

## **SECTION C**

This document covers thermostabilized sweet potato casserole packaged in a polymeric tray for use by the Department of Defense as a component of operational rations.

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

**PCR-S-022, SWEET POTATO CASSEROLE, PACKAGED IN A POLYMERIC TRAY, SHELF STABLE**

### **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 non comparable to the Product Standard, the contractor shall arrange for a new or alternate FA or PDM approval. In any event, all product produced must meet all requirements of this document including Product Standard comparability.

B. Commercial sterility. The packaged food shall be processed until commercially sterile.

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

D. Appearance.

(1) General. The finished product (sweet potato casserole) shall be cooked sweet potato dices and coconut shreds in a thick, sweet potato sauce. The finished product shall be free from foreign materials. The sweet potatoes shall be derived from the grade standards for U.S. Grade A or U.S. Fancy sweet potatoes of the United States Standards for Grades of Frozen Sweet Potatoes.

(2) Sweet potatoes. The cooked sweet potatoes shall be dices typically produced by a 1/2 by 3/4 by 1 inch dicer setting. The cooked sweet potatoes shall be an orange color.

(3) Coconut. The coconut shall be shredded and shall have an off white to tan color.

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(4) Sauce. The sweet potato sauce shall be smooth and thick with coconut shreds. The sauce shall be an orange to brown color.

E. Odor and flavor. The packaged food shall have an odor and flavor of cooked sweet potatoes. The packaged food may have the odor and flavor of brown sugar, coconut, and cinnamon. The packaged food shall be free from foreign odors and flavors.

F. Texture.

(1) Sweet potatoes. The sweet potatoes shall be soft, starchy and not pasty.

(2) Coconut. The coconut shreds shall be slightly tender.

(3) Sauce. The sweet potato sauce shall be smooth and moderately thick with coconut shreds.

G. Net weight. The average net weight shall be not less than 94 ounces (2665 grams). The net weight of an individual polymeric tray shall be not less than 92 ounces (2608 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) Fat content. The fat content shall be not greater than 4.0 percent.

(2) Salt content. The salt content shall be not greater than 1.0 percent.

(3) Moisture content. The moisture content shall not be less than 65.0 percent and not greater than 80.0 percent.

**C-3 MISCELLANEOUS INFORMATION**

THE FOLLOWING INGREDIENTS ARE FOR INFORMATION ONLY. THIS IS NOT A MANDATORY REQUIREMENT.

A. Ingredients. Water, sweet potatoes, sweet potato puree, sugar, brown sugar (sugar, cane syrups), nonfat dry milk, shredded coconut (coconut, sugar, water, propylene glycol [sustains freshness], salt, sodium metabisulfite [preserves whiteness]), modified food starch, butter (sweet cream, natural flavoring), salt, imitation vanilla flavor (water, propylene glycol,

caramel color, and artificial flavor), guar gum, xanthan gum, cinnamon, sodium metabisulfite (preservative), nutmeg.

## **SECTION D**

### **D-1 PACKAGING**

A. Preservation. Product shall be filled into polymeric trays and the trays with protective sleeves shall conform to the requirements of section 3 of MIL-PRF-32004, Packaging of Food in Polymeric Trays. Verification testing and inspection of trays, lids and sleeves shall be in accordance with Section 4 of MIL-PRF-32004 and the Quality Assurance Provisions of Section E of this Performance-based Contract Requirements document.

B. Polymeric tray closure. The filled, sealed, and processed tray shall be securely closed.

### **D-2 LABELING**

A. Polymeric tray body. The polymeric tray body shall be clearly printed or stamped, in a manner that does not damage the tray, with permanent ink of any contrasting color, which is free of carcinogenic elements. One end of the polymeric tray (see figure 1 of MIL-PRF-32004) shall be marked with the product name and number of portions. If the tray body end markings are not readily legible in low light conditions, a small, easily legible label shall be applied, but not over any existing tray markings. All other markings may be applied along the tray body side. To avoid erroneous marking of trays, the product name, lot number and filling equipment number shall be applied prior to processing. Additional tray marking may be applied before or after processing. 1/

Tray body markings shall include:

- (1) Product name. Commonly used abbreviations may be used.
- (2) Tray code includes: 2/
  - Lot Number
  - Filling equipment identification number
  - Retort identification number
  - Retort cook number

1/ As an alternate method, tray body markings may be clearly printed or stamped onto the polymeric tray lid prior to processing, in a manner that does not damage the lid, with permanent ink of any contrasting color, which is free of carcinogenic elements, provided that the required markings are applied onto the tray body after processing.

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2/ The lot number shall be expressed as a four digit Julian code. The first digit shall indicate the year of production and the next three digits shall indicate the day of the year (Example, 14 February 2010 would be coded as 0045). The Julian code shall represent the day the product was packaged into the tray and processed. Sublotting (when used) shall be represented by an alpha character immediately following the four digit Julian code. Following the four digit Julian code and the alpha character (when used), the other required code information shall be printed in the sequence as listed above.

B. Polymeric tray lid. The lid shall be clearly printed or stamped, in a manner that does not cause damage. Permanent ink of any contrasting color, which is free of carcinogenic elements, shall be used. As an alternate labeling method, a pre-printed self-adhering 0.002 inch thick clear polyester label printed with indelible contrasting color ink may be used.

Note: The font tested by Natick was Microsoft Helvetica. The font used shall be similarly clear/easy to read as Helvetica. The recommended font sizes are as follows: 22 for the product name, 14 for “yield” and “to heat in water.” If an additional note is required on the label, such as “fluff before serving,” it should also be in font size 14. All other information should be in font size 9.

(1) Lid labeling shall include:

- Product name
- Ingredients
- Net weight
- Name and address of packer
- Company Code
- “Nutrition Facts” label in accordance with the Nutrition Labeling and Education Act (NLEA) and all applicable USDA regulations

(2) Lid labeling shall also show the following statements:

**YIELD:** Serves 18 portions of approximately 2/3 cup each of Sweet Potato Casserole.

**TO HEAT IN WATER:** Submerge unopened tray in water. Bring water to a boil. Simmer gently 35 - 40 minutes. Avoid overheating (tray shows evidence of bulging).

**WARNING:** Do not heat tray in oven.

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**TO TRANSPORT AFTER HEATING:** Insert tray back into protective sleeve to protect during transport. If sleeve is unavailable, stack trays lid-to-lid with fiberboard pads in between.

**CAUTION:** Use care when opening as pressure may have been generated within the tray.

**TO OPEN:** Using a clean knife, cut the lidding around the inside perimeter of the tray seals.

**SUGGESTION:** Cut lid along 3 sides and fold over uncut portion. Fold back to keep unused portions protected.

(3) The product shall be formulated and labeled in accordance with all FDA labeling regulations and policies. The lid shall be labeled with the following product name.

SWEET POTATO CASSEROLE

**D-3 PACKING**

A. Packing. Four filled, sealed, processed and sleeved polymeric trays shall be packed in a fiberboard box conforming to style RSC-L of ASTM D 5118/D 5118M, Standard Practice for Fabrication of Fiberboard Shipping Boxes. The fiberboard shall conform to type CF, class D, variety SW, grade 275 of ASTM D 4727/D 4727M, Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes. The sleeved trays shall be placed flat with the first two trays placed with the lids together and the next two trays with the lids together. The box shall be closed in accordance with ASTM D 1974, Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes.

**D-4 UNITIZATION**

A. Unit loads. Unit loads shall be as specified in DSCP FORM 3507, Loads, Unit: Preparation of Semiperishable Subsistence Items.

**D-5 MARKING**

A. Shipping containers and unit loads. Marking of shipping containers and unit loads shall be as specified in DSCP 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.

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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 Research, Development, and Engineering Command  
Natick Soldier Research, Development, and Engineering Center  
RDNS-CFF  
15 Kansas Street  
Natick, MA 01760-5056

One lot shall be randomly selected during each calendar month of production. Two (2) sample units of each item produced shall be randomly selected from that one production lot. The two (2) 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 examinations 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/ASQ Z1.4. The lot size shall be expressed in trays. The sample unit shall be the contents of one tray. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 6.5 for minor defects. Defects and defect classifications are listed in table I below. The trays shall be heated in accordance with the heating instructions from the tray label prior to conducting any portion of the product examination.

TABLE I. Product defects 1/ 2/ 3/

Category		Defect
<u>Major</u>	<u>Minor</u>	
		<u>General</u>
101		Product not (sweet potato casserole) sweet potatoes dices and coconut shreds in a thick, sweet potato sauce.
		<u>Appearance</u>
	201	Cooked sweet potatoes not an orange color.
	202	Coconut not shredded or not an off white to tan color.
	203	Sweet potato sauce not smooth or not thick or not an orange to brown color or not with coconut shreds.
		<u>Odor and flavor</u>
102		Product not odor or flavor of cooked sweet potatoes.
		<u>Texture</u>
	204	Sweet potatoes not soft or not starchy or are pasty.
	205	Coconut shreds not slightly tender.

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206      Sauce not smooth or not moderately thick or not with coconut shreds.

Net weight

207      Net weight of an individual polymeric tray less than 92 ounces  
(2608 grams). 4/

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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/ Grade and size requirements for sweet potato dices shall be verified by Certificate of Conformance (CoC).

4/ Sample average net weight less than 94 ounces (2665 grams) shall be cause for rejection of the lot.

**B. Methods of inspection.**

(1) Commercial sterility. Commercial sterility shall be verified in accordance with FDA regulations.

(2) 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 hedonic scale to be considered acceptable.

(3) Net weight. The net weight of the filled and sealed polymeric tray shall be determined by weighing each sample unit on a suitable scale tared with a representative empty tray and lid. Results shall be reported to the nearest 1 ounce or the nearest 1 gram.

(4) Analytical. The sample to be analyzed shall be a one-pound composite of three filled and sealed polymeric trays which have been selected at random from one production lot. The composite sample shall be prepared and analyzed in accordance with the following methods of the Official Methods of Analysis (OMA) of AOAC International.



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<u>Test</u>	<u>Method Number</u>
Fat	985.15 or 2008.06
Salt	935.47 or 971.27
Moisture	925.45D

Test results shall be reported to the nearest 0.1 percent. Government verification will be conducted through actual testing by a Government laboratory. Any results not conforming to the analytical requirements shall be cause for rejection of the lot.

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

A. Packaging and labeling.

(1) Polymeric tray testing. For purposes of clarification, the polymeric tray without the lid will be referred to as the “tray” and the polymeric tray with the lid shall be referred to as the “container”. The polymeric tray with protective sleeve and polymeric tray material shall be examined for the characteristics listed in table I of MIL-PRF-32004, Packaging of Food in Polymeric Trays. The lot size, sample unit, and inspection level criteria are provided in table II below for each of the test characteristics. Any test failure shall be classified as a major defect and shall be cause for rejection of the lot. For rough handling survivability at frozen temperature, polymeric tray survival rate shall be at least 85 percent.

TABLE II. Polymeric tray quality assurance criteria  
Prior to processing

Characteristic	Lot size expressed in	Sample unit	Inspection level
Tray configurations and dimensions	Trays	1 tray	S-1
Oxygen gas transmission rate of tray	Trays	1 tray	S-1
Oxygen gas transmission rate of lid	Yards	1/2 yard	S-1
Water vapor transmission rate of tray	Trays	1 tray	S-1
Water vapor transmission rate of lid	Yards	1/2 yard	S-1
Camouflage	Containers	1 container	S-1

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Characteristic	<u>After processing</u>		
	Lot size expressed in	Sample unit	Inspection level
Processing	Trays	1 tray	S-2
Rough handling survivability	Test containers	1 container	S-2
Protective sleeve	Containers	1 container	S-1
Residual gas	Containers	1 container	S-1
Closure seal	Containers	1 container	S-1
Internal pressure	Containers	1 container	S-1
Lid opening	Containers	1 container	S-1

(2) Examination of container. The container with protective sleeve removed shall be examined for the defects listed in table II of MIL-PRF-32004 and the labeling defects listed in table III below. The lot size shall be expressed in containers. The sample unit shall be one processed and labeled container. The inspection level shall be I and the AQL, expressed in terms of defects per hundred units, shall be 0.65 for major A defects, 2.5 for major B defects and 4.0 for minor defects. Two hundred sample units shall be examined for critical defects. The finding of any critical defect shall be cause for rejection of the lot.

TABLE III. Container labeling defects

Category	Defect
<u>Major A</u>	<u>Minor</u>
101	Polymeric tray lid or body labeling or missing or incorrect or illegible.
201	When a pre-printed self adhering label is used, the label not adhering to tray lid (for example, label raised or peeled back from edge to corner) or presence of any areas of gaps along the perimeter of the label where the label is not properly adhered.

(3) Label adhesive examination. When self-adhering labels are used, the adhesive shall be tested in accordance with ASTM D 3330/D 3330M, Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape. In lieu of testing, a CoC shall be provided.

**B. Packing.**

(1) Shipping container and marking examination. The filled and sealed shipping containers shall be examined for the defects listed in table IV 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 IV. Shipping container and marking defects

Category		Defect
<u>Major</u>	<u>Minor</u>	
101		Marking missing or incorrect or illegible.
102		Inadequate workmanship. <u>1/</u>
	201	Arrangement or number of polymeric trays not as 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**

Unless otherwise specified, the issues of these documents are those active on the date of the solicitation or contract.

**DSCP FORMS**

DSCP FORM 3507	Loads, Unit: Preparation of Semiperishable Subsistence Items
DSCP FORM 3556	Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence

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MILITARY SPECIFICATIONS

MIL-PRF-32004F      Packaging of Food in Polymeric Trays

GOVERNMENT PUBLICATIONS

Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder  
(21 CFR Parts 1-199) and (9 CFR Parts 1-391)

U.S. STANDARDS FOR GRADES

U.S. Standards for Grades of Frozen Sweet Potatoes

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

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

D 1974      Standard Practice for Methods of Closing, Sealing, and  
Reinforcing Fiberboard Boxes

D 3330/D 3330M      Standard Test Method for Peel Adhesion of Pressure-  
Sensitive Tape

D 4727/D 4727M      Standard Specification for Corrugated and Solid  
Fiberboard Sheet Stock (Container Grade) and Cut  
Shapes

D 5118/D 5118M      Standard Practice for Fabrication of Fiberboard  
Shipping Boxes

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

Official Methods of Analysis (OMA) of the AOAC International