

SECTION C

This document covers thermostabilized Mexican-style macaroni and cheese packaged in a flexible pouch for use by the Department of Defense as a component of operational rations.

C-1 ITEM DESCRIPTION

PCR-M-009, MACARONI AND CHEESE, MEXICAN-STYLE, PACKAGED IN A FLEXIBLE POUCH, 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 food shall meet the minimum shelf life requirement of 36 months at 80°F.

D. Appearance.

(1) General. The finished product shall be uniform mixture of intact elbow macaroni in a spicy Mexican-style cheese sauce. The packaged food shall be free from foreign materials.

(2) Elbow macaroni. The elbow macaroni shall be an enriched macaroni product. The cooked macaroni shall be intact and typical of that made from heavy elbow macaroni with measurements of not less than 3/4 inches or greater than 1 1/2 inches in length.

(3) Cheese sauce. The cheese sauce shall be a glossy pale yellow to pale orange-yellow color with visible pieces of green and red bell peppers.

E. Odor and flavor. The packaged food shall have an odor and flavor of cooked macaroni in a spicy cheese sauce. The packaged food shall be free from foreign odors and flavors.

F. Texture.

(1) Elbow macaroni. The cooked macaroni shall be slightly soft to slightly firm. The cooked macaroni shall not be pasty.

(2) Cheese sauce. The cheese sauce shall be smooth, and shall not be excessively thick or thin.

G. Weight.

(1) Net weight. The average net weight shall be not less than 5.0 ounces. No individual pouch shall have a net weight of less than 4.5 ounces.

(2) Drained weight. The drained weight of the macaroni in an individual pouch shall be not less than 2.9 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 shall be not greater than 4.2 percent.

(2) Salt content. The salt content shall be not less than 0.5 percent and not greater than 1.5 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. Ingredients/formulation. Ingredients and formulation percentages for the cheese sauce may be as follows:

<u>Ingredients</u>	<u>Percent by weight</u>
Water	76.66
Mexican cheese powder <u>1/</u>	7.50
Process American cheese	6.37
Modified food starch <u>2/</u>	3.00
Margarine	2.94
Salt <u>3/</u>	0.93
Granulated white sugar	0.50
Dehydrated green peppers	0.50
Dehydrated red peppers	0.50
Ground white pepper	0.10
Filling aid starch <u>2/</u>	1.00

1/ Mexican cheese and spice blend product number 210006942800 manufactured by Kraft Food Ingredients, Memphis, TN was used in the development and testing of this product.

2/ The modified starch and filling aid starch may be adjusted as necessary to achieve uniform distribution for filling and to achieve the desired finished product appearance and consistency.

3/ The total amount of salt in the sauce formula may be adjusted as necessary to produce a product that complies with the finished product salt requirements.

B. Product preparation. Percentages for product preparation may be as follows:

<u>Ingredients</u>	<u>Percent by weight</u>
Cheese sauce	76.00
Macaroni, blanched <u>1/</u>	24.00

1/ The percent by weight of the blanched macaroni was based on the weight of the noodles after blanching to two times the dry weight, rinsing and cooling. Heavy wall elbow macaroni with 2 percent egg albumin and 1.5 percent glycerol mono stearate manufactured by A. Zerega's Sons, Inc., Fair Lawn, NJ was used in the development and testing of this product.

SECTION D

D-1 PACKAGING

Product shall be filled into pouches and each pouch shall be packed in a carton in accordance with MIL-PRF-44073, Packaging of Food in Flexible Pouches.

D-2 LABELING

A. Pouches. Each pouch shall be clearly printed or stamped, in a manner that does not damage the pouch, with permanent black ink or any other contrasting color, which is free of carcinogenic elements. Prior to thermal processing of the pouches, the product name, lot number and filling equipment number shall be applied. All other marking may be applied before or after thermal processing.

(1) Product name (not less than 1/8 inch high). Commonly used abbreviations may be used when authorized by the inspection agency.

(2) Pouch code includes: 1/

Lot Number
Filling equipment identification number
Official establishment number (for example, EST-38)
Retort identification number
Retort cook number

1/ 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, 6 August 2002 would be coded as 2218). The Julian code shall represent the day the product was packaged into the pouch and processed. Sub-lotting (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. Cartons.

(1) The cartons shall be clearly printed on one of the largest panels with permanent black ink as follows:

Product name (7/32 to 9/32 inch block letters)
Ingredients
Net weight
Name and address of packer
Code (same as pouch code, see pouches) 1/ 2/
USDA official inspection legend for the packer's plant
"Nutrition Facts" label in accordance with the Nutrition Labeling and Education Act (NLEA) and all applicable FDA/USDA regulations

1/ Code may be ink printed on any outside carton panel. Code may be embossed on any outside carton panel except the largest panels of the carton.

2/ Official establishment number not required in carton code.

(2) Military nutrition information entitled “Nutrition: A Force Multiplier” shall be printed on the product cartons large panel opposite to the panel printed with the data in D-2, B,(1) above. The information, provided by the contracting officer, shall be clearly printed with permanent black ink in an area no smaller than 3-3/4 inches by 5-3/4 inches.

D-3 PACKING

A. Packing for shipment to ration assembler. Seventy-two pouches (of the same product) in cartons shall be packed flat or on edge in a snug-fitting fiberboard shipping container conforming to style RSC, type CF, class domestic, grade 200 of ASTM D5118/D 5118M-95 (2001), Standard Practice for Fabrication of Fiberboard Shipping Boxes. Each container shall be securely closed in accordance with ASTM D1974-98, Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes.

D-4 MARKING

A. Shipping containers. Shipping containers shall be marked in accordance with DSCP FORM 3556, Marking Instructions for  es, Sacks and Unit 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. 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.

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:

 Army Research, Development and Engineering Command
Natick Soldier Center
AMSRD-NSC-CF-F
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 examinations/tests and methods of inspection cited in this section and in Section 4 of MIL-PRF-44073.

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. For drained weight inspection, a separate set of pouches shall be selected from the lot using the same sampling criteria as above. pouches shall be immersed in not less than 140°F water for 10 minutes prior to conducting the product examination.

TABLE I. Product defects 1/ 2/ 3/ 4/

<u>Category</u>		<u>Defect</u>
<u>Major</u>	<u>Minor</u>	
		<u>Appearance</u>
101		Product not a uniform mixture of intact elbow macaroni in a spicy Mexican-style cheese sauce.
	201	Cheese sauce not glossy pale yellow to pale orange-yellow color with visible pieces of green and red bell peppers.
		<u>Odor and flavor</u>
102		Odor or flavor not cooked macaroni in a spicy cheese sauce.
		<u>Texture</u>
	202	Cooked macaroni not slightly soft to slightly firm.
	203	Cooked macaroni is pasty.
	204	Cheese sauce not smooth.
	205	Cheese sauce is excessively thick or thin.
		<u>Weight</u>
	206	Net weight of an individual pouch less than 4.5 ounces. <u>5/</u>
	207	Drained weight of macaroni in an individual pouch less than 2.9 ounces.

- 1/ Presence of any foreign material such as, but not limited to dirt, insect parts, hair, glass, wood, metal, or mold, or any foreign odors or flavors such as, but not limited to burnt, scorched, rancid, sour, or stale 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/ Verification of the enriched macaroni product shall be with the statement of ingredients on the label.
- 4/ Size and type requirement for macaroni product shall be verified by certificate of conformance.
- 5/ Sample average net weight less than 5.0 ounces shall be cause for rejection of the lot.

B. Methods of inspection.

(1) Commercial sterility. Commercial sterility shall be verified in accordance with USDA/FSIS regulations.

(2) 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.

(3) Net weight. The net weight of the filled and sealed pouches shall be determined by weighing each sample on a suitable scale tared with a representative empty pouch. Results shall be reported to the nearest 0.1 ounce.

(4) Drained weight. The pouch contents shall be poured into a flat-bottom container. A minimum of three times the volume of the pouch of  less than 140°F water shall be added to the container so as to cover the contents. The  contents and water shall be gently agitated so as to liquefy rendered fat and to remove the sauce without breaking the macaroni. The contents shall then be poured into a U.S. Standard  7 sieve in a manner that will distribute the product over the sieve without breaking the macaroni. The sieve area shall be such that the distributed product does not completely cover all the openings of the sieve. The sieve shall be tilted at such an angle to assure complete drainage of liquid from the product. Drain product for two minutes before determining the drained weight by subtracting the sieve

tare weight from the gross weight. The drained weight shall be reported to the nearest 0.1 ounce.

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

<u>Test</u>	<u>Method Number</u>
Fat	985.15 or 925.12
Salt	935.47

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

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

A. Packaging and labeling.

(1) Pouch material testing. The pouch material shall be examined for the characteristics listed in table I of MIL-PRF-44073. The lot size, sample unit, and inspection level criteria for each of the test characteristics are listed below. Any test failure shall be classified as a major defect.

Characteristic	Lot size expressed in	Sample unit	Inspection level
Oxygen transmission rate	yards	1/2 yard	S-1
Water vapor transmission rate	yards	1/2 yard	S-1
Camouflage	yards	1/2 yard	S-1
Thermal processing	pouches	1 pouch	S-2
Environmental conditions	pouches	1 pouch	S-2

(2) Pouch examination. The pouches shall be examined for the defects listed in table II of MIL-PRF-44073. The lot size shall be expressed in pouches. The sample unit shall be one thermal processed pouch. 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.

(3) Examination of pouch and carton assembly. The completed pouch and carton assemblies shall be examined for the defects listed in table III of MIL-PRF-44073. The lot size shall be expressed in units of completed assemblies. The sample unit shall be one pouch and carton assembly. The inspection level shall be S-3 and the AQL, expressed in terms of defects per hundred units, shall be 0.65 for major defects and 2.5 for minor defects. Fifty sample pouch and carton assemblies shall be examined for critical defects. The finding of any critical defect 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.

SECTION J REFERENCE DOCUMENTS

DSCP FORMS

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

MILITARY SPECIFICATIONS

MIL-PRF-44073 Packaging of Food in Flexible Pouches



NON-GOVERNMENTAL STANDARDS

AMERICAN SOCIETY FOR QUALITY (ASQ)

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

ASTM INTERNATIONAL

D1974-98 Standard Practice for Methods of Closing, Sealing, and
Reinforcing Fiberboard Boxes

D5118/D5118M-95 Standard Practice for Fabrication of Fiberboard
(2001) Shipping Boxes

AOAC INTERNATIONAL

Official Methods of Analysis of the AOAC International (OMA)

AMSRD-NSC-CF-F (A. Richards/5037)

27 April 2004

TO: DSCP-HROS (D. Anthony/7160)

SUBJECT: ES04-058, (DSCP-SS-04-003743), Request for change, PCR-M-009, Macaroni and Cheese, Mexican-Style, MRE.

1. Date received: 20 April 2004

Date due: 26 April 2004

Date replied: 27 April 2004

2. The Natick Soldier Center (NSC) concurs with request to change the sieve size requirement for all current, pending and future procurements.

3. The following changes have been made to the subject (attached) PCR:

D-4, A, Shipping containers. Shipping containers shall be marked in accordance with DSCP FORM 3556, Marking Instructions for Boxes, Sacks and Unit Loads of Perishable and Semiperishable Subsistence.

E, B, (1) US Army Research, Development and Engineering Command
Natick Soldier Center
AMSRD-NSC-CF-F

E-5, A, last sentence, delete and substitute; The pouches shall be immersed in not less than 140°F water for 10 minutes prior to conducting the product examination.

E-5, B, (4), Second sentence, delete 180 to 190, insert not less than 140°F; fourth sentence, delete ¼ inch, insert No. 7.

J, DSCP FORM 3556, delete and substitute,

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

4. POC for this action is Judy Aylward, X4448 or Allen Richards, X5037.

PCR-M-009
6 August 2002
CHANGE 02; 27 April 2004

1 attachment

DONALD A. HAMLIN
Team Leader
DoD Food Engineering Services Team

(ARichards)

AMSRD-NSC-CF-F (A. Richards/5037)

27 April 2004

SUBJECT: ES04-058, (DSCP-SS-04-003743), Request for change, PCR-M-009, Macaroni and Cheese, Mexican-Style, MRE.

CF: NSC:

Aylward, J
Arcidiacono, C
Canniff, M
Friel, M
Hamlin, D
Hill, B
Richards, A
Sherman, P
Trottier, R
Valvano, R

CF: DSCP & SVCs:

Arthur, D
Tucker, S
Ervin, C
Gordon, T
Galligan, C
Haldeman, E
Kavanagh, D
Kasa, T
Lowry, A
Malason, M

Miller, G
Richardson, H
Salerno, L
Spencer, B