increments.

4.5.7 pH testing. The baked cakes of class 1, styles C and D, shall be tested for pH in accordance with the Official Methods of Analysis of the AOAC, method 925.08. The sample for testing shall be an 8 ounce composite derived from the baked product samples specified in 4.5.6. Results shall be reported to the nearest 0.1. Any test failure for pH shall be classified as a major defect and shall be cause for rejection of the lot.

4.5.8 Can condition examination. Examination of filled and sealed cans shall be in accordance with PPP-C-29. Inspection for labeling shall be in accordance with MIL-L-1497 (see 5.4).

4.5.9 Shipping container examination. Shipping containers shall be examined for defects in assembly, closure, and reinforcement (when applicable) in accordance with PPP-C-29.

4.5.10 Unit load inspection. Inspection of unit loads shall be in accordance with the quality assurance provisions of MIL-L-35078.

4.6 Methods of inspection.

4.6.1 Testing procedures for products. Cake batter from each bakery mix shall be prepared according to the directions for use specified in 5.4.1.2. In addition, the requirements listed in table V shall apply.

TABLE V. Testing of products 1/

Bakery mix	Amount of mix other than that in formulation to be used (grams)	Amount of sodium bi-carbonate to be used 1/ (grams)	Amount of other ingredients to be used (grams)
White cake	2255	11.3	--
Yellow cake	2255	12.5	--
Devil's food cake	2240	26.1	--

TABLE V. Testing of products 1/ (cont'd)

Bakery mix	Amount of mix other than that in formulation to be used (grams)	Amount of sodium bi-carbonate to be used 1/ (grams)	Amount of other ingredients to be used (grams)
Gingerbread cake	2245	22.7	—
Yellow corn bread	2030	10.2	—
Biscuit mix	1990	27.6	27.6 Sodium aluminum phosphate
Pancake and waffle, regular	1945	39.7	—
Cake doughnut mix	2020	19.2	—
Chocolate brownie mix	2260	6.8	—

Mixer speed where specified shall be defined as follows:

Low speed is first speed on a 3-speed mixer and second speed on a 4-speed mixer.
Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

The mixer paddle shall be the attachment known as a flat agitator.

1/ At high altitude test sites, use proportionately less soda (for example: at 2000 feet use 6/7 times amount listed above; at 4000 feet use 5/7 amount listed above; at 6000 feet use 4/7 amount listed above, etc.)

4.6.1.1 Class 1, styles A through D. Lightly grease the sides of an 8 inch round pan with 1-1/4 inch sides (an aluminum pan No. 5345 Wear-Ever or equivalent is acceptable) and add a release type parchment paper to the bottom of the pan. Prior to testing, test for batter set-up as follows: for class 1, styles A, B, and C, place a 450 gram sample of batter in a round pan as noted above, allow to set for 30 minutes at a temperature of 81°F ± 3°F, bake, and cool as described above. Examine for conformance to the batter setting requirement. Add 450 grams of batter and bake at 350°F for 25 to 30 minutes until cake is done for styles A, B, and C and at 350°F for 30 to 40 minutes until cake is done for style D. Place the baked cake in its pan on a wire rack in a well-ventilated area and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Remove cake from the pan, remove paper, determine the specific volume, and run a break test (see 4.6.2 and 4.6.3). Slice cake in half vertically and examine for the defects listed in table IV.

4.6.1.2 Class 2, style A. Into an 8-inch round pan with 1-1/4 inch sides (an aluminum pan No. 5345 Wear-Ever or equivalent is acceptable), add a release type parchment paper. Add 672 grams of batter and bake at 400°F to 425°F for 20 to 30 minutes. Place the baked corn bread in its pan on a wire rack in a well-ventilated area and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Remove corn bread from the pan, remove paper, examine the contour, and determine the specific volume (see 4.6.2). Slice corn bread in half vertically and horizontally and examine for the defects listed in table IV.

4.6.1.3 Class 2, style B. Turn out the dough between 1/2 inch gauge sticks on a lightly floured rolling board. Roll until the rolling pin rests on the sticks. Fold double and reroll at right angle to this fold. Cut out biscuits from the central portion of the dough and place them on a lightly greased cookie sheet. Biscuits must be at least 1/4 inch from each other while baking. Bake at 425°F for 15 minutes, or until the crust is a light brown. Place the baked biscuits on a cookie sheet on a wire rack in a well-ventilated area and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Remove biscuits from the cookie sheet, weigh three biscuits to the nearest gram, and determine the specific volume (see 4.6.2).

4.6.1.4 Class 2, style C. Utilizing the entire contents of the can, prepare batter in accordance with directions on can and allow batter to stand for 10 minutes. Using a number 20 ice cream scoop, dip one scoop (2 ounces) of liquid batter onto a lightly greased griddle, preheated at 375°F to 385°F. Fry for 75 seconds on first side, then turn over and fry for 60 seconds.

4.6.1.5 Class 3. Prepare the mix according to the can label directions. Drop the doughnuts into frying fat having a temperature of 375°F. Fry until light brown in color on the underside. Flip the doughnuts over and continue frying until they are uniformly colored. Remove the doughnuts from frying fat. Place the doughnuts on a wire rack in a well-ventilated area and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Weigh eight to ten doughnuts to the nearest gram and determine the specific volume (see 4.6.2). Slice doughnut horizontally and examine for the defects listed in table IV.

4.6.1.6 Class 4, style A. Weigh 1000 grams of mix and transfer to a 3 quart mixing bowl. Add 1 ounce of active dry yeast, suspended in the quantity of water which has been predetermined to give the optimum dough characteristics. The water temperature shall be so adjusted that the mixed dough will have a temperature of 81°F ± 1°F. The dough shall be mixed with a dough hook until the dough entirely cleans bowl, and for 1 additional minute thereafter. Remove the dough from the mixer and scale two pieces weighing 23 ounces each. Place each piece into a greased glass jar (approximately 5 inches inside diameter by 7 inches inside height and calibrated in mL). Cover the jars with a loose-fitting lid. Place the jars in a fermentation cabinet set at 81°F ± 1°F and a relative humidity of 75

to 85 percent. Ferment dough in the jars until the outer edge of the dough piece reaches the 1400 mL mark. Remove the jars from cabinet, remove the dough and punch and round it to expel gas and air pockets. Return the rounded pieces of dough to jars and place the jars in the fermentation cabinet for an additional 15 minutes. After 15 minutes remove the dough and mold each piece into a loaf shape. Place the loaves into lightly greased 1 pound loaf bread pans and place in a proof cabinet maintained at a temperature of 96°F to 100°F and a relative humidity of 75 to 85 percent. Proof for approximately 1 hour. After proofing, bake the loaves at 415°F to 435°F for 30 minutes or until done. Remove the baked loaves from the pans and place them on a wire rack in a well-ventilated area, and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Determine the loaf volume (see 4.6.2). Slice a loaf vertically through the center with a sharp knife and examine for the defects listed in table IV.

4.6.1.7 Class 4, style B. Weigh 1000 grams of mix and transfer to a 3-quart mixing bowl. Add 3/4 ounce of active dry yeast, suspended in the quantity of water which has been predetermined to give the optimum dough characteristics. The water temperature shall be so adjusted that the mixed dough will have a temperature of 81°F ± 1°F. The dough shall be mixed with a dough hook until the dough entirely cleans bowl, and for 1 additional minute thereafter. Place dough into a greased glass jar or can. Cover the jars or cans with a loose-fitting lid. Place the jars or cans in a fermentation cabinet set at 81°F ± 1°F and a relative humidity of 75 to 85 percent. Ferment dough in the jars or cans for 1-1/4 hours. Remove the jars or cans from cabinet, remove the dough and scale two pieces weighing 22 ounces each. Round the dough pieces and allow to rest on a bench for 15 minutes, covering the pieces with a cloth. After 15 minutes mold each piece into a loaf shape. Place the loaves into lightly greased 1 pound loaf pans and place in a proof cabinet maintained at a temperature of 96°F to 100°F and a relative humidity of 75 to 85 percent. Proof for approximately 1 hour. After proofing, bake the loaves at 390°F to 410°F for 30 minutes or until done. Remove the baked loaves from the pans and place them on a wire rack in a well-ventilated area, and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent. Determine the loaf volume (see 4.6.2). Slice a loaf vertically through the center with a sharp knife and examine for the defects listed in table IV.

4.6.1.8 Class 5. Lightly grease the bottom of an 8 inch by 8 inch square pan with 3/4 inch sides. Add 500 grams of batter and bake at 350°F for 35 to 40 minutes until done. Place the baked brownie in its pan on a wire rack in a well-ventilated area and allow to cool at a room temperature of 69°F ± 6°F and a relative humidity of 50 ± 5 percent.

4.6.2 Specific or loaf volume. Determination of specific or loaf volume shall be accomplished by a loaf volumeter (8 inch round cake size) or equivalent (see 6.4) or by the rapeseed method (see below). Avoid any vibrations that would tend to pack the rapeseed.

a. Remove parchment and place cooled product in a container.

b. Fill the void space in the container containing the product with rapeseed so that the rapeseed is level with the top edge of the container. Measure this amount of rapeseed in whole milliliters, using a graduated cylinder or equivalent measuring device.

c. Remove product from the container and weigh the product. The weight shall be calculated in terms of whole grams.

d. Fill the empty container with rapeseed so that the rapeseed is level with the top edge of the container. Measure the amount of rapeseed as specified in b. above. Alternatively, container volume may be established in the above manner, prior to putting baked product in a container.

e. Calculate specific volume as follows:

$$\frac{\text{Volume of rapeseed (d)} - \text{Volume of rapeseed (b)}}{\text{Weight of product (c)}} = \text{Specific volume}$$

Volume of rapeseed (d) - Volume of rapeseed (b) = Loaf volume

4.6.3 Breaks and cracks. Bake as in 4.6.1.

a. Cool the cake in the pan for 2 hours at room temperature 69°F ± 6°F and a relative humidity of 50 ± 5 percent.

b. Space two 4 inch diameter cylinders (for example, two flat-topped metal cans) 6-1/2 inches apart at the closest point.

c. Place the cake (with pan and liner removed) with the flat side down equally on the two cylinders.

d. Examine after 2 minutes for breaks and cracks.

4.6.4 Pouch leakage, delamination, and seal separation testing. The filled and sealed sodium bicarbonate or sodium aluminum phosphate pouch, as applicable, shall be tested by placing in a dry desiccator, or similar apparatus, and subjecting to a vacuum of 26 inches of mercury (atmospheric pressure is 29.9 inches of mercury) for 30 seconds. Any pouch that does not swell to form a tightly distended form having at least one distorted edge while under vacuum shall be classified as a major defect. After leakage testing, the pouch shall be visually inspected for evidence of delamination and for seal separation. Any delamination or any seal separation of more than 1/16 inch from the product edge of any seal shall be classified as a major defect. The lot size shall be expressed in units of pouches. The sample unit shall be one filled and sealed pouch. The inspection level shall be I and the AQL, expressed in terms of defects per hundred units, shall be 0.65.

5. PACKAGING

5.1 Preservation. The product shall be preserved in accordance with level A or C as specified (see 6.1).

5.1.1 Level A or C. A net weight of 5 pounds of class 1 and class 5 products, or 4 pounds 8 ounces of class 2 (style A), class 3 and class 4 products, or 4 pounds of class 2 (style C) shall be unit packed into a size 603 by 700, open-top style, round metal can in accordance with level A or level C requirements of PPP-C-29 for the level specified. Each filled and sealed can shall contain a pouch of sodium bicarbonate or sodium aluminum phosphate, as applicable. The required amount of sodium bicarbonate or sodium aluminum phosphate, as applicable, shall be separately unit packed in a foil-laminated pouch. The pouch shall be hermetically sealed and shall be tested in accordance with 4.6.4. The pouches of sodium bicarbonate or sodium aluminum phosphate, as applicable, shall be placed either at the bottom of the can or on top of the product before final sealing of the product container. The weight of the separately packed ingredients shall be included in the net weight for each can.

5.2 Packing. The product shall be packed in accordance with level A, B, or C requirements of PPP-C-29, as specified (see 6.1).

5.3 Unit loading. When specified (see 6.1), the product, packed as specified in 5.2, shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified. When unit loads are strapped, the strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.4 Labeling and marking.

5.4.1 Cans. Cans shall be labeled in accordance with MIL-L-1497, and shall include the following information. Instructions for high altitude baking, and directions for use, as applicable, shall be in accordance with 5.4.1.1 and 5.4.1.2. Cans shall have the date of pack included in the labeling. Each can containing a pouch or pouches shall indicate on the can that the end with the pouch or pouches shall be opened first.

5.4.1.1 Labeling instructions. The following instructions for baking chemically leavened mixes at high altitudes shall be printed legibly on one side of the sodium bicarbonate pouch with food compatible ink which imparts no odor or taste to the baking mix. The printing shall be protected from smudging with a coating of lacquer or plastic film. If leavening agent and sodium bicarbonate are both used, as in biscuit mix, the contents of each pouch shall be clearly and distinctly marked on the body of the pouch. Additionally, in the cans having pouches of dissimilar products, each product shall be in a color-coded pouch to preclude mixing error.

HIGH ALTITUDE BAKING INSTRUCTIONS

Line and altitude markings on the reverse side of this pouch are to be used as a guide for high altitude baking, as follows:

1. Determine local altitude.

2. Place pouch on a flat horizontal surface, pat gently to distribute contents evenly.

3. Holding pouch in horizontal position, cut across entire width of the pouch and contents with scissors or sharp knife along the line representing local altitude.

4. Discard portion of pouch with contents representing altitude below your present altitude.

5. Add contents of remaining portion of pouch to the mix and prepare according to "Directions for Use" on can.

6. Minor adjustments may be required on subsequent cakes.

The reverse side of the pouch shall be printed in accordance with the example shown below. The 2000 foot line shall be printed across the width of the seal at 1/7 the distance from the inside of the top seal to the inside of the bottom seal. Subsequent 2000 foot altitude lines (e.g., 4000, 6000, and 8000 foot) shall be printed across the width of the seal printed at intervals of 2/7, 3/7, and 4/7, the distance between inside length dimensions.

(Example of required altitude marking)

LEAVENING AGENT (leavening acid or sodium bicarbonate as applicable)

If leavening acid and sodium bicarbonate are both used, as in biscuit mix, each pouch shall be appropriately marked to indicate their contents.

At sea level or below 2,000 feet

2,000 ft _____ USE ENTIRE CONTENTS _____

At altitudes above 2,000 ft, amount of leavening needed decreases

4,000 ft _____

6,000 ft _____

8,000 ft _____

EXAMPLE: At 6,000 ft cut along line marked 6,000 ft.
At 5,000 ft cut midway between 4,000 ft and 6,000 ft lines.

5.4.1.2 Directions for use. The following directions for use, as applicable, shall be lithographed on the top of the can:

DIRECTIONS FOR USE

Class 1: Style A - White cake mix, Style B - Yellow cake mix, Style C - Devil's food cake mix.

5 lb mix, sodium bicarbonate pouch, 4-3/4 cups water*

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions).

2. Blend with paddle at low speed** for 1 minute.

3. Add 1/3 of total water (approx 1-1/2 cups) immediately. Using paddle, mix in low speed** for 2 minutes.

4. Add remaining water gradually while mixing for 2 minutes at low speed**. Scrape bowl and paddle.

5. Mix in medium speed*** for 4 minutes.

6. Pour 3-3/4 quarts (7-1/4 lb) batter into a greased and floured sheet pan; spread evenly. For cupcakes: fill each greased or paper-lined muffin tin with 1/4 cup (2 oz) batter (1 No. 16 scoop).

7. To Bake:

	Conventional rotary ovens****	or	Convection oven**** low fan, open vent
Sheetcakes	350°F 40 to 50 min		300°F 25 to 35 min
Cupcakes	350°F 20 to 30 min		300°F 10 to 15 min

8. Cool and frost or dust with confectioner's sugar as desired. Cut each pan 6 by 9.

9. For 108 portions: for cakes use 2 cans (10 lb) (2 sheet pans), each portion: 1 piece (2 oz); for cupcakes use 3-1/2 cans (17 lb 8 oz), each portion: 2 cupcakes (3-1/2 oz).

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

**** Bake time may require adjustment depending on the oven and oven load.

Class 1: Style D - Gingerbread cake mix.

5 lb mix, sodium bicarbonate pouch, 3-1/2 cups water*

7 lb 8 oz mix (1-1/2 sheet pans = 1 sheet pan)

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions).

2. Blend with paddle in low speed** for 1 minute.

3. Add 2/3 of total water (approx 1-3/4 qt per 100 portions) immediately. Using paddle, mix in low speed** for 2 minutes.

4. Add remaining water gradually while mixing for 2 minutes in low speed**. Scrape bowl and paddle.

5. Mix in medium speed*** for 4 minutes.

6. Pour 1 gallon (9 lb 14 oz) batter into each lightly greased sheet pan; spread evenly.

7. Bake at 350°F for 35 to 45 minutes; for a convection oven, bake at 300°F for 25 to 35 minutes on low fan, open vent****.

8. Cool and cut each pan 6 x 9.

9. For 108 portions, use 3 cans (15 lb), (2 sheet pans), each portion: 1 piece (2-3/4 oz).

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

**** Bake time may require adjustment depending on the oven and oven load.

Class 2, style A - Yellow Corn Bread Mix.

4 lb 8 oz mix, sodium bicarbonate pouch, 6-1/4 cups water*

1-1/4 cans (5 lb 10 oz) = 1 sheet pan

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions). Add 6 oz (7/8 cup) granulated sugar. For a less sweet corn bread, omit the sugar.

2. Add water gradually while mixing for 1 minute at low speed** using paddle. Scrape bowl and paddle.

3. Mix at low speed** for 30 seconds.

4. Pour about 1 gallon (9 lb 8 oz) batter into each of lightly greased sheet pan or fill each greased muffin tin with 1/4 cup (2 oz) batter (1 No. 16 scoop.)

5. Bake until done at 425°F 15 to 20 minutes for muffins, or 20 to 25 minutes for cornbread; for convection oven, bake at 375°F on low fan, open vent for 15 minutes for corn muffins, or 20 minutes for cornbread.***

6. Cool, cut each pan 6 by 9.

7. For 108 portions: for corn bread use 2-1/2 cans (11 lb 4 oz) (2 sheet pans), each portion: 1 piece (2-1/2 oz); for corn muffins use 2 cans (9 lb) (9 12-cup muffin pans), each portion: 1 muffin (2-1/4 oz).

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Bake time may require adjustment depending on the oven and oven load.

Class 2, style B - Biscuit mix.

Biscuits

4 lb 8 oz mix, sodium bicarbonate pouch and sodium aluminum phosphate pouch, 4-1/2 cups water*

1. Place mix in mixer bowl. Add contents of sodium bicarbonate and sodium aluminum phosphate pouches (at high altitudes use less - see pouch directions).

2. Blend with paddle at low speed** for 1 minute.

3. Add water gradually while mixing at low speed** for 30 seconds.

4. Fold over onto a lightly floured working surface. Knead lightly approximately 1 minute or until dough is smooth.

5. Roll out 1/2 inch thick and cut with a floured 2-1/2 inch biscuit cutter. Place biscuits on lightly greased sheet pan in rows 6 by 9.

6. Bake until lightly browned at 450°F for 15 to 20 minutes; for convection oven, bake at 350°F for 15 minutes on low fan, open vent.***

7. For 100 portions, use 1-3/4 cans (7 lb 14 oz) (4 sheet pans), each portion: 1 biscuit (1-1/2 oz.)

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Bake time may require adjustment depending on the oven and oven load.

Pie Dough (Alternate Use)

1. Place 1 can biscuit mix in mixer bowl. (Discard both pouches. Do not add pouch contents to mix).

2. Add 7-1/2 ounces (1 cup shortening and mix with paddle 1 minute on low speed*. Scrape down sides and bottom of bowl.

3. Add 2-3/4 cups cold water and mix with paddle 1 minute on low speed* or until all water is absorbed.

4. Revove from bowl, scale into 13 7-1/2 oz balls. Roll each ball on a well-floured surface to 1/8 inch thickness, and fit into a 9 inch pie pan.

5. For one-crust pie use 1 can of mix, and for each pie shell, use about 3 cups of filling. Bake at 450°F for 11 to 13 minutes; for convection oven, bake at 400°F for about 6 minutes or until golden brown on high fan, open vent.**

   For two-crust pie use 2 cans of mix and for each pie shell, use about 3 cups of filling. Roll out top crust as in step 4; make several slits near the center to let out steam. Brush outer edge of bottom crust with water. Lay top crust over filling; seal by crimping edges. Wash with egg wash if desired. Bake at 425°F for 30 to 35 minutes; for convention oven, bake at 375°F for about 16 minutes or until golden brown on high fan, open vent.**

6. Cool. Cut pie into 1/8 sections.

7. For 104 portions: for 13 one-crust pies use 1 can or 13 two-crust pies use 2 cans, each portion: 1/8 pie.

* Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

** Bake time may require adjustment depending on the oven and oven load.

Class 2: Style C - Pancake and waffle mix, regular.

4 lb mix, sodium bicarbonate pouch, 8-3/4 cups water*

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions).

2. Blend with paddle in low speed** for 1 minute.

3. Add water gradually while mixing for 1 minute in low speed**.

4. Pour 1/4 cup batter on a lightly greased 375°F griddle. Cook on one side until top is covered with bubbles and underside is browned. Turn, and cook 1-1/2 to 2 minutes until other side is browned.

5. For waffles, pour 1/2-cup batter on preheated lightly greased waffle iron. Bake until steaming stops.

6. For 100 portions, use 3-1/4 cans (13 lb), each portion: 2 pancakes or 1 waffle.

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

Class 3: Cake doughnut mix.

4 lb 8 oz mix, sodium bicarbonate pouch, 3-3/4 to 4-1/2 cups water*

Machine Cut

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions). (Add 2 tbsp ground nutmeg and 2 tbsp vanilla per can).

2. Blend with paddle in low speed** for 1 minute.

3. Adjust water temperature so that batter temperature is 70°F to 75°F.

4. Add water gradually while mixing in low speed** for 1 minute and medium speed*** for 2 minutes.

5. Let rest 10 minutes, then place in doughnut cutter.

6. Drop doughnuts in 375°F deep fat, fry 1 minute on each side or until lightly browned. Drain on absorbant paper.

7. For 100 portions, use 2 cans (9 lb), each portion: 1 doughnut.

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

Hand Cut:

Follow mixing directions above, except use 3 to 3-3/4 cups of water. Dough may be chilled one hour for ease in handling. Place on well-floured bench for make-up. (Allow about 8 oz flour per can). Dough should be quite moist. Roll dough 3/8 inch thick, cut with doughnut cutter. Drop doughnuts in 375°F fat. Fry 1 minute on each side or until lightly browned. Drain on absorbent paper.

Class 4: Style A - Roll mix.

4 lb 8 oz mix, (yeast not included), 4-3/4 cups

Rolls

1. Place 1 cup (105°F to 110°F) water in mixer bowl (NOTE: DO NOT USE TEMPERATURES ABOVE 110°F).

2. Sprinkle 1-1/2 oz active dry yeast over water. Mix well. Let stand 5 minutes. Add roll mix and remaining 3-3/4 cups water which has been adjusted in temperatue so that final dough temperature is 80°F.

3. Using dough hook, mix 3 to 5 minutes at low speed* until water is absorbed.

4. Mix at medium speed** 3 to 5 minutes or until dough is developed and cleans the bowl.

5. Cover. Ferment at 80°F to 86°F until double in bulk (about 1 hour).

6. Punch and scale dough. Shape into smooth balls; let rest 10 to 20 minutes. Make up in desired styles, see Armed Forces Recipe Service Guide for Hot Roll Make-up. Place on lightly greased sheet pans.

7. Proof at 90°F to 100°F until double in bulk (about 1 hour).

8. Bake until lightly browned in 400°F oven for 15 minutes or, for convection oven, bake at 350°F, for 10 to 15 minutes on high fan, open vent.

9. For 100 portions, use 3-1/3 cans (15 lb) and 5 oz (1 cup) active dry yeast, each portion: 2 rolls.

* Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

Pizza Dough

1. Follow steps 1 thru 4 above.

2. Scale dough into 2 lb 10 oz pieces and shape into smooth balls.

3. Follow step 5 above.

4. Place dough balls on lightly floured suface. Roll out each ball into 1/8 inch thickness. Transfer dough to well-oiled sheet pans (2 tbsp salad oil per pan - bottom and sides) pushing dough slightly up edges of each pan. Brush dough with 2 tbsp salad oil per pan. Prick dough to prevent bubbling.

5. Bake at 400°F for 30 minutes or until slightly browned. For convention oven, bake at 350°F for 7 minutes on high fan, closed vent.

6. For each pan, use 1 qt pizza sauce, 4-1/2 cups mozzarella or pizza blend cheese and 1/2 cup parmesan cheese. Add other toppings (for example, green peppers, mushrooms, pepperoni and sausage) if desired.

7. Bake at 400°F for 30 minutes or until cheese starts to turn golden; for convection oven, bake at 350°F for 10 minutes on high fan, closed vent.

8. Cut each pan 5 by 5.

9. For 100 portions, use 1-1/2 cups (6 lb 12 oz) (7 sheet pans) and 2-1/4 oz (1/3 cup) active dry yeast, each portion: 1 piece (3 oz).

Class 4: Style B - Sweet dough.

4 lb 8 oz mix (yeast not included), 3-1/2 cups water

Sweet Rolls

1. Place water (105°F to 110°F) in mixer bowl (NOTE: DO NOT USE TEMPERATURES ABOVE 110°F).

2. Sprinkle 1-1/2 oz active dry yeast on top of water. Stir to dissolve. Let stand 5 minutes. Add mix.

3. Using dough hook, mix at low speed* 3 to 5 minutes or until water is absorbed.

4. Mix at medium speed** 3 to 5 minutes or until dough is developed and cleans the bowl.

5. Cover. Ferment at 80°F to 86°F until double in bulk (about 1 hour).

6. Punch and scale dough into 4 lb 2 oz pieces. Shape into smooth rectangular pieces; let rest 10 to 20 minutes. Make up in desired styles, see Armed Forces Recipe Service Guide for Sweet Roll Make-up. Dusting lightly with flour may be required. Place on lightly greased sheet pans.

7. Proof at 90°F to 100°F (45 to 60 minutes) or until double in bulk.

8. For baking time, see Armed Forces Recipe Service Guide for Sweet Roll Make-up. Most sweet rolls bake until lightly brown in 375°F oven for 20 to 25 minutes; for convention oven, bake at 325°F for 15 minutes on high fan, closed vent.

9. For 100 portions, use 2 cans (9 lb), and 3 oz (1/3 cup) active dry yeast, each portion: 1 roll.

* Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

Raised Doughnuts

1. In step 1 above, reduce water to 3 cups.

2. In step 2 above, add optional ingredients of 1 tsp ground nutmeg and 1 tsp vanilla.

3. Follow steps 3 and 4 above.

4. In step 5 above, ferment for 30 minutes or until light.

5. Punch and scale dough in to 3 lb 8 oz pieces. Shape into smooth balls; let rest 10 to 20 minutes. Roll out each ball into 1/2 inch thickness and cut with floured doughnut cutter. Place on lightly greased and floured sheet pans.

6. Follow step 7 above.

7. Fry at 370°F 1 minute per side until golden brown. Drain on absorbent paper. Let cool and coat as desired.

8. For 100 portions, use 2 cups (9 lb), each portion: 1 doughnut.

Class 5: Chocolate Brownie Mix.

5 lb mix, sodium bicarbonate pouch, 2 cups water*

1. Place mix in mixer bowl. Add contents of sodium bicarbonate pouch (at high altitudes use less - see pouch directions).

2. Blend with paddle at low speed** for 1 minute.

3. Add water gradually while mixing 1 minute in low speed**. Scrape bowl and paddle. Mix in medium speed for 2 minutes***.

4. Add 8 oz (2 cups) unsalted chopped nuts for each can of mix (optional). Mix 30 seconds in low speed**.

5. Spread 4-1/4 qt (9 lb 10 oz w/nuts) batter evenly into each lightly greased sheet pan.

6. Bake at 350°F for 35 to 40 minutes; for convection oven, bake at 325°F for 30 to 35 minutes on high fan, open vent****.

7. Cool baked brownie. Cut each pan 6 by 9.

8. For 108 portions, use 3 cups (15 lb) (2 sheet pans), each portion: 1 brownie (2-1/2 oz).

* Best results are obtained with a 70°F to 75°F batter temperature.

** Low speed is first speed on a 3-speed mixer and second on a 4-speed mixer.

*** Medium speed is second speed on a 3-speed mixer and third speed on a 4-speed mixer.

**** Bake time may require adjustment depending on the oven and oven load.

5.4.2 Shipping containers. Shipping containers shall be marked in accordance with MIL-STD-129. In addition, the following markings shall appear upon the top of each shipping container in letters not less than 1 inch high:

STORE IN COOL, DRY PLACE
PRODUCT DETERIORATES RAPIDLY
ABOVE 80°F

5.4.3 Unit loads. Unit loads shall be marked in accordance with MIL-L-35078.

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 must specify the following:

a. Title, number, and date of this specification.
b. Class and style required (see 1.2.1).
c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
d. When a first article is required (see 3.1, 4.4, and 6.2).
e. Provisions for approved preproduction samples (see 3.4.3 and 6.2).
f. Level of preservation and packing required (see 5.1 and 5.2).
g. Type and class of unit load when unit loading is required (see 5.3).

6.2 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209-4. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.3 Appropriate level of pack. Based on the conditions known or expected to be encountered during shipment, handling, and storage of the specific item being procured, the procuring activity should select the appropriate level of pack in accordance with the criteria established in AR 700-15/NAVSUPINST 4030.28/AFR 71-6/MCO 4030.33A/DLAR 4145.7.

6.4 Volumeter availability. A loaf volumeter manufactured by National Manufacturing Co., P.O. Box 30226, Lincoln, Nebraska, has been found to accurately test for volume.

6.5 Subject term (key word) listing.

Biscuit
Brownie
Bread
Cake
Doughnut
Pancake
Roll
Sweet dough
Waffle

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - GL
Navy - SA
Air Force - 50

Review Activities:

Army - MD, QM
Navy - MC, MS
DP - SS

Preparing Activity:

Army - GL

(Project 8920-0540)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-B-44275A	1992 September 21

3. DOCUMENT TITLE
BAKERY MIXES, PREPARED

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code)	
U.S. Army Natick RD&E Center	(1) Commercial 508-651-4501	(2) AUTOVON/DSN 256-4501
c. ADDRESS (Include Zip Code) Commander, U.S. Army Natick RD&E Center ATTN: SATNC-WTP Natick, MA 01760-5018	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	