

MIL-S-43145E  
15 August 1985  
W/Change 02 12 Jun 09  
SUPERSEDING  
MIL-S-43145D  
30 June 1981

MILITARY SPECIFICATION  
SHRIMP, DEHYDRATED, COOKED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This document covers freeze-dehydrated cooked shrimp to be used by the Department of Defense as an item of general issue.

2. APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

SPECIFICATIONS  
FEDERAL

TT-C-495 - Coatings, Exterior, for Tinned Food Cans  
PPP-B-636 - Boxes, Shipping, Fiberboard  
PPP-C-96 - Cans, Metal, 28 Gage and Lighter

MILITARY

MIL-L-1497 - Labeling of Metal Cans for Subsistence Items  
MIL-L-35078 - Loads, Unit: Preparation of Non-Perishable Subsistence  
Items: General Specification for

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Soldier Systems Command, Natick Research, Development, and Engineering Center, ATTN: SSCNC-WRE, Natick, MA 01760-5018 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8905

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage

(Copies of documents required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

OTHER GOVERNMENT DOCUMENTS

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Federal Food, Drug, and Cosmetic Act and Regulations Promulgated Thereunder (21 CFR Parts 1-199)

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

U.S. DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration  
Regulations Governing Processed Fishery Products (50 CFR Part 260 and 265)

(Application for copies should be addressed to the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Page Building No. 2, Room 300, 300 Whitehaven Street, N.W., Washington, DC 20235.)

U.S. DEPARTMENT OF AGRICULTURE (USDA)

U.S. Standards for Condition of Food Containers

(Application for copies should be addressed to the Director, Market Research and Development Division, Agricultural Marketing Service, U.S. Department of Agriculture, Washington, DC 20250.)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

National Interim Primary Drinking Water Regulations

(Application for copies should be addressed to the Office of Drinking Water WH550, Environmental Protection Agency, Washington, DC 20460.)

2.2 Other publications. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS (AOAC)

Official Methods of Analysis of the Association of Official Analytical Chemists

(Application for copies should be addressed to the Association of Official Analytical Chemists, 1111 North 19th Street, Suite 210, Arlington, VA 22209.)

THE UNITED STATES PHARMACOPOEIAL CONVENTION (USP)

Pharmacopoeia of the United States

(Application for copies should be addressed to the United States Pharmacopoeial Convention, 12601 Twinbrook Parkway, Rockville, MD 20852.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, N.W., Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence.

3. REQUIREMENTS

3.1 First article. When specified, a sample shall be subjected to first article inspection (see 4.4, 6.1, and 6.3.)

3.2 Ingredients. All ingredients shall be clean, sound, wholesome, and free from foreign material, evidence of rodent or insect infestation, extraneous material, off-odors, off-flavors, and off-colors.

3.2.1 Shrimp.

3.2.1.1 Shrimp, raw, headless. Raw, headless shrimp shall comply with the requirements for Grade A shrimp of the United States General Standards for Grades of Shrimp (50, CFR, Chapter II, 265.101-106.) for flavor and odor, texture, dehydration, deterioration, and uniformity of size. The shrimp shall be of such size that after peeling and deveining there are 36 to 42 shrimp per pound.

3.2.1.2 Shrimp, headless, peeled, deveined, cooked, frozen. The headless, peeled, deveined, cooked and frozen shrimp shall meet the requirements for USDC Grade A for frozen, cooked shrimp. The shrimp shall be sized such that there are ~~36 to 42~~ 41 to 60 shrimp per pound.

**Comment [U1]:** Natick case ES09-126 (DSCP-SS-09-32361) Change 02, 12- Jun- 09. Follow up of changes Memo dated 01-JUN-09 sentence 2, delete "36 to 42"; insert: "41 to 60"

3.2.2 Nitrogen. Nitrogen shall be U.S. Pharmacopoeia grade and shall be water or liquid nitrogen pumped.

3.2.3 Water. Water used for formulation, washing, tempering and thawing shall conform to the National Interim Primary Drinking Water Regulations.

3.3 Processing.

3.3.1 Preparation, handling and processing. The shrimp, raw (fresh or frozen) or cooked, frozen shall be handled and process in accordance with good commercial practices used in the US fisheries industry.

3.3.1.1 Preparation of fresh/frozen raw headless shrimp. The raw shrimp shall be peeled, deveined and the last segment of each shrimp shall be slit or pierced. The raw shrimp shall be cooked in accordance with good commercial practices. The raw shrimp shall not be tempered or thawed more than once before freezing the cooked shrimp for placement in the dehydrator. Raw shrimp shall not be stored frozen more than 120 days.

3.3.1.2 Preparation of headless, peeled, deveined, cooked, frozen shrimp. Slitting or piercing the last segment of each shrimp shall be done before cooking and freezing. Cooked frozen shrimp shall not be thawed and refrozen before placement in the dehydrator. Cooked frozen shrimp shall not be held more than 30 days before the start of dehydration. The shrimp shall show no signs of freezer burn, desiccation, discoloration, deterioration caused by thawing and refreezing.

3.3.1.3 Dehydration. The product shall be freeze dehydrated at an absolute pressure not to exceed 1.5 mm of mercury except that momentary increases in pressure due to operational factors may be permitted provided that no thawing of the product or moisture drip on the product occurs. After dehydration is completed, the pressure shall be equalized to atmospheric level with nitrogen and product shall be packaged within 24 hours as specified in 5.1. Product may be held between dehydration and packaging provided that it is adequately protected from oxygen and moisture by either holding under a nitrogen atmosphere with a maximum of 2.0 percent oxygen, or under a vacuum of at least 27 inches of mercury for the entire period. If vacuum is used, it shall be broken with nitrogen.

3.4 Finished product.

3.4.1 Finished product requirements. The finished product shall comply with the following requirements.

Dehydrated product.

- a. There shall be no foreign material such as, but not limited to, dirt, glass, or paint.
- b. There shall be no color foreign to the product, such as, but not limited to black or purple.
- c. There shall be no evidence of incomplete dehydration such as damp or soggy areas.
- d. There shall be no glazed area larger than 1/4 inch in any dimension on more than two shrimp per container.
- e. There shall be no more than 0.75 ounces of fragments and broken or damaged shrimp per container.
- f. There shall be no more than 2.0 percent moisture in the product.
- g. There shall be no more than 2.0 percent oxygen in the headspace gas, within 24 hours after sealing.
- h. The aerobic plate count shall not exceed 75,000 per gram in four of five samples and 150,000 per gram in any sample.
- i. The E. coli count shall be less than 3 per gram (no positives in the standard 3 tube MPN technique) in four of five samples and not greater than 20 per gram in any sample.

Rehydrated product (when rehydrated in accordance with 4.5.4).

- a. There shall be no tough or dry areas measuring more than 1/4 inch in two dimensions perpendicular to each other.
- b. The texture, color, odor, and flavor shall be in the range considered normal for cooked shrimp.
- c. The product shall be free from excessive or strong iodoform-like flavor or odor.

3.4.2 Palatability. The finished product shall be equal to or better than the approved preproduction sample (see 6.1) in palatability and overall appearance.

3.5 Plant qualifications. The product shall be prepared, processed, handled and delivered under continuous inspection and under the sanitary conditions set forth in applicable paragraphs contained in Code of Federal Regulations, Title 50, Chapter II, Part 260 of the National Oceanic and Atmospheric Administration Regulations Governing Processed Fishery Products.

3.6 Federal Food, Drug, and Cosmetic Act. All deliveries shall conform in every respect to the provisions of the Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Contractor's responsibility. Inspection and acceptance by the USDC shall not relieve the contractor of obligation and responsibility to deliver a product complying with all requirements of this document. The contractor shall assure product compliance prior to submitting the product to the USDC for any inspection.

4.2 Inspection and certification. Product acceptability shall be determined by the USDC. The USDC will determine the degree of supervision necessary to assure compliance with the requirements of this document.

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

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.4 First article inspection. When a first article is required (see 6.1), it shall be inspected in accordance with the quality assurance provisions of this document and evaluated for overall appearance and palatability. Any failure to conform to the quality assurance provisions of this document or any appearance or palatability failure shall be cause for rejection of the first article.

4.5 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.5.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.5.1.1 Ingredient and component examination. Conformance of ingredients and components to identity, condition, and other requirements specified in 3.2 shall be certified by the ingredient supplier or ingredient manufacturer, or compliance be evident by examination of pertinent labels, markings, U.S. Grade certificates, certificates of analyses, or other such valid documents acceptable to the inspection agency. In addition, prior to use, each ingredient shall be examined organoleptically, as necessary, to determine conformance to the condition requirements. Any nonconformance to an identity, condition, or other requirement shall be cause

for rejection of the ingredient or component lot or of any involved product.

4.5.1.2 Unfilled can inspection. Conformance of unfilled cans to requirements specified in 5.1.1 shall be determined by examination of certificates of conformance or of other valid documents. Any nonconformance shall be cause for rejection of the can lot or of any involved product.

4.5.2 In-process examination. In-process examination shall be performed to determine conformance with the requirements for size, preparation, slitting or piercing of last segment, cooking, freeze dehydration, time and temperature limitations, pressures, use of nitrogen and packaging requirements. Records shall be maintained of specified time cycles, temperatures and pressures for each lot. Any nonconformance revealed by actual examination or by review of records of time, temperature and formulation or of other valid documents shall be cause for rejection of the involved product.

4.5.3 Net weight inspection. The packaged product shall be inspected for net weight as follows. Randomly select 30 filled and sealed cans from the inspection lot and weigh separately. Subtract the average tare weight (determined by randomly selecting and weighing 30 empty cans and lids used in preparing the product and dividing the total weight by 30) from the weight of each filled can in the sample. The results shall be reported to the nearest 0.1 ounce. If the average net weight is less than 13.0 ounces or if the net weight of any individual can is less than 12.75 ounces, the lot shall be rejected.

4.5.4 Product examination. The finished product shall be examined for the defects listed in table I. The lot size shall be expressed in units of cans. The sample unit shall be the contents of one filled and sealed can. 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.

TABLE I. Product defects. 1/ 2/

| Category     | Defect   |
|--------------|--|
| <u>Major</u> | Applicable to dehydrated product:  |
| 101          | Evidence of incomplete dehydration such as damp or soggy areas.  |
| 102          | More than two shrimp containing a glazed area larger than 0.25 inch in any dimension.  |
| 103          | More than 0.75 ounce of broken or damaged shrimp or shrimp fragments.  |
|              | <u>Applicable to rehydrated product</u> 3/ 4/  |
| 106          | Texture not in range considered normal for cooked shrimp.  |
| 107          | Tough or dry area or areas measuring more than 0.25 inch in one dimension and 0.25 inch or more in a second perpendicular dimension. |

Presence of excessive or strong iodoform flavor or odor (do not tally as defect 106). 5/

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1/ The presence of foreign material (for example, glass, dirt, insect parts, hair, wood, metal), foreign odor or flavor (for example, moldy, rancid, sour, stale,) or foreign color shall be cause for rejection of the lot.

2/ Product not equal to or better than the approved preproduction sample in palatability and overall appearance shall be cause for rejection of the lot (This comparison shall be performed when deemed necessary to the USDC inspector).

3/ Ten (10) shrimp shall be examined from each sample can. Unrehydrated shrimp may be recanned provided that recanning is done within 2 hours of opening the can.

4/ The dehydrated shrimp shall be rehydrated in an excess of 90<sup>0</sup>F to 100<sup>0</sup>F water for 20 minutes, drained, and held in a covered container at 40<sup>0</sup>F for 4 to 8 hours.

5/ Iodoform odors and flavors in shrimp are caused by what the shrimp were feeding on before harvesting. Iodoform can be an unpleasant sharp odor. Freeze dehydrated shrimp is a process intensive product that requires careful handling and can be prone to off odor development if improperly handled or exposed to too much oxygen. If the inspector is uncertain if the product can be classified 'excessive or strong' then the product can be sent to Natick for sensory test that will evaluate the intensity of the odor and flavor iodoform attribute and determine acceptability.(Codex Committee on Fish and Fishery Products, 1968)

4.5.5 Can leakage testing. The filled and sealed cans shall be tested for leakage by submerging in water contained in a vacuum desiccator or equivalent device, drawing a vacuum of 10 inches of mercury, holding for 30 seconds, and observing for leakage. Leakage is indicated by a steady progression of hubbles. Isolated or static bubbles caused by entrapped air in seams or on surfaces are not considered leakage. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-2. Any sign of leakage shall be counted as a major defect and shall be cause for rejection of the lot.

4.5.6 Oxygen in headspace testing. The determination of the oxygen content in the headspace gas shall be by using an electronic oxygen analyzer which operates on the principle of the difference in partial pressure of oxygen between the oxygen reference and the oxygen content of the sample as detected by a porous ceramic Zirconia sensor, such as the Illinois Instruments analyzer or its equivalent; or on the principle of paramagnetic resonance such as the Servomex analyzer, or its equivalent. The oxygen analyzer shall be calibrated to a known standard prior to testing the headspace gas of the product. Product shall be tested within 24 hours of packing. Results shall be reported to the nearest 0.1 percent. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-2. Any nonconformance to the requirement in 3.4.1 shall be classified as a major defect and shall be cause for rejection of the lot. The contents of these cans may be used for the product inspection in 4.5.4.

4.5.7 Moisture content testing. The product shall be tested for moisture content in accordance with the Moisture-Drying in Vacuum method in the Meat section of the Meat and Poultry Products chapter in the Official Methods of Analysis of the Association of Official Analytical Chemists, except that a temperature of 70<sup>0</sup>C for 16 hours under a pressure of 100 mm of mercury shall be used. The results shall be reported to the nearest 0.1 percent. Any result not conforming to the requirement in 3.4.1f shall be considered a major defect. The lot size shall be expressed in cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 1.5.

4.5.8 Microbiological testing. Five filled and sealed cans of finished product shall be selected at random from the lot regardless of lot size. The contents of each sample can shall be tested for aerobic plate count and E. coli in accordance with the Official Methods of Analysis of the Association of Official Analytical Chemists, Chapter: Microbiological Methods: Section: Examination of Frozen, Chilled, Precooked, or Prepared Foods – Official First Action. The diluent shall be added to each sample of dry product and allowed to stand for 15 minutes before the blending of that sample. Continue as directed by AOAC. Any result not conforming to the requirements in 3.4.1h and i shall be considered a test failure. Any test failure shall be counted as a major defect and shall be cause for rejection of the lot.

4.5.9 Can condition examination. Examination of filled and sealed cans shall be in accordance with the United States Standards for Condition of Food Containers, except that inspection for labeling shall be in accordance with MIL-L-1497 (see 5.4).

4.5.10 Shipping container examination. When shipping containers are required to be in accordance with PPP-B-636, examination for defects in construction, closure and reinforcement shall be in accordance with the appendix of PPP-B-636. In addition, the following defects shall be classified as follows:

- Major: National Stock Number, item description, contract number, or date of pack markings missing, incorrect, or illegible.  
Reinforcement with nonmetallic strapping or tape is not used.
- Minor: Other markings missing, incorrect, or illegible.  
Arrangement or number of cans not as specified.  
Not snug-fitting.

Level C shipping containers shall be examined only for the marking, arrangement, and number of cans defects specified above and for the closure method specified in 5.2.3.

4.5.11 Unit load inspection. Inspection of unit loads shall be in accordance with quality assurance provisions in MIL-L-35078.

## 5. PACKAGING

5.1 Preservation. The product shall be preserved in accordance with level A.

5.1.1 Level A. A net weight of 13 ounces of the product shall be filled into a size 603 by

700, open-top style, round, metal can with soldered or welded side seam and compound-lined, double-seamed ends. A minus 0.25 ounce tolerance will be allowed in any individual container provided the average net weight is not less than 13 ounces. The can shall be made throughout from commercial electrolytic tin plate of not less than 0.25 pound per base box, and shall be coated overall outside with a coating conforming to type I of TT-C-495. Cans of product shall be nitrogen flushed prior to sealing to comply with 3.4.1. The filled and sealed can shall not leak when tested as specified in 4.5.5.

5.2 Packing. Six cans of the dehydrated shrimp, arranged 3 by 2 by 1, shall be packed on end in a snug fitting shipping container in accordance with level A, B, or C, as specified (see 6.1 and 6.2).

5.2.1 Level A packing. The shipping container shall be a fiberboard box constructed and closed in accordance with RSC, V2s of PPP-B-636. Each fiberboard box shall be reinforced with nonmetallic strapping or pressure-sensitive adhesive filament reinforced tape in accordance with the appendix of PPP-B-636. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.1). Strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.2.2 Level B packing. The shipping container shall be a fiberboard box constructed and closed in accordance with style RSC, grade W5c of PPP-B-636. When specified (see 6.1), each box shall be reinforced with nonmetallic strapping or pressure-sensitive adhesive filament reinforced tape in accordance with the appendix of PPP-B-636.

5.2.3 Level C. The shipping container shall be in accordance with the Uniform Freight Classification or National Motor Freight Classification, as applicable.

5.3 Unit loads. When specified (see 6.1), the product packed as specified in 5.2.2 and 5.2.3 shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified. When unit loads are strapped the strapping shall be limited to nonmetallic strapping.

5.4 Labeling and marking.

5.4.1 Cans. Cans shall be labeled in accordance with MIL-L-1497, and as follows:

SHRIMP, DEHYDRATED, COOKED

Net Weight \_\_\_\_\_

Directions for use (see 5.4.1.1)

This product is gas packed

5.4.1.1 Directions for use. The following directions for use shall be included with the labeling information:

SHRIMP, DEHYDRATED, COOKED

Directions for use

Add entire contents of can to 3 quarts of water (90-100<sup>0</sup>F). Stir.

Soak 20 minutes.

Drain and chill in covered container.

Handle and use like fresh cooked shrimp.

1 pound cooked dehydrated shrimp equals about 3-1/2 pounds of cooked, peeled, deveined shrimp.

Each portion: 8 to 10 shrimp. For 100 portions: use 4 #10 cans.

5.4.2 Shipping containers. Shipping containers shall be marked in accordance with MIL-STD-129

5.4.3 Unit loads. Unit loads shall be marked in accordance with MIL-L-35078.

6. NOTES

6.1 Ordering data. Purchasers should exercise any desired options offered herein and acquisition document should specify the following:

- a. Title, number, and date of this document.
- b. When a first article is required (see 3.1, 4.4 and 6.3).
- c. Level of packing required (see 5.2).
- d. When nonmetallic reinforcement is required for level B packing (see 5.2.2).
- e. Type and class of unit load required when unit loading is specified (see 5.3).
- f. Provisions for approved preproduction samples (see 3.4.2 and 6.3).

6.2 Appropriate level of pack. Based on conditions known or expected to be encountered during shipment, handling, and storage of the specific item being procured, the procuring activity should select the appropriate level of pack in accordance with the criteria established in AR 700-15/NAVSUPINST 4030.28AFR 71-6/MCO 4030 33A/DLAR 4145.7, as applicable.

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army – GL  
Navy - SA  
Air Force – 50

Preparing activity:

Army - GL  
(Project 8905-B017)

Review activities:

Army – MD, TS  
Navy – MS, MC  
DP - SS

## For DSCP Website Posting

RDNS-CFF

12 June 2009

TO: DSCP-FTRE

SUBJECT: Follow up to ES09-126 (DSCP-SS-09-32361) Request for specification changes to Shrimp, Dehydrated, Cooked MIL-S-43145E, used in UGR-B™

1. References:

a. Memo from RDNS-CFF (Friel/4261) to DSCP-FTRE (C. Henry/7802), dated 1 June 2009, SUBJECT: ES09-126 (DSCP-SS-09-32361) Request for specification changes to Shrimp, Dehydrated, Cooked MIL-S-43145E, used in UGR-B™

b. Email memos from DSCP (C. Henry) to RDNS-CFI (V. Loveridge), dated 5 June 2009, subject as above.

2. Natick received additional information from the vendor and their supplier of cooked shrimp. It was noted that the count for the cooked product needs to be adjusted for processing losses and that the same range as the raw shrimp would not be appropriate. The supplier was asked to provide size ranges for the cooked product that could be directly related to the raw product count. An inspection certificate from US Department of Commerce (USDC) for shrimp produced for OFD in November 2008 was submitted to Natick.

Raw product count at 39 shrimp per pound relates to about 49 shrimp per pound. The USDC inspection certificate is labeled for 41-60 which encompasses two ranges 41-50 and 51-60. This range can be used for the cooked shrimp paragraph.

3. Natick recommends the following changes to MIL-S-43145E for all current, pending and future contracts:

Section 3.2.1.2, sentence 2, delete “36 to 42”; insert: “41 to 60”

4. Attached is Shrimp, Dehydrated, Cooked MIL-S-43145E with Change 02 dated 12 Jun 09 with changes highlighted.