

## **SECTION C**

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

### **C-1 ITEM DESCRIPTION**

#### **PCR-S-026, SWIRL ROLL, PACKAGED IN A FLEXIBLE POUCH, SHELF STABLE**

##### Flavor.

Flavor 1 - Italian style herb and cheese

### **C-2 PERFORMANCE REQUIREMENTS**

A. Product standard. A sample shall be subjected to first article (FA) or product demonstration model (PDM) inspection as applicable, in accordance with the tests and inspections of Section E of this Performance-based Contract Requirements (PCR) document. The approved sample shall serve as the product standard. Should the contractor at any time plan to or actually produce the product using different raw material or process methodologies from the approved product standard, which result in a product noncomparable to the product standard, the contractor shall submit a replacement FA or PDM for approval. In any event, all product produced must meet all requirements of this document including product standard comparability.

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

##### C. Appearance.

(1) General. The finished product shall be an intact, round swirl roll. The product shall be produced from enriched flour. The product shall be slightly dense, have a uniform crumb structure and show no evidence of excessive flour dusting. The product shall show no evidence of excessive baking (materially darkened or scorched). There shall be no evidence of compression streaks when broken by hand. The finished product shall be free from foreign materials.

(2) Flavor 1. The exterior of the Italian style herb and cheese swirl roll shall be a light to medium tan color and shall have a reddish-orange color near the swirl edges. The interior crumb shall be an off-white to light tan color. The Italian style herb and cheese swirl roll shall have flecks of herbs throughout.

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D. Odor and flavor.

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

(2) Flavor 1. The packaged food shall have a moderate Italian seasoning, tomato and slight cheese odor and flavor. The product shall have a slight to moderate wheat flavor and may have a slight leavening aftertaste.

E. Texture.

(1) Flavor 1. The Italian style herb and cheese swirl roll shall be tender, slightly chewy, and slightly dense. The product shall not be excessively dry and crumbly or excessively moist and gummy.

F. Dimensions. The swirl roll dimensions shall be not greater than 4.0 inches in diameter and not greater than 1.3 inches in height.

G. Net weight. The net weight of an individual pouch shall be not less than 55 grams.

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) Calories. The calories shall not be less than 180 per serving.

(2) pH. The pH shall be not less than 4.7 and not greater than 5.2.

(3) Water activity. The water activity ( $a_w$ ) shall be not greater than 0.86 when measured at 77°F (25°C).

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

J. Microbiological requirements.

~~(1) Aerobic plate count. The aerobic plate count shall not be greater than 1,000 Colony Forming Units (CFU) per gram.~~

~~(2) Yeast and mold. The yeast and mold count (combined) shall not exceed 100 CFU per gram.~~

~~(3) Coliforms. The total *coliform* count shall not exceed 100 CFU per gram.~~

## **SECTION D**

### **D-1 PACKAGING**

A. Packaging. One swirl roll and one intact oxygen scavenger shall be packaged in a preformed or form-fill-seal barrier pouch.

(1) Preformed pouch.

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 bonded to 0.0005 inch thick polyester. Tolerances for thickness of plastic films shall be plus or minus 20 percent and tolerance for the foil layer shall be plus or minus 10 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. The complete exterior surface of the pouch shall be uniformly colored and shall conform to number 20219, 30219, 30227, 30279, 30313, 30324, or 30450 of SAE AMS-STD-595, Colors Used in Government Procurement.

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, + 3/16 inch) wide 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. 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. A tear nick, notch, or serrations shall be provided 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.

c. Pouch filling and sealing. One swirl roll and one oxygen scavenger 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. Alternatively, the filled and sealed pouch shall exhibit no

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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.

(2) Horizontal form-fill-seal pouch.

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 D1238, Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer and a density range of 0.918 to 0.922 g/cc in accordance with ASTM D1505, Standard Test Method for 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. Tolerances for thickness of plastic films shall be plus or minus 20 percent and tolerance for the foil layer shall be plus or minus 10 percent. The color requirements of the exterior of the pouch 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 swirl roll and one oxygen scavenger shall be placed into the tray-shaped body of the pouch. 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. 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. The maximum outside dimensions of the sealed pouch shall be 6 inches wide by 6 inches long. A tear nick, notch, or serrations shall be provided to facilitate opening of the filled pouch. The sealed pouch shall not show any evidence of material degradation, aluminum stress cracking, delamination or foreign odor.

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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. The oxygen scavenger shall be constructed of materials that are safe for direct food contact. The oxygen scavenger shall be in compliance with all applicable Food and Drug Administration (FDA) regulations.

## **D-2 LABELING**

A. Pouches. Each pouch shall be correctly and legibly labeled. Printing ink shall be permanent black ink or other dark contrasting color which is free of carcinogenic elements. The label shall contain the following information:

- (1) Name and flavor of product (letters not less than 1/8 inch high)
- (2) Ingredients
- (3) Date 1/
- (4) Net weight
- (5) Name and address of packer
- (6) "Nutrition Facts" label in accordance with the Nutrition Labeling and Education Act (NLEA) and all applicable FDA regulations

1/ Each pouch shall have the date of pack noted by using either a four-digit code or five-digit code. When using the four-digit code, begin with the final digit of the current year followed by the three-digit Julian code. For example, 14 February 2050 would be coded as 0045. When using the five-digit code, begin with the decade digit of the current year followed by the three-digit Julian code. For example, 14 February 2050 would be coded as 50045. The Julian code shall represent the day the product was packaged into the pouch.

## **D-3 PACKING**

A. Packing. Not more than 40 pounds of product shall be packed in a fiberboard shipping box constructed in accordance with style RSC-L of ASTM D5118/D5118M, Standard Practice for Fabrication of Fiberboard Shipping Boxes. The fiberboard shall conform to type CF, class D, variety SW, minimum burst grade 200 or ECT 32 of ASTM D4727/D4727M, Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes. Each box shall be closed in accordance with ASTM D1974/D1974M, Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes.

**D-5 MARKING**

A. Shipping containers. Shipping containers shall be marked in accordance with DLA Troop Support Form 3556, Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence.

**SECTION E INSPECTION AND ACCEPTANCE**

The following quality assurance criteria, utilizing ANSI/ASQ Z1.4, Sampling Procedures and Tables for Inspection by Attributes, are required. Unless otherwise specified, single sampling plans indicated in ANSI/ASQ Z1.4 will be utilized. 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 appearance, odor, flavor, and texture. Any failure to conform to the performance requirements or any appearance or palatability failure shall be cause for rejection of the lot.

(2) Periodic review evaluation. The approved first article or product demonstration model shall be used as the product standard for periodic review evaluations. All food components that are inspected by the USDA shall be subject to periodic review sampling and evaluation. The USDA shall select sample units during production of contracts and submit them to the following address for evaluation:

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COMBAT CAPABILITIES DEVELOPMENT COMMAND (DEVCOM) SOLDIER CENTER  
 FCDD-SCD-SCR  
 10 GENERAL GREENE AVENUE  
 NATICK, MA 01760-5000

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

(3) Conformance inspection. Conformance inspection shall include the examinations/tests and 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/ASQ Z1.4. 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		Product not a swirl roll or not flavor as specified. <u>3/</u>
102		Evidence of excessive baking (materially darkened or scorched).
103		Pouch does not contain one intact oxygen scavenger. <u>4/</u>
104		Tear or hole or open seal in oxygen scavenger.
	201	Finished product not intact or not round. <u>5/</u>

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- 202 Product not slightly dense or not with a uniform crumb structure.
- 203 Product shows evidence of excessive flour dusting.
- 204 Evidence of compression streaks. 6/

TABLE I. Product defects 1/ 2/ - Continued

<u>Category</u>		<u>Defect</u>
Major	Minor	
		<u>Appearance</u>
	205	Flavor 1 Italian style herb and cheese swirl roll exterior not a light to medium tan color or not a reddish-orange color near the swirl edges.
	206	Flavor 1 Italian style herb and cheese swirl roll interior crumb not an off-white to light tan color.
	207	Flavor 1 Italian style herb and cheese swirl roll not with flecks of herbs throughout.
		<u>Odor and flavor</u>
105		Flavor 1 packaged food does not have a moderate Italian seasoning or not a tomato or not a slight cheese odor or flavor.
106		Flavor 1 packaged food does not have a slight to moderate wheat flavor.
		<u>Texture</u>
	208	Flavor 1 Italian style herb and cheese swirl roll not tender or not slightly chewy or not slightly dense.
	209	Flavor 1 Italian style herb and cheese swirl roll is excessively dry or crumbly or excessively moist or gummy.
		<u>Dimensions</u>
	210	Swirl roll dimensions not as specified.
		<u>Net weight</u>



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211      Net weight of individual pouch less than 55 grams.

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1/ Presence of any foreign materials such as, but not limited to dirt, insect parts, hair, glass, wood, or metal, or any foreign odors or flavors such as, but not limited to burnt, scorched, rancid, sour, stale, musty or moldy 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/ The requirement for enriched flour shall be verified with the statement of ingredients on the label or verified by the producer's Certificate of Conformance (CoC). Any nonconforming result shall be cause for rejection of the lot.

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

5/ Not intact means a swirl roll that is broken into two or more pieces.

6/ When broken by hand.

**B. Methods of inspection**

(1) Shelf life. The contractor shall provide a Certificate of Conformance that the product has a 36 month 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 quality scale to be considered acceptable.

(2) Net weight. The net weight of the filled and sealed pouch shall be determined by weighing each sample unit on a suitable scale tared with a representative empty pouch and one oxygen scavenger. Results shall be reported to the nearest 1 gram.

(3) Analytical.

a. Calories. The calories shall be verified by the NLEA "Nutrition Facts" label. Product not conforming to the calorie content as specified in Section C of this document shall be cause for rejection of the lot.

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

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

Test results of pH value shall be reported to the nearest 0.1 value for pH . Government verification will be conducted through actual testing by a Government laboratory. Any result not conforming to the pH requirement Section C of this document shall be cause for rejection of the lot.

c. Water activity ( $a_w$ ) testing. Eight filled and sealed pouches shall be randomly selected from one production lot and individually tested for  $a_w$  in accordance with the latest edition of the Official Methods of Analysis (OMA) of AOAC International, method 978.18, using an electric hygrometer system self-temperature controlled (at 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. Each individual sample unit shall be homogenized prior to  $a_w$  analysis. Test results shall be reported to the nearest 0.01. Government verification will be conducted through actual testing by a Government laboratory. Any nonconforming  $a_w$  result shall be cause for rejection of the lot.

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

~~(4) Microbiological testing. The finished product shall be tested for microbiological activity. Five filled and sealed samples shall be randomly selected from one lot regardless of lot size. The pouched product shall be individually tested for microbiological levels in accordance with the Official Methods of Analysis (OMA) of AOAC International or the Food and Drug Administration (FDA) Bacteriological Analytical Manual (BAM). For aerobic plate count the results for each pouched product tested must comply as provided in C-2,J(1). For yeast and mold, results for each pouched product must comply as provided in C-2,J(2). For *Coliforms*, results for each pouch must comply as provided in C-2,J(3). Government verification will be conducted through actual testing by a Government laboratory. Any result not conforming to the requirements specified in Section C of this Performance based Contract Requirements document shall be cause for rejection of the lot.~~

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<u>Test</u>	<u>Method Number</u>
Aerobic plate count	966.23, 990.12, or BAM Ch. 3
Yeast and mold	997.02, 2014.05, or BAM Ch. 18
Total <i>Coliforms</i>	991.14 or BAM Ch. 4

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

A. Packaging.

(1) Pouch material certification. The pouch material shall be tested for these characteristics. A Certificate of Conformance (CoC) may be accepted as evidence that the characteristics conform to the specified requirements.

<u>Characteristic</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	ASTM D2103 <u>1/</u>
Aluminum foil thickness	D-1,A(1)a and D-1,A(2)a	ASTM B479 <u>2/</u>
Laminated material identification and construction	D-1,A(1)a and D-1,A(2)a	Laboratory evaluation
<u>Color of laminated material</u>	<u>D-1,A(1)a and D-1,A(2)a</u>	<u>SAE AMS-STD-595 <u>3/</u></u>

1/ Standard Specification for Polyethylene Film and Sheeting

2/ Standard Specification for Annealed Aluminum and Aluminum-Alloy Foil for Flexible Barrier, Food Contact, and Other Applications

3/ Colors Used in Government Procurement

(2) Unfilled preformed pouch certification. A CoC 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,B(1)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

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sample unit shall be one pouch. The inspection level shall be I and the 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 or 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 or incorrect or illegible.
	202	Tear nick or notch or serrations missing or does not facilitate opening.
	203	Seal width less than 1/8 inch but greater than or equal to 1/16 inch. <u>2/</u>
	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:

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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 ( $\pm 1/16$  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 - 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).

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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.

**B. Methods of inspection.**

(1) 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 F88/F88M, Standard Test Method for Seal Strength of Flexible Barrier Materials. The lot size shall be expressed in pouches. The sample unit shall be one unfilled pouch. 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 classified as a major defect and 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 F88/F88M. The lot size shall be expressed in pouches. The sample unit shall be one pouch. 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 the 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

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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 classified as a major defect and 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 lot size shall be expressed in pouches. The sample unit shall be one pouch. 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 end of the pouch and the distance between restraining plates shall be 1/2 inch. 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 rate of 1-2 pounds 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 classified as a major defect and shall be cause for rejection of the lot.

C. Packing.

(1) Shipping container and marking examination. The filled and sealed shipping containers shall be examined for the defects listed in table III. 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 missing or incorrect or illegible.
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**

Unless otherwise specified, the applicable version of these documents is that which is active on the date of the solicitation or contract.

DLA Troop Support Form

Form 3556                      Marking Instructions for Boxes, Sacks, and Unit Loads of  
Perishable and Semiperishable Subsistence

GOVERNMENTAL PUBLICATION

FOOD AND DRUG              Bacteriological Analytical Manual (BAM)  
ADMINISTRATION            [www.fda.gov/food/laboratory-methods-food/bacteriological-analytical-manual-bam](http://www.fda.gov/food/laboratory-methods-food/bacteriological-analytical-manual-bam)

NON-GOVERNMENTAL STANDARDS

AMERICAN SOCIETY FOR QUALITY (ASQ) [www.asq.org](http://www.asq.org)

ANSI/ASQ Z1.4              Sampling Procedures and Tables for Inspection by Attributes

AOAC INTERNATIONAL [www.aoac.org](http://www.aoac.org)

Official Methods of Analysis (OMA) of AOAC International

ASTM INTERNATIONAL [www.astm.org](http://www.astm.org)

B479                              Standard Specification for Annealed Aluminum and  
Aluminum-Alloy Foil for Flexible Barrier, Food Contact,  
and Other Applications

D1238                              Standard Test Method for Melt Flow Rates of  
Thermoplastics by Extrusion Plastometer

D1505                              Standard Test Method for Density of Plastics by the  
Density-Gradient Technique



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D1974/D1974M	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
D2103	Standard Specification for Polyethylene Film and Sheeting
D4727/D4727M	Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes
D5118/D5118M	Standard Practice for Fabrication of Fiberboard Shipping Boxes
F88/F88M	Standard Test Method for Seal Strength of Flexible Barrier Materials

SAE INTERNATIONAL [www.sae.org](http://www.sae.org)

SAE AMS-STD-595 Colors Used in Government Procurement