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MILITARY SPECIFICATION

# CHEESE, COTTAGE, DEHYDRATED

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 cottage cheese for use by the Department of Defense as an item of limited use (see 6.1).

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issue of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

| | | |
|---|---|---|
| A-A-20154 | - | Cottage Cheese |
| 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 Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; 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: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, 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 8910

STANDARDS

FEDERAL

FED-STD-595 - Colors

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 contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

U.S. DEPARTMENT OF AGRICULTURE (USDA)

Visual Aids for Inspection of Metal Containers

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

General Specifications for Approved Dairy Plants and Standards for Grades of Dairy Products

Dairy Plants Surveyed and Approved for USDA Grading Service

(Application for copies should be addressed to the U.S. Department of Agriculture, Agricultural Marketing Service, Dairy Division, Room 2750-S, Washington, DC 20250.)

United States 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.)

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.)

Directory of Sanitarily Approved Food Establishments for Armed Forces Procurement (in CONUS)

(Application for copies should be addressed to the Department of the Army, Headquarters, U.S. Army Health Services Command, ATTN: HSVS-FI, Fort Sam, Houston, TX 78234-6000.)

INTERSTATE MILK SHIPPERS

Sanitation Compliance and Enforcement Ratings of Interstate Milk Shippers

(Application for copies should be addressed to the U.S. Food and Drug Administration, 200 C Street, S.W., Washington, DC 20204.)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

National Primary Drinking Water Regulations

(Application for copies should be addressed to the Office of Drinking Water Environmental Protection Agency, WH550D, 401 M Street, S.W., Washington, DC 20460.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN DAIRY PRODUCTS INSTITUTE

Standards for Grades of Dry Milks Including Methods of Analysis, Bulletin 916

(Application for copies should be addressed to the American Dairy Products Institute, 130 North Franklin Street, Chicago, IL 60606.)

INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment

(Application for copies should be addressed to International Association of Milk, Food and Environmental Sanitarians, Inc., Box 701, Ames, IA 50010.)

AMERICAN ASSOCIATION OF CEREAL CHEMISTS (AACC)

Approved Methods of the American Association of Cereal Chemists

(Application for copies should be addressed to the American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121.)

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.)

UNIFORM CLASSIFICATION COMMITTEE

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Suite 1120, 222 South Riverside Plaza, Chicago, IL 60606.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC.

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Association, Inc., Traffic Department, 2200 Mill Road, Alexandria, VA 22314.)

(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. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 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.

3.1.1 Fresh creamed cottage cheese. The fresh cottage cheese shall conform to the requirements for group A, subgroup (1) or (2), type I or III, class 1, style (a) or (b) of A-A-20154, with the following additions and exceptions:

a. The fresh cottage cheese shall originate and be manufactured, packaged, and shipped by establishments listed in one of the following documents as being specifically inspected and approved or certified as a source of supply of cottage cheese for the military.

1) Sanitation Compliance and Enforcement Ratings of Interstate Milk Shippers.

2) Dairy Plants Surveyed and Approved for USDA Grading Service.

3) Directory of Sanitarily Approved Food Establishments for Armed Forces Procurement

b. The cottage cheese shall be overcooked to a slight degree which will produce a firm but not tough or rubbery curd.

c. Sour cream shall be used as a cream dressing and shall meet the commodity requirements as specified in the General Specifications for Dairy Plants Approved for USDA Inspection and Grading Service, except No.1 quality milk shall be used as the source of cream for the dressing.

d. When type I cottage cheese is used as the source of curd, the sour cream dressing shall be added at the dehydrator's plant. Proper sanitation shall be practiced to prevent contamination of the product.

e. The physical requirements of the fresh cottage cheese (flavor, odor, body, texture, color, and appearance) shall possess those quality characteristics, which, after freeze dehydration and subsequent rehydration, shall yield a product which meets the requirements of 3.4.2.

f. Large or small curd cottage cheese may be used in the manufacture of the dehydrated cottage cheese provided the finished product meets the requirements of 3.4.4.

g. When transporting the fresh cottage cheese from the processing plant to the dehydration plant, the product shall be packaged in polyethylene bags tightly closed by tying or heat sealing the closure. The bags shall be packed into appropriate fiberboard boxes or clean and sanitary 30 to 50 pound capacity lacquered tin cans, or suitable multiple-use heavy density plastic pails approved for use in compliance with 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment; and provided with tight lids made of like material. The package or container shall be legibly identified as to contents. Date of manufacture shall be part of the label. The packaged cheese shall be immediately placed in a cold room maintained at 32° to 40°F and shall

not be frozen until transferred to the trays used in the freeze-dehydration process. Cheese transported to a freeze-dehydration plant shall have a lot average temperature of 40°F or below, with no sample being greater than 45°F, upon receipt of the product.

3.1.2 Nitrogen. The packaging gas shall be of food grade quality and may consist of pure nitrogen or a mixture of nitrogen and approximately 10 percent of carbon dioxide plus other inert gases in the atmosphere, but shall contain no more than 0.05 percent of oxygen.

3.1.3 Water. Water used for processing and washing shall conform to the National Primary Drinking Water Regulations.

3.2 Preparation for freeze dehydration.

3.2.1 Holding temperature and transfer time. The fresh cottage cheese shall not be frozen prior to freeze dehydration. The cheese may be held for up to 72 hours from preparation to freeze dehydration provided the temperature of the cheese at no time exceeds 45°F. Cultured fresh cottage cheese may be held for not more than 6 days from preparation to freeze dehydration provided the temperature of the cheese at no time exceeds 40°F.

3.2.2 Blending curd and dressing. When type I (dry curd) cottage cheese is utilized, the sour cream dressing shall be incorporated prior to dehydration. The dry curds and sour cream dressing shall be carefully blended together with gentle mixing to avoid breakage or shattering of the curd. The mixing vessels and any utensils in contact with the product must be pre-sanitized and shall be in compliance with 3-A Standards. The curd and dressing shall be blended resulting in a uniform distribution.

3.2.3 Freezing. The cottage cheese shall be spread uniformly on freezer trays (see 6.3.3) and placed in the freeze dryer promptly to avoid deterioration and some air drying due to exposure to normal atmospheric conditions. Provision shall be made to keep the cottage cheese under refrigeration so that the temperature does not rise above 50°F at any time during loading of the trays and placing them in the dryer. Freezing of the product shall be accomplished by evaporative cooling in the dryer itself.

3.3 Dehydration. The frozen product shall be freeze dehydrated at an absolute pressure not to exceed 1.5 millimeters of mercury (see 6.3.4 and 6.3.5). Momentary increases in pressure for short periods of time, due to introducing additional chambers into the system or other operational factors, may be permitted provided that no thawing of the product or moisture drip in the product shall occur. After dehydration is completed, the pressure in the drying chamber shall be equalized to atmospheric pressure by the introduction of nitrogen into the chamber, and the finished product shall be immediately packaged as specified in 5.1. If it is necessary to hold the product more than 2 hours between dehydration and packaging, it shall be adequately protected from oxygen and

moisture by either holding under a nitrogen atmosphere with 2 percent or less of oxygen, or under a vacuum of at least 27 inches of mercury. If the vacuum is broken, it shall be broken with nitrogen.

3.4 Finished product. The finished product shall be free from foreign material (e.g., metal, dirt, wood, paint, glass, filth, insects, or insect parts).

3.4.1 Dehydrated cottage cheese. The dehydrated cottage cheese shall meet the color standard in the range of 37875 to 37855 as defined in FED-STD-595. The curd particles shall not shatter or pulverize upon slight finger pressure.

3.4.2 Rehydrated cottage cheese. The product shall have the appearance of fresh cottage cheese when rehydrated in accordance with 4.3.8. The body and texture shall not be dry, mealy, sticky, slimy, mushy, rubbery, pasty, or water soaked. The flavor shall be characteristic, lightly salted, mildly and pleasingly lactic acid in nature with associated biacetyl and related flavor tones, and shall be free from stale, oxidized, rancid, unclean, bitter, fermented, fruity, yeasty, metallic, chlorine, musty, or any other objectionable odor or flavor.

3.4.3 Moisture requirements. The finished dehydrated cottage cheese shall contain not more than 2.0 percent by weight of moisture.

3.4.4 Particle size. The dehydrated cheese shall have a lot average particle size where not less than 75.0 percent of the product shall be retained on a U.S. Standard No. 8 (0.0937 inch) sieve, with no individual samples having less than 70.0 percent retained, when examined in accordance with 4.3.7.

3.5 Plant qualification. The product shall be prepared, processed, and packaged in establishments meeting the applicable requirements 21 CFR 110, "Current Good Manufacturing Practices in Manufacturing, Processing and Holding of Human Foods" and in plants which operate under USDA Regulations Governing Grading and Inspection of Manufactured or Processed Dairy Products and listed by the USDA in the document entitled "Dairy Plants Surveyed and Approved for USDA Grading Service" and approved for the finished product described in this specification.

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 USDA 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 USDA for any inspection.

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

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

4.3.1 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.

4.3.1.1 Ingredient and component examination. Conformance of ingredients and components to identity, condition, and other requirements specified in 3.1 shall be certified by the ingredient supplier or ingredient manufacturer, or compliance be verified by examination of pertinent labels, markings, U.S. Grade Certificates, certificates of analysis, or other such valid documents acceptable to the inspection agency. If necessary, each ingredient shall be examined organoleptically or inspected according to generally recognized test methods, such as the standard methods described in the Official Methods of Analysis of the Association of Official Analytical Chemists and in the Approved Methods of the American Association of Cereal Chemists, 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.

4.3.2 In-process inspection.

4.3.2.1 Preprocess examination. Examination shall be made prior to processing to determine compliance with the requirements of 3.2.1 as concerns holding and transfer time. Records shall be maintained of the age of the freshly made (nondehydrated) cottage cheese after its production and its temperature during storage prior to freezing. Nonconformance to one or more of the above requirements as determined by actual examination or as reflected by records shall be cause for rejection of the lot or the involved quantity of the finished product made therefrom.

4.3.2.2 Preprocess examination. Examination shall be made during processing to determine compliance with the requirements of 3.2.3 and 3.3 as concerns procedures during freezing, freeze dehydration, and packaging. Records shall be maintained of specified time cycles, temperatures, and pressures for each lot. Nonconformance to one or more of the above requirements as determined by actual examination or as reflected by records shall be cause for rejection of the lot or the involved quantity of the finished product made therefrom.

4.3.3 External examination of the can. The end item 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 one can. The inspection level shall be I and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 0.25 for critical defects, 1.5 for major defects, and 2.5 for minor defects.

TABLE I. External examination of can 1/

| Classification | | | Defect |
|---|---|---|---|
| Critical | Major | Minor | |
| 1 | | | Leaker or hole |
| 2 | | | False seam or otherwise improperly closed |
| 3 | | | Pitted rust 2/ |
| | 101 | | Not type, style, or size specified |
| | 102 | | Severe dent |
| | 103 | | Dent causing sharp ridge |
| | 104 | | Severe paneling, buckling or collapsed can |
| | 105 | | Cable cut |
| | | 201 | Moderate dent |
| | | 202 | Not clean 3/ |

1/ Use USDA Visual Aids for Inspection of Metal Containers as a guide for classifying can defects.

2/ Rust that can be removed by wiping with a soft cloth will not be considered as pitted rust.

3/ Cans showing a very thin film of grease which is discernible to the touch but not readily discernible visually are considered to be free from grease.

4.3.4 Net weight examination. The end item shall be examined for net weight. Any individual sample having a net weight less than 16-3/4 ounces shall be scored as a minor defect. Results shall be reported to the nearest 1/8 ounce. The lot size shall be expressed in units of cans. The sample unit shall be one can of product. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5. In addition, the lot shall be rejected if the sample average net weight is less than the specified net weight.

4.3.5 Product examination. The end item shall be examined for the defects listed in table II. The lot size shall be expressed in units of cans. The sample unit shall be one can. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

TABLE II. Product defects 1/

| Classification | Defect |
|---|---|
| Major | |
| | Dehydrated product |
| 101 | Curd particle shatters or pulverizes under slight finger pressure (examine five per sample unit) |
| 102 | Color not as specified (see 3.4.1) |
| | Rehydrated product 2/ |
| 103 | Not appearance of fresh cottage cheese 3/ |
| 104 | Body or texture dry, pasty, or mealy 4/ |
| 105 | Flavor not mildly and pleasingly lactic in nature (see 3.4.2) 5/ |
| 106 | Not lightly salted |

1/ Presence of foreign material (e.g., metal, dirt, wood, paint, glass, filth, insects, or insect parts shall be cause for rejection of the lot.)

2/ When rehydrated in accordance with 4.3.8.

3/ Appearance of fresh cottage cheese shall be a soft cheese mass showing a slight moist and shiny appearance and having good curd identity. Individual curd particles shall, generally, be embedded in free but not excessive cream dressing.

4/ Presence of a sticky, slimy, mushy, rubbery, or water-soaked condition shall be cause for rejection of the entire lot.

5/ Presence of a rancid, abnormally fermented, fruity, yeasty, musty, or other similar objectionable flavor or odor shall be cause for rejection of the entire lot.

4.3.6 Leakage inspection. The filled can shall be examined for leakage by submerging the can in water, contained in a vacuum desiccator or other suitable container, and maintaining a vacuum of 10 inches of mercury (atmospheric pressure 29.9 inches) for at least 30 seconds. A steady progression of bubbles from any part of the package will indicate a leak. Isolated or static bubbles caused by entrapped air on seams or surfaces of the packages will not be considered as signs of leaks. Dented or damaged cans shall not be used. The inspection level shall be S-3 and the AQL, expressed in terms of defects per hundred units, shall be 0.65.

4.3.7 Examination for particle size. Examination of the contents of the filled and sealed can shall be made to determine compliance with the requirements of 3.4.4. An 8 inch diameter, U.S. Standard No. 8, 0.0937 inch sieve, provided with an 8 inch diameter cover lid shall be inserted into an 8 inch diameter bottom catch pan. Remove cover lid and carefully fill the entire sieve surface with approximately 1 inch of product. Replace the lid and agitate the sieve horizontally in a back and forth motion through a distance of approximately 12 inches (1 back and forth motion represents a single cycle) for 5 cycles in a 5-second time period (1 second/cycle). The back and forth motion shall be smooth and continuous and not short, jerky, or abrupt motions. The contents of the sieve and the catch pan shall be carefully emptied into previously tared separate containers. This procedure shall be repeated until the entire contents of the can of finished product have been similarly treated. The net weight in grams of curd particles retained on the sieve shall be determined and the percentage calculated (see 3.4.4). Results shall be reported to the nearest 0.1 percent. The lot size shall be expressed in terms of cans. The sample unit shall be one filled and sealed can. The inspection level shall be S-2. Nonconformance to particle size requirements of 3.4.4 shall be cause for rejection of the lot.

4.3.8 Rehydration procedure. The rehydration procedure shall be conducted by weighing 4 ounces of $70^{\circ} \pm 5^{\circ}F$ water into a suitable container such a a sauce pan or stainless steel bowl. Distribute 1 ounce of product evenly over the surface of the water. Stir gently to wet all particles of cheese, then allow to remain undisturbed for 5 minutes. Stir gently again, and examine in accordance with table II.

4.3.9 Moisture content testing. The finished product shall be tested for moisture content in accordance with the Official Methods of Analysis of the Association of Official Analytical Chemists; Chapter: Dairy Products; Section: Cheese; Method: Method I. Official Final Action, except that the vacuum oven drying shall be modified to read $70^{\circ}C$ for a 16 hour drying time at a pressure less than or equal to 100 mm Hg. Test results shall be reported to the nearest 0.1 percent. Any result not conforming to the requirements of 3.4.3 shall be considered a 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.

4.3.10 Oxygen in headspace testing. The filled and sealed cans shall be tested for oxygen in headspace in accordance with the Determination of Oxygen Method in Bulletin 916 of the American Dry Milk Institute. Test results shall be reported to the nearest 0.1 percent. Any result not conforming to the oxygen in headspace requirement in 5.1.1 shall be classified as a major defect. The lot size shall be expressed in units of cans. The sample size 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.

4.3.11 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).

4.3.12 Shipping container examination. Shipping containers shall be examined for defects in assembly, closure, and reinforcement (when applicable) 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.
Reinforced with other than nonmetallic strapping or tape.

Minor: Other required markings missing, incorrect, or illegible.
Arrangement or number of cans not as specified.
Container not snug-fitting.

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

4.3.13 Examination of unit loads. Inspection of unit loads shall be in accordance with the quality assurance provisions of MIL-L-35078.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Seventeen 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 1/4 ounce tolerance will be allowed in any individual container, provided the average net weight of the cans, inspected in accordance with 4.3.4 is not less than 17 ounces. The can shall be made throughout from not less than commercial 0.25 pound electrolytic tin plate per base box. The can shall be coated outside with a coating conforming to type I of TT-C-495. The product shall be unit packed under an atmosphere of nitrogen so that the oxygen content of the gases in the filled and

sealed containers shall not exceed 2.0 percent when tested as specified in 4.3.10. Each can shall be hermetically sealed. The filled and hermetically sealed can shall not show leakage when examined in accordance with 4.3.6.

5.1.2 Level C. The product shall be preserved as specified in 5.1.1, except that cans with or without exterior commercial coating will be acceptable. Alternatively, cans may be made from 0.20 pound per base box electrolytic tin plate provided the cans have an exterior commercial coating.

5.2 Packing. The product shall be packed in accordance with level A, B or C as specified (see 6.1).

5.2.1 Level A packing. Six cans of product, preserved as specified in 5.1, shall be packed in a fiberboard box, constructed and closed in accordance with style RSC, grade V2s of PPP-B-636. The cans shall be packed on end three in length, two in width, and one in depth, within a snug-fitting shipping container. Each shipping container 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). When unit loads are strapped, strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.2.2 Level B packing. Six cans of product, preserved as specified in 5.1, shall be packed as specified in 5.2.1, except the box shall be constructed of grade V3c, V3s, or V4s fiberboard.

5.2.3 Level C packing. Six cans of product, preserved as specified in 5.1, shall be packed in a fiberboard box on end three in length, two in width, and one in depth within a snug-fitting container in accordance with the National Motor Freight Classification or Uniform Freight Classification, as applicable, except the closure of the fiberboard boxes shall be in accordance with Method II as specified in the appendix of PPP-B-636.

5.3 Unit loading. When specified (see 6.2), 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 except for type II, class F loads.

5.4 Marking.

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

CHEESE, COTTAGE, DEHYDRATED

_____ OUNCES, NET WEIGHT

DEHY. _____ Month and year of dehydration, in numerals, (may be embossed on lid)

_____ Name and address of packer

_____ Location of processing plant

THIS PRODUCT IS GAS PACKED.

Any other information required by the Federal Food, Drug and Cosmetic Act and regulations promulgated thereunder.

5.4.1.1 Directions for use. The following directions, as applicable for use, shall be lithographed on the can body or can lid or printed on the label:

DIRECTIONS FOR USE

Cheese, cottage, dehydrated. 17 oz. (1 No. 10 can)

Water, 70° ± 5°F 2-1/8 quarts

Measure water into a shallow serving pan.

Pour cottage cheese evenly over the water.

Stir gently to wet all particles of cheese.

Let stand 5 minutes and then stir gently. If more water is needed, sprinkle 1/2 to 1 cup water over cheese.

Chill rehydrated cheese thoroughly before serving (3-4 hours).

Makes 3 quarts, or 50 servings of about 1/4 cup each.

Rehydration ratio: 1 part dehydrated cottage cheese to 4 parts water, by weight.

(In its rehydrated form, the product may be used in menus in the same manner as fresh creamed cottage cheese. Increased palatability may be obtained by adding a quantity of pasteurized cream or sterile cream to the rehydrated product.)

5.4.2 Shipping containers. Shipping containers shall be marked in accordance with MIL-STD-129. End-opening shipping containers shall be marked in the same manner as top-opening containers.

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

6. NOTES

6.1 Intended use and product information. The dehydrated cottage cheese, after rehydration by adding four parts of water by weight to one part by weight of dry product, produces a cottage cheese comparable to the fresh product. In its rehydrated form, the product may be used in menus in the same manner as fresh cottage cheese. Increased palatability may be obtained by adding to the rehydrated product a quantity of pasteurized or sterile cream. When nitrogen-packed, the product should have a useful shelf life of up to one year at a storage temperature not exceeding 72°F and for two years at a storage temperature not exceeding 40°F.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Level of preservation and packing required (see 5.1 and 5.2).
c. Type and class of unit load required (see 5.2.1 and 5.3).

6.3 Procedures successfully used to produce the product. Good quality freeze-dehydrated cottage cheese has been successfully manufactured employing procedures and equipment outlined in 6.3.1 through 6.3.6. These procedures are not requirements. While the following procedures are described in somewhat great detail in accordance with the experience gained during the developmental stages of this product, the procedural requirements for evaporative cooling in the freeze dryer as detailed in 3.2.3 preclude the prior freezing of the product in trays before placing in the dryer.

6.3.1 Preparation of the cottage cheese for dehydration. Freshly made firm cottage cheese curd, well drained and washed free from excess whey, was used as the basic raw material. This product was creamed with fresh-cultured soured cream dressing formulated as specified in 6.3.3. The dressing was stirred until it was smooth and would spread freely around the curd particles. To each 78 pounds of curd, 22 pounds of the salted dressing were added and carefully mixed with the curd, so as to minimize breaking up of the curd particles. This produced a creamed cheese containing not less than 4 percent of milk fat. Inasmuch as the rehydrated cottage cheese must meet the minimum fat content of 4.0 percent, it has been found desirable to compensate for any possible fat loss during the freeze dehydration process by starting with a cheese of more than 4.0 percent fat prior to processing. The product was held at 40° to 45°F until placing it in the freezing trays (see 6.3.3). Before placing in freezing trays, the product was again carefully mixed to redistribute such cream as may have

drained off. Best results were obtained when the salt was added to the sour cream instead of directly to the curd and when creaming was done immediately after manufacture of the fresh cottage cheese.

6.3.2 Preparation of the cultured, soured cream. - A satisfactory cultured soured cream dressing was prepared by pasteurizing 18 percent milk fat cream at 160°F and holding at 160°F for 30 minutes. The cream was then homogenized, using a single stage valve at 3500 pounds pressure per square inch. The cream was then cooled at 72°F, inoculated with one to three percent of a mixed strain starter culture, and incubated for 16 hours at 72°F, or until a pH of 4.55 was obtained. NOTE: If the cultured product is not to be used shortly after the completion of ripening, it should be chilled to 40°F or below, by packing the containers in ice to prevent excess acid development. The coagulum should not be broken until ready to use to prevent wheying off of the product. To give the finished creamed cottage cheese a salt content of 0.75 to 1.0 percent, the necessary amount of salt is added to the cream before creaming the cheese curd.

6.3.3 Freezing the cottage cheese. The cottage cheese was spread evenly to not over 3/4 inch deep in stainless steel freezing trays chilled from 32° to 35°F and holding 150 square inches or approximately 2.6 pounds of the cheese. In spreading the cheese over the surface of the trays, breaking up of and mechanical packing of the curd were avoided. When properly frozen in the dehydration chamber, the cheese should be completely white rather than yellowish in color. This yellow color has been found to occur when the freezing requires longer than 2-1/2 hours. The darker color is in all probability caused by a case-hardening effect. Such cheese after dehydration will rehydrate poorly. The cheese was considered to be solidly frozen for freeze dehydration when its temperature was approximately 20°F or below. The reserve refrigeration held in the cheese minimizes the chances of its temperature rising appreciably above 20°F, before actual dehydration begins.

6.3.4 Freeze dehydration. Two difficulties often resulting in an unacceptable finished product are: (1) Thawing of a portion of the frozen product before dehydration was complete. This was obviated by advance arrangements which avoided time delays in transferring the frozen product from freezer to dryer and then subjecting the frozen product quickly to an absolute pressure of 1.5 millimeters of mercury or lower before application of heat to the frozen product. (2) Flashbacks or sudden loss of vacuum due to mechanical failure of vacuum system. When this occurred, the partially dehydrated product was generally lost due to contamination with moisture or other objectionable material. The rapidity and progress of the dehydration process was measured by insertion of thermocouples in the bed of cheese prior to freezing. Readings taken with a recording potentiometer indicated when the drying cheese approached the drying shelf temperature. The usual drying cycle required 20 to 24 hours for completion.

fter drying. Before removing the dehydrated product from
or, the chamber was loaded with nitrogen so that the
equalized to atmospheric level with nitrogen. This inert
orosity of the dried product and minimizes oxidative
product. The product should be repackaged in a room with
cent relative humidity within one hour from the time of
The finished product should not be exposed to outside
ore than 15 percent relative humidity) longer than the time
fer the product from the dryer to the dehumidified room.

After the dehydrator chamber was opened, the dried product
aged in No. 10 cans and sealed under vacuum or nitrogen with
of desiccant. Sealing under nitrogen with use of a
hold the moisture in the product to not over 0.05 percent
onged storage life at temperatures varying from 70° to 90°F.
ounds of fresh cottage cheese should be approximately 20
t.

evel of pack. Based on the conditions known or expected to
shipment, handling and storage of the specific item being
ing activity should select the appropriate level of pack in
criteria established in AR 700-15/NAVSUPINST 4030.28/AFR
AR 4145.7.

key word) listing).

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revious issue. Asterisks are not used in this revision to
respect to the previous issue due to the extensiveness of

Preparing activity:

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