

## SECTION C

This document covers shelf stable cakes and brownies packaged in a flexible pouch for use by the Department of Defense as a component of operational rations.

### C-1 ITEM DESCRIPTION

#### **PCR-C-007A, CAKES AND BROWNIES, SHELF STABLE**

##### Types and Flavors.

Type I - Cakes, shelf stable

- Flavor 1 - Vanilla pound cake
- Flavor 2 - Lemon pound cake
- Flavor 3 - Orange pound cake
- Flavor 4 - Pineapple pound cake
- Flavor 5 - Chocolate mint pound cake with chocolate drops
- Flavor 6 - Lemon poppy seed pound cake
- Flavor 7 - Spice pound cake
- Flavor 8 - Almond poppy seed pound cake
- Flavor 9 - Pumpkin pound cake

Type II - Brownies, shelf stable

- Flavor 1 - Fudge brownie with chocolate drops

##### Packages.

- Package A - Meal, Cold Weather (MCW)
- Package B - Food Packet, Long Range Patrol (LRP)
- Package C - Meal, Ready-to-Eat (MRE)

### C-2 PERFORMANCE REQUIREMENTS

A. Product standard. A sample shall be subjected to first article or product demonstration model inspection as applicable, in accordance with the tests and inspections of Section E of this Performance-based Contract Requirements document.

B. Shelf life. The packaged food shall meet the minimum shelf life requirement of 36 months at 80°F.

C. Appearance.

(1) General. The product shall be intact. The product shall show no signs of excessive heating (materially darkened or scorched). The product surface may have slightly browned edges. The product shall have a uniform cell (crumb) structure. The product shall be free from foreign materials.

(2) Type I.

- a. Flavor 1 cake shall have a light tan surface and a pale, off-white crumb.
- b. Flavor 2 cake shall have a light golden surface and a yellow crumb.
- c. Flavor 3 cake shall have a medium orange surface and a light orange crumb.
- d. Flavor 4 cake shall have a light golden tan surface and a pale yellow crumb.

e. Flavor 5 cake shall have a dark brown surface and crumb and shall have chocolate drops distributed throughout.

f. Flavor 6 cake shall have a light golden surface and a yellow crumb with poppy seeds.

g. Flavor 7 cake shall have a medium beige surface and a light beige crumb and may have flecks of spices.

h. Flavor 8 cake shall have a golden brown surface and a medium golden brown crumb with poppy seeds.

i. Flavor 9 cake shall have a golden brown surface and a golden brown crumb.

(3) Type II. Flavor 1 brownie shall have a very dark brown surface and crumb and shall have chocolate drops distributed throughout.

D. Odor and flavor.

(1) Foreign. The packaged food shall be free from foreign odors and flavors.

(2) Type I.

a. Flavor 1 cake shall have a sweet vanilla odor and flavor.

b. Flavor 2 cake shall have a sweet, mild lemon odor and flavor.

c. Flavor 3 cake shall have a sweet, mild orange odor and flavor.

d. Flavor 4 cake shall have a sweet, mild pineapple odor and flavor.

e. Flavor 5 cake shall have a semi-sweet chocolate and mild mint odor and flavor.

f. Flavor 6 cake shall have a sweet, mild lemon and poppy seed odor and flavor.

g. Flavor 7 cake shall have a sweet spice odor and flavor.

h. Flavor 8 cake shall have a sweet almond and poppy seed odor and flavor.

i. Flavor 9 cake shall have a sweet pumpkin spice odor and flavor.

(3) Type II. Flavor 1 brownie shall have a sweet, slightly bitter chocolate odor and flavor.

E. Texture.

(1) Type I.

a. Flavor 1, flavor 2, flavor 3, flavor 4, flavor 7 or flavor 9 cake shall have a dense, firm, tender, moist, fine grain crumb texture.

b. Flavor 5 cake shall have a dense, firm, tender, moist, fine grain crumb texture with chocolate drops.

c. Flavor 6 and flavor 8 cakes shall have a dense, firm, tender, moist, fine grain crumb with slightly crunchy poppy seeds.

(2) Type II. Flavor 1 brownie shall have a very dense, firm, moist texture with chocolate drops.

F. Size. The product dimensions shall be not greater than 4 3/4 inches long and 3 1/4 inches wide.

G. Weight.

(1) Type I. The average net weight of type I cake shall be not less than 2.5 ounces. No individual pouch shall have a net weight of less than 2.25 ounces.

(2) Type II. The average net weight of type II brownie shall be not less than 3.0 ounces. No individual pouch shall have a net weight of less than 2.6 ounces.

H. Palatability and overall appearance. The finished product shall be equal to or better than the approved product standard in palatability and overall appearance.

I. Analytical requirements.

(1) Fat content. The fat content for type I - cakes and type II - brownies shall be not less than 18.0 percent.

(2) Moisture content. The moisture content for type I - cakes shall be not less than 13.0 percent. The moisture content for type II - brownies shall be not less than 15.0 percent.

(3) Water activity (Aw). The water activity of the packaged product shall be not greater than 0.850.

(4) Oxygen content. The oxygen content of the filled and sealed pouch shall not exceed 0.30 percent.

**C-3 MISCELLANEOUS INFORMATION**

THE FOLLOWING IS INFORMATION ONLY TO PROVIDE THE BENEFIT OF PAST GOVERNMENT EXPERIENCE. THIS IS NOT A MANDATORY CONTRACT REQUIREMENT.

A. Product ingredients/formulation. Ingredients and formulation percentages for cakes flavor 1 through 6 and brownies may be as follows:

<u>Ingredient</u>	<u>Cake Flavors</u>						<u>Brownies</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>1</u>
Flour, cake	24.12	24.06	23.98	24.00	16.33	23.58	13.79
Sugar, granulated	27.69	27.65	27.65	27.65	24.91	27.10	24.25
Starch, instant, granular	1.00	1.00	1.00	1.00	1.00	0.98	1.00
Maltodextrin	2.50	2.50	2.50	2.50	2.50	2.45	---
Salt	0.34	0.34	0.34	0.34	0.30	0.33	0.28
Baking powder	0.15	0.15	0.15	0.15	0.13	0.14	---
Xanthan gum	0.03	0.03	0.03	0.03	0.03	0.03	0.11
Guar gum	0.03	0.03	0.03	0.03	0.03	0.03	0.11
Potassium sorbate	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Shortening, high ratio	16.25	16.25	16.25	16.25	13.73	15.93	---
Eggs	17.28	17.28	17.28	17.28	15.57	16.93	11.26
Water	6.91	6.91	6.91	6.91	6.23	6.77	13.57
Glycerol	3.46	3.46	3.46	3.46	3.12	3.39	2.13
Cocoa	---	---	---	---	6.00	---	---
Flavoring, cream	0.04	0.04	0.04	0.04	0.04	0.04	---
Flavoring, vanilla, double strength	0.15	0.11	0.11	0.11	0.10	0.11	---
Flavoring, vanilla, single strength	---	---	---	---	---	---	0.94
Lemon oil	---	0.05	---	---	---	0.05	---
Orange oil	---	---	0.07	---	---	---	---
Flavoring, pineapple	---	---	---	0.07	---	---	---
Flavoring, chocolate mint	---	---	---	---	0.30	---	---
Chocolate drops	---	---	---	---	9.90	---	10.79
Yellow lake dispersion	---	0.02	---	0.01	---	0.02	---
Orange lake dispersion	---	---	0.08	---	---	---	---
Citric acid, anhydrous	---	0.07	0.07	0.12	---	0.07	---
Cocoa	---	---	---	---	---	---	6.46
Shortening, vegetable	---	---	---	---	---	---	15.02
Emulsifier	---	---	---	---	---	---	0.12
Sodium steroyl-2-lactylate	---	---	---	---	---	---	0.12
Poppy seeds	---	---	---	---	---	2.00	---

B. Ingredients for flavor 7 cake may be as follows:

Sugar, bleached enriched flour (bleached flour, reduced iron, niacin, thiamine mononitrate, riboflavin, folic acid), vegetable shortening (emulsified, partially hydrogenated soybean oil and/or cottonseed oil, mono and diglycerides), water, glycerol, maltodextrin, may contain 2% or less of: food starch-modified, salt, baking powder (sodium acid pyrophosphate, sodium bicarbonate, corn starch, monocalcium phosphate), potassium

sorbate (a mold inhibitor), xanthan gum, guar gum, egg whites, artificial flavor, cinnamon, allspice, ginger.

C. Ingredients for flavor 8 cake may be as follows:

Sugar, bleached and enriched flour (wheat flour, niacin, reduced iron, thiamine mononitrate, riboflavin folic acid), whole eggs, vegetable shortening (partially hydrogenated soybean and cottonseed oils with mono and diglycerides), water, glycerol, egg whites, maltodextrin. Contains 2% or less of the following: Poppy seeds, leavening (sodium acid pyrophosphate, sodium bicarbonate, monocalcium phosphate), xanthan gum, guar gum, potassium sorbate, natural and artificial flavors, caramel color.

D. Ingredients for flavor 9 cake may be as follows:

Sugar, bleached and enriched flour (wheat flour, niacin, reduced iron, thiamine mononitrate, riboflavin, folic acid), whole eggs, vegetable shortening (partially hydrogenated soybean and cottonseed oils with mono and diglycerides), pumpkin, water, glycerol, egg whites, maltodextrin. Contains 2% or less of the following: modified food starch, salt, leavening (sodium acid pyrophosphate, sodium bicarbonate, monocalcium phosphate), xanthan gum, guar gum, potassium sorbate, natural and artificial flavors, spice.

**SECTION D**

**D-1 PACKAGING**

A. Packaging. One unit of product and one oxygen scavenger packet shall be packed in a preformed or form-fill-seal barrier pouch as described below.

(1) Preformed pouches.

a. Pouch material. The preformed pouch shall be fabricated from 0.002 inch thick ionomer or polyethylene film laminated or extrusion coated to 0.00035 inch thick aluminum foil which is then laminated to 0.0005 inch thick polyester. The three plies shall be laminated with the polyester on the exterior of the pouch. All tolerances for thickness of pouch material shall be plus or minus 20 percent. The material shall show no evidence of delamination, degradation, or foreign odor when heat sealed or fabricated into pouches. The material shall be suitably formulated for food packaging and shall not impart an odor or flavor to the product. For package A (MCW), the complete exterior surface of the pouch shall be colored white overall with a color in the range of 37778 through 37886 of FED-STD-595, Colors Used in Government Procurement. For package B (LRP) and package C (MRE) the complete exterior surface of the pouch shall be uniformly colored in the range of 20219, 30219, 30227, 30279, 30313, 30324, or 30450 of FED-STD-595.

b. Pouch construction. The pouch shall be a flat style preformed pouch having maximum inside dimensions of 5-1/2 inches wide by 6-3/4 inches long. The pouch shall be made by heat sealing three edges with 3/8 inch (-1/8 inch, +3/16 inch) wide seals. The heat seals shall be made in a manner that will assure hermetic seals. The side and bottom seals shall have an average seal strength of not less than 6 pounds per inch of width and no individual specimen shall have a seal strength of less than 5 pounds per inch of width when tested as specified in E-6, A., (4), a. Alternatively, the filled and sealed pouch shall exhibit no rupture or seal separation greater than 1/16 inch or seal separation that reduces the effective closure seal width to less than 1/16 inch when tested for internal pressure resistance as specified in E-6, A., (4), c. A tear notch shall be made in one or both side seals to facilitate opening of the filled and sealed pouch. A 1/8 inch wide lip may be incorporated at the open end of the pouch to facilitate opening and filling of the pouch.

c. Pouch filling and sealing. One unit of product and one oxygen scavenger packet shall be inserted into the pouch. The filled pouch shall be sealed. The closure seal shall be free of foldover wrinkles or entrapped matter that reduces the effective closure seal width to less than 1/16 inch. Seals shall be free of impression or design on the seal surface that would conceal or impair visual detection of seal defects. The average seal strength shall be not less than 6 pounds per inch of width and no individual specimen shall have a seal strength of less than 5 pounds per inch of width when tested as specified in E-6,A.,(4),b. Alternatively, the filled and sealed pouch shall exhibit no rupture or seal separation greater than 1/16 inch or seal separation that reduces the effective closure seal width to less than 1/16 inch when tested for internal pressure resistance as specified in E-6,A.,(4),c.

(2) Horizontal form-fill-seal pouches.

a. Pouch material. The horizontal form-fill-seal pouch shall consist of a formed tray-shaped body with a flat sheet, heat sealable cover or a tray-shaped body with a tray-shaped heat sealable cover. The tray-shaped body and the tray-shaped cover shall be fabricated from a 3-ply flexible laminate barrier material consisting of, from outside to inside, 0.0009 inch thick oriented polypropylene bonded to 0.0007 inch thick aluminum foil with 10 pounds per ream pigmented polyethylene or adhesive and bonding the opposite side of the aluminum foil to 0.003 inch thick ionomer or a blend of not less than 50 percent linear low density polyethylene and polyethylene. The linear low density polyethylene portion of the blend shall be the copolymer of ethylene and octene-1 having a melt index range of 0.8 to 1.2 g/10 minutes in accordance with ASTM D 1238, Flow Rates of Thermoplastics by Extrusion Plastometer and a density range of 0.918 to 0.922 g/cc in accordance with ASTM D 1505, Density of Plastics by Density Gradient Technique. Alternatively, 0.0005 inch thick polyester may be used in place of the oriented polypropylene as the outer ply of the laminate. The flat sheet cover shall be made of the same 3-ply laminate as specified for the tray shaped body except the aluminum foil thickness may be 0.00035 inch. All tolerances for thickness of pouch materials shall be plus or minus 20 percent. The color requirements of the exterior (oriented polypropylene or polyester side) of the laminate shall be as specified in D-1,A.,(1),a. The material shall show no evidence of delamination, degradation, or foreign odor when heat sealed or fabricated into pouches. The material shall be suitably formulated for food packaging and shall not impart any odor or flavor to the product.

b. Pouch construction. The tray-shaped body and the tray-shaped cover shall be formed by drawing the flexible laminate material into an appropriately shaped cavity. The flat cover shall be in the form of a flat sheet of the barrier material taken from roll stock. One unit of product and one oxygen scavenger packet shall be placed into the tray-shaped body of the pouch. The filled pouch body shall be hermetically sealed. Pouch closure shall be effected by heat sealing together the cover and body along the entire pouch perimeter. The closure seal width shall be a minimum of 1/8 inch. The closure seal shall have an average seal strength of not less than 6 pounds per inch of width and no individual specimen shall have a seal strength of less than 5 pounds per inch of width when tested as specified in E-6,A.,(4),b. Alternatively, the filled and sealed pouch shall exhibit no rupture or seal separation greater than 1/16 inch or seal separation that reduces the effective closure seal width to less than 1/16 inch when tested for internal pressure resistance as specified in E-6,A.,(4),c. The maximum outside dimensions of the sealed pouch shall be 6 inches wide by 6 inches long. A tear notch, or serrations shall be provided on one or more edges of the pouch to facilitate opening of the filled and sealed pouch. The sealed pouch shall not show any evidence of material degradation, aluminum stress cracking, delamination or foreign odor. Heat seals shall be free of entrapped matter that reduces the effective closure seal width to less than 1/16 inch. Seals shall be free of impression or design on the seal surface that would conceal or impair visual detection of seal defects.

(3) Oxygen scavenger packet. The oxygen scavenger (absorber) 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 (absorber) shall be in compliance with all applicable FDA and USDA regulations.

## **D-2 LABELING**

A. Pouches. Each pouch shall be clearly printed or stamped, in a manner that does not conceal or impair visual examination of heat seals or damage the pouch, with permanent black ink or other, dark, contrasting color which is free of carcinogenic elements. Pre-printed information, information printed prior to sealing or information printed by non-contact type printing equipment may be located anywhere on the pouch (in one complete print). Information printed subsequent to sealing by contact type printing equipment may be located anywhere on the pouch, except the closure seal area. The label shall contain the following information:

- (1) Product name (letters not less than 1/8 high).
- (2) Date. 1/
- (3) Net Weight.
- (4) Contractor's name and address.
- (5) "Nutrition Facts" label in accordance with the Nutrition Labeling and Education Act (NLEA) and all applicable FDA/USDA regulations.

1/ Each pouch shall have the date of pack noted by using a four digit code beginning with the final digit of the current year followed by the three digit Julian day code. For example, 16 October 2001 would be coded as 1289 The Julian day code shall represent the day the product was packaged into the pouch.

## **D-3 PACKING**

A. Packing for shipment to ration assembler. Not more than 40 pounds of pouched product shall be packed in a fiberboard shipping container constructed in accordance with style RSC-L, class domestic, variety SW, grade 200 of ASTM D 5118, Standard Practice for Fabrication of Fiberboard Shipping Boxes. Each container shall be securely closed in accordance with ASTM D 1974, Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Shipping Containers.

## **D-4 MARKING**

A. Shipping containers. Shipping containers shall be marked in accordance with DPSC Form 3556, Marking Instructions for Shipping Cases, Sacks and Palletized/Containerized Loads of Perishable and Semiperishable Subsistence.

## **SECTION E INSPECTION AND ACCEPTANCE**

The following quality assurance criteria, utilizing ANSI/ASQC Z1.4-1993, Sampling Procedures and Tables for Inspection by Attributes, are required. When required, the manufacturer shall provide the certificate(s) of conformance to the appropriate inspection activity. Certificate(s) of conformance not provided shall be cause for rejection of the lot.

### A. Definitions.

(1) Critical defect. A critical defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using,

maintaining, or depending on the item; or a defect that judgment and experience indicate is likely to prevent the performance of the major end item, i.e., the consumption of the ration.

(2) Major defect. A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

(3) Minor defect. A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

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

(1) Product standard inspection. The first article or product demonstration model shall be inspected in accordance with the provisions of this document and evaluated for overall appearance and palatability. Any failure to conform to the performance requirements or any appearance or palatability failure, shall be cause for rejection of the lot. 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:

US Army Soldier & Biological Chemical Command  
Soldiers System Ctr., Natick Soldier Center  
Attn: AMSSB-RCF-F(N)  
15 Kansas Street  
Natick, MA 01760-5018

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

(2) Conformance inspection. Conformance inspection shall include the product examination and the methods of inspection cited in this section.

**E-5 QUALITY ASSURANCE PROVISIONS (PRODUCT)**

A. Product examination. The finished product shall be examined for compliance with the performance requirements specified in Section C of this Performance-based Contract Requirements document utilizing the double sampling plans indicated in ANSI/ASQC Z1.4 - 1993. The lot size shall be expressed in pouches. The sample unit shall be the contents of one pouch. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 4.0 for minor defects. Defects and defect classifications are listed in table I.

TABLE I. Product defects 1/ 2/

Category		Defect
<u>Major</u>	<u>Minor</u>	<u>General</u>
101		Cake not type or flavor specified.
102		Evidence of excessive heating (materially darkened or scorched).

- 103 Pouch does not contain one intact oxygen scavenger packet.
- 201 Net weight of any individual type I cake less than 2.25 ounces. 3/
- 202 Net weight of any individual type II brownie less than 2.6 ounces. 4/

TABLE I. Product defects 1/ 2/ cont'd

Category		Defect
<u>Major</u>	<u>Minor</u>	
	203	Dimensions of cake or brownie not as specified.
	204	Not an intact cake or brownie.
	205	Evidence of dense crumb compression streaks.
		<u>Type I, Flavor 1</u>
104		Odor or flavor not a sweet vanilla.
	206	Not a light tan surface and not a pale off-white crumb.
	207	Not dense, firm, tender, moist, and fine.
		<u>Type I, Flavor 2</u>
105		Odor or flavor not a sweet, mild lemon.
	208	Not a light golden surface and not a yellow crumb.
	209	Not dense, firm, tender, moist, and fine.
		<u>Type I, Flavor 3</u>
106		Odor or flavor not a sweet, mild orange.
	210	Not a medium orange surface and not a light orange crumb.
	211	Not dense, firm, tender, moist, and fine.
		<u>Type I, Flavor 4</u>
107		Odor or flavor not a sweet, mild pineapple.
	212	Not a light tan surface and not a pale yellow crumb.
	213	Not dense, firm, tender, moist, and fine.
		<u>Type I, Flavor 5</u>
108		Odor or flavor not a semi-sweet chocolate with mild mint.
	214	Not a dark brown surface and crumb with chocolate drops distributed throughout.
	215	Not dense, firm, tender, moist, fine, with chocolate drops.

Type I, Flavor 6

- 109 Odor or flavor not a sweet mild lemon and poppy seed.
- 216 Not a light golden surface and not a yellow crumb with poppy seeds throughout.

TABLE I. Product defects 1/ 2/ cont'd

Category		Defect
<u>Major</u>	<u>Minor</u>	
	217	Not dense, firm, tender, moist, fine grain crumb with slightly crunchy poppy seeds.
<u>Type I, Flavor 7</u>		
110		Odor or flavor not a sweet, spice.
	218	Not a medium beige surface and not a light beige crumb.
	219	Not dense, firm, tender, moist, and fine.
<u>Type I, Flavor 8</u>		
111		Odor or flavor not a sweet almond and poppy seed.
	220	Not a golden brown surface and not a medium golden brown crumb with poppy seeds.
	221	Not dense, firm, tender, moist, fine grain crumb with slightly crunchy poppy seeds.
<u>Type I, Flavor 9</u>		
112		Odor or flavor not a sweet pumpkin spice.
	222	Not a golden brown surface and not a golden brown crumb.
	223	Not dense, firm, tender, moist, and fine.
<u>Type II, Flavor 1</u>		
113		Brownie odor or flavor not a sweet, slightly bitter chocolate.
	224	Brownie not a very dark brown surface and crumb with chocolate drops distributed throughout.
	225	Brownie not very dense, firm, moist with chocolate drops.

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

2/ Finished product not equal to or better than the approved product standard in palatability and overall appearance shall be cause for rejection of the lot.

3/ Sample average net weight less than 2.5 ounces shall be cause for rejection of the lot.

4/ Sample average net weight less than 3.0 ounces shall be cause for rejection of the lot.

B. Methods of inspection.

(1) Shelf life. The contractor shall provide a certificate of conformance that the product has a 3 year shelf life when stored at 80°F. Government verification may include storage for 6 months at 100°F or 36 months at 80°F. Upon completion of either storage period, the product will be subjected to a sensory evaluation panel for appearance and palatability and must receive an overall score of 5 or higher based on a 9 point hedonic scale to be considered acceptable.

(2) Net weight. The net weight shall be determined by weighing each sample unit on a suitable scale tared with a representative empty pouch and an oxygen scavenger packet. Results shall be reported to the nearest 0.1 ounce.

(3) Analytical. Eight filled and sealed pouches shall be randomly selected from one production lot and prepared and analyzed in accordance with the latest edition of the Official Methods of Analysis of AOAC International (OMA). Test results shall be reported to the nearest 0.1 percent. Verification will be conducted through actual testing by a Government laboratory. Any individual pouch not conforming to the analytical requirements shall be cause for rejection of the lot.

(4) Water activity testing. Eight filled and sealed pouches shall be randomly selected from one production lot and tested for water activity in accordance with the latest edition of the Official Methods of Analysis of AOAC International (OMA), using an electric hygrometer system self temperature controlled (at 25°C) or an equivalent instrument. Water activity shall be determined not less than 4 days but not more than 14 days after baking to allow moisture equilibration in the product. The sample unit shall be a specimen from the center of the product. Test results shall be reported to the nearest 0.01 Aw. Verification will be conducted through actual testing by a Government laboratory. Any individual result not conforming to the water activity requirement shall be cause for rejection of the lot.

(5) Oxygen content testing. Eight filled and sealed pouches shall be randomly selected from one production lot and individually tested for oxygen content in accordance with any USDA approved test method. Testing shall be accomplished after the filled and sealed pouches have been allowed to equilibrate at room temperature for not less than 48 hours from the time of sealing. Test results shall be reported to the nearest 0.01 percent. Verification will be conducted through actual testing by a Government laboratory. Any individual result not conforming to the oxygen content requirement shall be cause for rejection of the lot.

**E-6 QUALITY ASSURANCE PROVISIONS (PACKAGING AND PACKING MATERIALS)**

A. Packaging.

(1) Pouch material certification. Material listed below may be accepted on the basis of a contractor's certification of conformance to the indicated requirements. In addition, compliance to the requirements for inside pouch dimensions and dimensions of manufacturer's seals may be verified by certificate of conformance.

<u>Requirement</u>	<u>Requirement paragraph</u>	<u>Test procedure</u>
Thickness of films for laminated material	D-1,A, (1), a and D-1,A, (2), a	As specified in ASTM D 2103
Aluminum foil thickness	D-1,A, (1), a and D-1,A, (2), a	As specified in ASTM B 479 <u>2/</u>

Laminated material identification and construction	D-1,A, (1),a and D-1,A, (2),a	Laboratory evaluation
Color of laminated material	D-1,A, (1),a and D-1,A, (2),a	Visual evaluation by FED-STD-595 <u>3/</u>

1/ ASTM D 2103 Specification for Polyethylene Film and Sheeting.

2/ ASTM-B-479 Specification for Annealed Aluminum Foil For Flexible Barrier Application.

3/ FED-STD-595 Colors Used in Government Procurement.

(2) Unfilled preformed pouch certification. A certification of conformance may be accepted as evidence that unfilled pouches conform to the requirements specified in D-1,A., (1),a. and b. When deemed necessary by the USDA, testing of the unfilled preformed pouches for seal strength shall be as specified in E-6,A., (4),a.

(3) Filled and sealed pouch examination. The filled and sealed pouches shall be examined for the defects listed in table II. The lot size shall be expressed in pouches. The sample unit shall be one pouch. The inspection level shall be I and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 0.65 for major defects and 2.5 for minor defects.

TABLE II. Filled and sealed pouch defects 1/

Category		Defect
<u>Major</u>	<u>Minor</u>	
101		Tear, hole, or open seal.
102		Seal width less than 1/16 inch. <u>2/</u>
103		Presence of delamination. <u>3/</u>
104		Unclean pouch. <u>4/</u>
105		Pouch has foreign odor.
106		Any impression or design on the heat seal surfaces which conceals or impairs visual detection of seal defects. <u>5/</u>
107		Not packaged as specified.
108		Presence of stress cracks in the aluminum foil. <u>6/ 7/</u>
	201	Label missing, incorrect, or illegible.
	202	Tear notch or serrations missing or does not facilitate opening.
	203	Seal width less than 1/8 inch but greater than 1/16 inch.
	204	Presence of delamination. <u>3/</u>

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

2/ The effective closure seal is defined as any uncontaminated, fusion bonded, continuous path, minimum 1/16 inch wide, from side seal to side seal that produces a hermetically sealed pouch.

3/ Delamination defect classification:

Major - Delamination of the outer ply in the pouch seal area that can be propagated to expose aluminum foil at the food product edge of the pouch after manual flexing of the delaminated area. To flex, the delaminated area shall be held between the thumb and forefinger of each hand with both thumbs and forefingers touching each other. The delaminated area shall then be rapidly flexed 10 times by rotating both hands in alternating clockwise- counterclockwise directions. Care shall be exercised when flexing delaminated areas near the tear notches to avoid tearing the pouch material. After flexing, the separated outer ply shall be grasped between thumb and forefinger and gently lifted toward the food product edge of the seal or if the separated area is too small to be held between thumb and forefinger, a number two stylus shall be inserted into the delaminated area and a gentle lifting force applied against the outer ply. If separation of the outer ply can be made to extend to the product edge of the seal with no discernible resistance to the gentle lifting, the delamination shall be classified as a major defect. Additionally, spot delamination of the outer ply in the body of the pouch that is able to be propagated beyond its initial borders is also a major defect. To determine if the laminated area is a defect, use the following procedure: Mark the outside edges of the delaminated area using a bold permanent marking pen. Open the pouch and remove the contents. Cut the pouch transversely not closer than 1/4 inch (+1/16 inch) from the delaminated area. The pouch shall be flexed in the area in question using the procedure described above. Any propagation of the delaminated area, as evidenced by the delaminated area exceeding the limits of the outlined borders, shall be classified as a major defect.

Minor - Minor delamination of the outer ply in the pouch seal area is acceptable and shall not be classified as a minor defect unless it extends to within 1/16 inch of the food product edge of the seal. All other minor outer ply delamination in the pouch seal area or isolated spots of delamination in the body of the pouch that do not propagate when flexed as described above shall be classified as minor defects.

4/ Outer packaging shall be free from foreign matter which is unwholesome, has the potential to cause pouch damage (for example, glass, metal filings) or generally detracts from the clean appearance of the pouch. The following examples shall not be classified as defects for unclean:

a. Foreign matter which presents no health hazard or potential pouch damage and which can be readily removed by gently shaking the package or by gently brushing the pouch with a clean dry cloth.

b. Dried product which affects less than 1/8 of the total surface area of one pouch face (localized and aggregate).

c. Water spots.

5/ If doubt exists as to whether or not the sealing equipment leaves an impression or design on the closure seal surface that could conceal or impair visual detection of seal defects, samples shall be furnished to the contracting officer for a determination as to acceptability.

6/ Applicable to form-fill-seal pouches only.

7/ The initial examination shall be a visual examination of the closed package. Any suspected visual evidence of stress cracks in the aluminum foil (streaks, breaks, or other disruptions in the laminated film) shall be verified by the following physical examination. To examine for stress cracks, the inside surface of both tray-shaped bodies shall be placed over a light source and the outside surface observed for the passage of light. Observation of light through the pouch material in the form of a curved or straight line greater than 2 mm in length shall be evidence of the presence of stress cracks.

Observation of light through the pouch material in the form of a curved or straight line 2 mm in length or smaller or of a single pinpoint shall be considered a pinhole. Observation of ten or more pinholes per pouch shall be evidence of material degradation.

(4) Seal testing. The pouch seals shall be tested for seal strength as required in a, b, or c, as applicable.

a. Unfilled preformed pouch seal testing. The seals of the unfilled preformed pouch shall be tested for seal strength in accordance with ASTM F 88 - Seal Strength of Flexible Barrier Materials. The lot size shall be expressed in pouches. The sample size shall be the number of pouches indicated by inspection level S-1. Three adjacent specimens shall be cut from each of the three sealed sides of each pouch in the sample. The average seal strength of any side shall be calculated by averaging the three specimens cut from that side. Any average seal strength of less than 6 pounds per inch of width or any test specimen with a seal strength of less than 5 pounds per inch of width shall be cause rejection of the lot.

b. Pouch closure seal testing. The closure seals of the pouches shall be tested for seal strength in accordance with ASTM F 88. The lot size shall be expressed in pouches. The sample size shall be the number of pouches indicated by inspection level S-1. For the closure seal on preformed pouches, three adjacent specimens shall be cut from the closure seal of each pouch in the sample. For form-fill-seal pouches, three adjacent specimens shall be cut from each side and each end of each pouch in the sample. The average seal strength of any side, end or closure shall be calculated by averaging the three specimens cut from that side, end or closure. Any average seal strength of less than 6 pounds per inch of width or any test specimen with a seal strength of less than 5 pounds per inch of width shall be cause for rejection of the lot.

c. Internal pressure test. The internal pressure resistance shall be determined by pressurizing the pouches while they are restrained between two rigid plates. The sample size shall be the number of pouches indicated by inspection level S-1. If a three seal tester (one that pressurizes the pouch through an open end) is used, the closure seal shall be cut off for testing the side and bottom seals of the pouch. For testing the closure seal, the bottom seal shall be cut off. The pouches shall be emptied prior to testing. If a four-seal tester (designed to pressurize filled pouches by use of a hypodermic needle through the pouch wall) is used, all four seals can be tested simultaneously. The distance between rigid restraining plates on the four-seal tester shall be equal to the thickness of the product +1/16 inch. Pressure shall be applied at the approximate uniform rate of 1 pound per square inch gage (psig) per second until 14 psig pressure is reached. The 14 psig pressure shall be held constant for 30 seconds and then released. The pouches shall then be examined for separation or yield of the heat seals. Any rupture of the pouch or evidence of seal separation greater than 1/16 inch in the pouch manufacturer's seal shall be considered a test failure. Any seal separation that reduces the effective closure seal width to less than 1/16 inch (see table II, footnote 2/) shall be considered a test failure and shall be cause for rejection of the lot.

B. Packing.

(1) Shipping container and marking examination. The filled and sealed shipping containers shall be examined for the defects listed in table III below. The lot size shall be expressed in shipping containers. The sample unit shall be one shipping container fully packed. The inspection level shall be S-3 and the AQL, expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total defects.

TABLE III. Shipping container and marking defects

Category	Defect
<u>Major</u>	<u>Minor</u>

- 101 Marking omitted, incorrect, illegible, or improper size, location sequence or method of application.
- 102 Inadequate workmanship. 1/  
201 More than 40 pounds of product.
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1/ Inadequate workmanship is defined as, but not limited to, incomplete closure of container flaps, loose strapping, inadequate stapling, improper taping, or bulged or distorted container.

#### **SECTION J REFERENCE DOCUMENTS**

##### DSCP FORMS

DPSC FORM 3556 Marking Instructions for Shipping Cases, Sacks and Palletized/  
Containerized Loads of Perishable and Semiperishable Subsistence

##### FEDERAL STANDARD

FED-STD-595 Colors Used in Government Procurement

##### NON-GOVERNMENTAL STANDARDS

##### AMERICAN SOCIETY FOR QUALITY (ASQ)

ANSI/ASQCZ1.4-1993 Sampling Procedures and Tables for Inspection by Attributes

##### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

B 479 Specification for Annealed Aluminum Foil For Flexible Barrier Application  
D 1238 Flow Rates of Thermoplastics by Extrusion Plastometer  
D 1505 Density of Plastics by Density Gradient Technique  
D 1974 Standard Practice for Methods of Closing, Sealing, and Reinforcing  
Fiberboard Shipping Containers  
D 2103 Specification for Polyethylene Film and Sheeting  
D 5118 Standard Practice for Fabrication of Fiberboard Shipping Boxes  
F 88 Seal Strength of Flexible Barrier Materials

##### AOAC INTERNATIONAL Official Methods of Analysis of the AOAC International