

**PACKAGING REQUIREMENTS AND QUALITY ASSURANCE PROVISIONS FOR
MIL-DTL-32141, SANDWICH, SHELF STABLE, FOR OPERATIONAL RATIONS**

SECTION D

D-1 PACKAGING

A. Packaging. One sandwich and one packet of an FDA approved oxygen scavenger shall be packed in a preformed or form-fill-seal barrier pouch as described below. The temperature of the sandwich at the time of pouch filling shall be not less than 80°F nor greater than 135°F.

(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. The 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, 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 in width and 6-3/4 inches in length. The pouch shall be made by heat sealing three edges with 3/8 inch (\pm 1/8 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-5,A(5)a. Alternatively, the 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-5,A(5)c. A tear notch shall be made in one or both side seals to facilitate opening. An 1/8 inch wide lip may be incorporated at the open end of the pouch to facilitate opening and filling.

c. Pouch filling and sealing. One baked sandwich and one packet of oxygen scavenger (see D-1,B(3)) shall be placed into the pouch in a manner so as to avoid

contamination of the closure seal area. The filled pouch shall be closed with a continuous heat seal not less than 1/4 inch wide. If thermal impulse or combination (heated curved bar with thermal impulse) sealing is used, any seal width from 1/8 to 7/16 inch will be acceptable. 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-5,A(5)b.

(2) Horizontal form-fill-seal pouches.

a. Pouch material. The 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 1238-01e1, Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer and a density range of 0.918 to 0.922 G/CC in accordance with ASTM D 1505-98e1, Standard Test Method for Density of Plastics by the 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 from the same 3-ply laminate as specified for the tray-shaped body or tray-shaped cover, except that the aluminum foil thickness may be 0.00035 inch. 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. The color requirements of the exterior of the pouch shall be as specified in D-1, B(1)a.

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 baked sandwich and one oxygen scavenger (see D-1,B(3)) 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 be free of entrapped matter (sandwich crumbs, moisture, etc.) that reduces the effective closure seal to less than 1/16 inch wide. 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 (see E-5,A(5)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-5,A(5)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. The sealed pouch shall not show any evidence of material degradation, aluminum stress cracking, delamination or foreign odor when heat sealed into pouches. 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. The information shall be located on the body of the pouch not closer than 1/16 inch to any seal. If a non-contact type printer is used, the information may be located anywhere on the pouch (in one complete print) except the closure seal area. The label shall contain the following information:

(1) Product name (letters not less than 1/8 inch high).

For Type I Sandwich
**SANDWICH, SHELF STABLE
NACHO FLAVORED BEEF**

or

For Type II Sandwich
**SANDWICH, SHELF STABLE
PEPPERONI**

or

For Type III Sandwich
**SANDWICH, SHELF STABLE
HONEY BARBECUED CHICKEN**

or

For Type IV Sandwich
**SANDWICH, SHELF STABLE
HONEY BARBECUED BEEF**

(2) Ingredients.

(3) Date. 1/

(4) Net weight.

(5) Contactor's name and address.

(6) Official establishment number (for example, EST-38)

(7) "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, 5 April 2004 would be coded as 4096. The Julian day code shall represent the day the product was packaged into the pouch.

D-3 PACKING

Packing shall be level B or C, as specified.

A. Level B. Forty-eight (48) pouches of sandwiches, preserved as specified in D-1, 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/D5118M-95 (2001), Standard Practice for Fabrication of Fiberboard Shipping Boxes. Each container shall be securely closed in accordance with ASTM D 1974-98, Standard Practice for Methods of Closing,

Sealing, and Reinforcing Fiberboard Boxes. The top and bottom of the box shall be fitted with pads, constructed of grade V3c fiberboard in accordance with ASTM D4727/ D4727M-98, Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes. The inside of the box shall be 16-11/16 inches in length, 10-1/4 inches in width and 9-7/8 inches in depth. Each shipping container shall be securely closed and sealed in accordance with ASTM D1974-98.

B. Level C. Forty-eight pouches of sandwiches, preserved as specified in D-1, shall be packed in a snug fitting fiberboard shipping container conforming to style RSC-L, type CF, grade 200, class domestic of ASTM D5118/D5118M-95(2001). Each shipping container shall be closed in accordance with ASTM D1974-98.

D-4 UNITIZATION

A. Unit loads. Thirty-six (36) shipping containers shall be palletized into unit loads in accordance with DSCP Form 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items.

D-5 MARKING

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

SECTION E INSPECTION AND ACCEPTANCE

E-5 PACKAGING AND PACKING MATERIALS

The following quality assurance criteria, utilizing ANSI/ASQC Z1.4-1993, Sampling Procedures and Tables for Inspection by Attributes, are required. Unless otherwise specified, Single Sampling Plans indicated in ANSI/ASQC Z1.4-1993 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.

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.

A. Packaging.

(1) Pouch material certification. A certificate of compliance may be accepted as evidence that the characteristics listed below conform to the specified requirements.

<u>Material requirement</u>	<u>Requirement paragraph</u>	<u>Test procedures</u>
Thickness of films	D-1,B(1)a and D-1,B(2)a	As specified in ASTM D D2103-97 <u>1/</u>
Aluminum foil thickness	D-1,B(1)a and D-1,B(2)a	As specified in ASTM B B479-00 <u>2/</u>
Laminated material identification and construction	D-1,B(1)a and D-1,B(2)a	Laboratory evaluation.
Color of laminated material	D-1,B(1)a	Visual evaluation by FED-STD-595 <u>3/</u>

1/ ASTM D D2103-97 Standard Specification for Polyethylene Film and Sheeting

2/ ASTM B 479-00 Standard Specification for Annealed Aluminum and Aluminum-Alloy Foil for Flexible Barrier, Food Contact, and Other Applications

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

(2) Unfilled preformed pouch certification. A certificate of compliance may be accepted as evidence that unfilled pouches conform to the requirements specified in D-1,B(1). When deemed necessary by the USDA, testing of the unfilled preformed pouches for seal strength shall be as specified in E-5,A(5)a.

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(3) In-process examination. In-process examination shall be performed to determine conformance to the pouch filling, pouch sealing, and packaging requirements. Any nonconformance revealed by actual examination or by review of records or of other valid documents shall be cause for rejection of the involved product.

(4) Filled and sealed pouch examination. The filled and sealed pouches shall be examined for the defects listed in table I. The lot size shall be expressed in pouches. The sample unit shall be one filled and sealed 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 I. Filled and sealed pouch defects ^{1/}

Category		Defect
<u>Major</u>	<u>Minor</u>	
101		Unclean pouch. <u>2/</u>
102		Tear, hole, or open seal.
103		Presence of delamination. <u>3/</u>
104		Seal width less than 1/16 inch. <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	Presence of delamination. <u>3/</u>
	202	Labeling missing, incorrect or illegible.
	203	Tear notch or serrations missing or does not facilitate opening.
	204	Seal width less than 1/8 inch, but greater than 1/16 inch.

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- 1/ Any evidence of insect or rodent infestation shall be cause for rejection of the lot.
- 2/ Outer packaging shall be free from foreign matter which is unwholesome, has the potential to cause pouch damage (for example, glass, metal fillings, etc.) or generally detracts from the clean appearance of the pouch. The following examples shall not be scored 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.

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 delamination 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 delamination area shall then be rapidly flexed 10 times by rotating both hands in alternating clockwise-counter clockwise 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 the 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 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 scored 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 delaminated 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 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 scored as a major defect.

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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/ 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.

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.

(5) 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 strength testing. The seals of the unfilled pouches shall be tested for seal strength in accordance with ASTM F88-00. 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 each seal shall be calculated by averaging the strengths of the three test specimens cut from that seal. Any test specimen failing to meet the individual test specimen seal strength requirement or any seal failing to meet the average seal strength requirement specified in D-1,B(1)b shall be classified as a major defect and shall be cause for rejection of the lot.

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b. Pouch closure seal testing. The closure seals of the pouches shall be tested in accordance with ASTM F88-00. 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 the closure seal shall be calculated by averaging the test results of the three test specimens cut from that seal. The lot size shall be expressed in pouches. The sample unit shall be one filled and sealed pouch. The sample size shall be the number of pouches indicated by inspection level S-1. Any individual test specimen or average closure seal strength failing to meet the requirements of D-1,B(1)c or D-1,B(2)b 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 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 I, footnote 4/) shall be classified as a major defect 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 II 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 II. 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. <u>1/</u>
	201	Contents more or less than specified.

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.

C. Unitization.

(1) Unit load examination. The unit load shall be examined in accordance with the requirements of DSCP Form 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items. Any nonconformance shall be classified as a major defect.

SECTION J REFERENCE DOCUMENTS

DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP) FORMS

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

DSCP Form 3507 Loads, Unit: Preparation of Semiperishable Subsistence Items

FEDERAL

FED-STD-595 - Colors Used in Government Procurement

NON-GOVERNMENT STANDARDS

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

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

ASTM International

B479-00	Standard Specification for Annealed Aluminum and Aluminum-Alloy Foil for Flexible Barrier, Food Contact, and Other Applications
D1238-01e1	Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
D1505-98e1	Standard Test Method for Density of Plastics by the Density-Gradient Technique
D1974-98	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
D2103-97	Standard Specification for Polyethylene Film and Sheeting
D4727/D4727M-98	Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes
D5118/D5118M-95 (2001)	Standard Practice for Fabrication of Fiberboard Shipping Boxes
F88-00	Standard Test Method for Seal Strength of Flexible Barrier Materials