MIL-J-35049E
2 March 1987
SUPERSEDING
MIL-J-35049D
3 November 1981

MILITARY SPECIFICATION

JUICE, ORANGE, INSTANT

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

1. SCOPE

* 1.1 Scope. This document covers instant (dehydrated) Grade A, unfortified orange juice for use by the Department of Defense as an item of general issue and as a component of operational rations.

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 issues 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

TT-C-495	- Coatings, Exterior, for Tinned Food Cans
PPP-B-636	- Boxes, Shipping, Fiberboard
PPP-C-29	- Canned Subsistence Items, Packaging Of

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 8915

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

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
MIL-D-43266	- Desiccants and Desiccation, Method of, for Packaging Subsistence

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 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 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 AGRICULTURE (USDA)

U.S. Standards for Grades of Orange Juice

(Application for copies should be addressed to the Chief, Processed Products Branch, Fruit and Vegetable Division, Agricultural Marketing Service, U.S. Department of Agriculture, Washington, DC 20250.)

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.)

* 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.

NATIONAL ACADEMY OF SCIENCE

Food Chemicals Codex

(Application for copies should be addressed to the National Academy Press, 2101 Constitution Avenue, N.W., Washington, DC 20418.)

ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS

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.)

AMERICAN DRY MILK INSTITUTE, INC.

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

(Application for copies should be addressed to the American Dry Milk Institute, Inc., 130 North Franklin Street, 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.)

AMERICAN ASSOCIATION OF CEREAL CHEMISTS

Approved Methods of the American Association of Cereal Chemists

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

UNIFORM CLASSIFICATION COMMITTEE

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Suite 1160, 222 South Riverside Plaza, Chicago, IL 60606.)

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

* 2.3 Order of precedence. In the event of 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 Orange juice concentrate. Orange juice concentrate shall have been prepared under high vacuum at low temperatures or by methods that produce equivalent results from the unfermented juice obtained from clean, sound, mature oranges of the species *Citrus sinensis*. Unfermented juice obtained from clean, sound, mature oranges of the species *Citrus reticulata* or *Citrus aurantium* may be used only in quantities permitted by the Food and Drug Administration Standards of Identity for Frozen Concentrated Orange Juice. The orange juice concentrate shall not be bitter, nor shall it produce any bitterness in the reconstituted finished product. The orange juice concentrate shall be either (a) frozen immediately after processing and stored at temperatures of 0°F or below until dehydration or (b) dehydrated without prior freezing, provided holding time, temperature, and conditions are such that no deteriorative changes occur in the concentrate.

* 3.1.2 Entrapped orange oil granules. Orange oil granules shall be prepared by entrapping oil of orange, with or without orange essence (see 3.1.2.1), in a combination with one or more of the following ingredients: sucrose, dextrose, corn sirup, corn sirup solids, malto-dextrin, gum acacia, other suitable vegetable gums, glycerol, emulsifiers, and anticaking agents. The granules shall be readily soluble in cool water.

3.1.2.1 Oil of orange. Oil of orange used in the preparation of entrapped orange oil granules shall be cold-pressed orange oil meeting the requirements for orange oil specified in the Food Chemicals Codex, a partially deterpened oil prepared therefrom, or a combination of both. Antioxidants of the types and in the amounts approved by the Food and Drug Administration may be used.

3.1.3 Sodium sulfite or sodium bisulfite. Sodium sulfite or sodium bisulfite shall meet the applicable requirements of the Food Chemicals Codex and shall be added to the orange juice concentrate prior to dehydration in such quantities that the sulfur dioxide content of the dehydrated product shall meet the requirements specified in 3.3.

3.1.4 Drying aids. Drying aids such as foam stabilizers, vegetable gums or carboxymethylcellulose, which have been approved by the Food and Drug Administration, may be used in quantities permitted by that agency.

3.1.5 Anticaking agents. Anticaking agents, approved by the Food and Drug Administration, may be used in quantities permitted by that agency provided mouth feel or taste is not affected.

3.2 Processing. Preparation of dehydrated orange juice shall be in accordance with a method or methods that ensure maximum preservation of the natural characteristics of orange juice. The product shall be prepared and processed with minimum delay between the various stages of production.

3.2.1 Processing equipment. All machinery, equipment, and parts thereof, with which the liquid materials may come into contact during processing, shall be made of stainless steel, glass, or material equally resistant to corrosion.

* 3.3 Finished product. The finished product shall comply with the requirements, as applicable, for U.S. Grade A of the U.S. Standards for Grades of Orange Juice except as follows:

a. There shall be no foreign materials such as, but not limited to, dirt, insects, insect parts, hair, wood, paper, paint, glass, or metal.

b. There shall be no foreign odor or flavor such as, but not limited to, burnt, scorched, stale, sour, rancid, musty, moldy, or sulfurous.

c. There shall be no color foreign to the product.

d. The recoverable oil content for Grade A shall not exceed 0.035 mL per 100 mL of reconstituted juice.

e. The moisture content shall not exceed 2.5 percent at the time of pack and shall not exceed 1.5 percent within 21 days after packaging.

f. The sulfur dioxide content shall not be less than 100 parts per million and not more than 200 parts per million.

g. The product shall contain no added sweetener, except that used as a carrier for orange oil.

h. The product shall not contain any lumps of dehydrated juice that cannot readily be broken by shaking or by application of slight pressure.

i. One gallon of juice shall contain not less than 15.5 avoirdupois ounces of orange juice solids.

3.4 Plant qualification. The product shall be prepared, processed, and packaged in establishments meeting the requirements of Title 21, Code of Federal Regulations, Part 110, "Current Good Manufacturing Practice in Manufacturing, Processing, Packaging, or Holding of Human Foods" and the plant sanitation requirements of the appropriate Government inspection agency.

3.5 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 supervision 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 analyses 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.

4.3.1.2 Unfilled can inspection. Conformance of unfilled cans to the 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.

4.3.2 In-process examination. In-process examination shall be performed to determine conformance to the processing, desiccant addition, and unit packing requirements. Any nonconformance revealed by actual examination or by review of records of calculation of desiccant amounts or by review of other valid documents shall be cause for rejection of the involved product.

* 4.3.3 Moisture determination at time of pack. Eight cans of product shall be randomly selected from the lot at time of pack. The moisture content of the product from each can shall be determined in accordance with the Official Methods of Analysis of the AOAC; Chapter: Sugar and Sugar Products, Method; Moisture in Sugars, Vacuum Drying; except that the temperature shall be 60°C and a permitted alternative to redrying every hour is to dry for a consecutive 16 hours, cool in a desiccator, and weigh. Any failure to conform to the moisture requirement in 3.3 shall be classified as a major defect and shall be cause for rejection of the lot.

* 4.3.4 Moisture determination within 21 days after packaging. Eight cans of product shall be randomly selected from the lot after packaging. The moisture content of the product from each can shall be determined within 21 days after packaging in accordance with 4.3.3. The contractor shall indicate the minimum length of time within the 21 day period that the cans are to be held prior to testing. Any failure to conform to the moisture requirement in 3.3 shall be classified as a major defect and shall be cause for rejection of the lot.

* 4.3.5 Net weight examination on a dry solids basis. Examination shall be made during packaging for the defects listed in table I to determine compliance with the fill requirement of 5.1.1. The average moisture content of the product (taken at time of packaging and tested in accordance with 4.3.3) representing the lot in question shall be used to make this determination. If moisture test results are not available at time of packaging, reserve computations until test results become available. Net weight results shall be recorded to the nearest 0.1 ounce. The lot size shall be expressed in units of cans. The sample unit shall be one filled can without desiccant. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5.

TABLE I. Net weight defect

Category	Defect
Minor	
201	Net weight less than 15 1/2 ounces, for 401 by 411 or 401 by 602 cans

4.3.6 Product examination. The finished product 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 the contents of 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 for major defects and 6.5 for minor defects.

TABLE II. Product defects 1/

Category		Defect
Major	Minor	
101		Desiccant bag missing
102		Desiccant bag has tear, hole, or open seal
	201	Desiccant bag folded over itself
103		Lumps of product that cannot be readily broken up by shaking or by application of slight finger pressure

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

* 4.3.7 Oxygen in headspace testing (applicable to gas packed cans). 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, Inc. Alternatively, the headspace oxygen content may be determined by an Instrumentation Laboratories Oxygen Analyzer or equivalent instrument. Test results shall be reported to the nearest 0.1 percent. Any result failing to conform to the oxygen in headspace requirements in 5.1.1 shall be classified as a major defect. When referee testing is necessary, the American Dry Milk Institute Method shall be followed. The lot size shall be expressed in units of 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 2.5.

* 4.3.8 Sulfur dioxide content testing. The finished product shall be tested for sulfur dioxide content in accordance with the Official Methods of Analysis of the AOAC; Chapter: Food Additives; Direct, Method: Sulfurous Acid (Total) in Food; Modified Monier-Williams Method. Test results shall be reported to the nearest 1 ppm. The lot size shall be expressed in units of cans. The sample shall be a 1-pound composite derived from the number of cans indicated by inspection level S-2. Any result failing to conform to the sulfur dioxide content requirements in 3.3 shall be classified as a major defect and shall be cause for rejection of the lot.

* 4.3.9 Recoverable oil content testing. Conformance to the requirement for the recoverable oil content requirement in 3.3 shall be determined in accordance with the U.S. Standards for Grades of Orange Juice.

4.3.10 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).

4.3.11 Leakage and vacuum inspection. Inspection for leakage and vacuum shall be in accordance with PPP-C-29 (see 5.1.1).

* 4.3.12 Shipping container examination. When shipping containers are required to be in accordance with PPP-B-636, examination for defects in assembly, 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.
Number of cans not as specified.
Reinforcement with nonmetallic strapping or tape is not used.

Minor: Other required markings missing, incorrect, or illegible.
Tiered cans not separated as specified for Level A packing.
Container not snug-fitting.
Arrangement of cans not as specified.

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

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

5. PACKAGING

5.1 Preservation. The product shall be preserved in accordance with level A or C, as specified (see 6.1).

* 5.1.1 Level A. Not less than 15 1/2 avoirdupois ounces of the finished product, on a dry solids basis, shall be filled into a size 401 by 411 or 401 by 602 open-top style, round, metal can with soldered or welded side seam and compound-lined, double-seamed ends. When drying aids or anticaking agents or both are used (see 3.1.4 and 3.1.5), their addition calculated to the nearest 1/2 ounce shall be reflected in the net weight declaration. The can shall be

made throughout from not less than commercial 0.25-pound electrolytic tin plate per base box and shall be coated on the outside with a coating conforming to type I of TT-C-495. Each can shall be provided with sufficient desiccant complying with MIL-D-43266 to reduce the moisture content to 1.5 percent within 21 days of production. The amount of desiccant required shall be calculated from the formula specified in MIL-D-43266 except that the value for percent water as used in the formula shall be the actual percent moisture content of the product, minus 1.5 percent. A record of the calculations shall be maintained. After filling, the can shall be hermetically sealed under conditions which will result in a vacuum of not less than 15 inches of mercury when tested in accordance with the method specified in PPP-C-29. Alternatively, the product shall be unit packed under an atmosphere of nitrogen so that the oxygen content of the gases in the filled and sealed container does not exceed 2.0 percent when tested in accordance with 4.3.7. The gas packed cans shall not show leakage when tested in accordance with PPP-C-29.

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

5.2 Packing. Twenty-four cans of the product, arranged four in length, three in width and two in depth, shall be packed in a snug-fitting shipping container complying with level A, B, or C, as specified (see 6.1).

* 5.2.1 Level A packing. Each shipping container shall be a snug-fitting fiberboard box, constructed and closed in accordance with style RSC, grade V2s of PPP-B-636. Tiers of cans shall be separated by a fiberboard pad. 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). 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. The shipping container shall be a fiberboard box, constructed and closed in accordance with style RSC, grade V3c, V3s, or V4s, of PPP-B-636. Each fiberboard box shall be reinforced with nonmetallic strapping or pressure-sensitive filament-reinforced tape in accordance with the appendix of PPP-B-636.

* 5.2.3 Level C packing. The shipping container shall be in accordance with the National Motor Freight Classification or Uniform Freight Classification, as applicable, except closure and reinforcement of the fiberboard boxes shall be in accordance with method II as specified in the appendix of PPP-B-636.

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, except for type II, class F loads.

5.4 Labeling and marking.

5.4.1 Cans. Cans shall be labeled in accordance with MIL-L-1497. When the product has been gas-unit packed, the following marking shall also appear on the label: Gas Packed. In addition, cans destined for overseas shipment shall have the following information lithographed on one end or on the body of the can in black letters:

JUICE, ORANGE, INSTANT

Preserved with sulfur dioxide

Net weight _____

Lot No. _____

DIRECTIONS FOR USE

Important: Discard desiccant bag.

Pour approximately a quart of cold water into a gallon measure. While whipping water, gradually add product. When product has dissolved, add water to make one gallon of juice and stir. If desired, 1/4 cup of sugar may be added. Makes 16 8-fl. oz. servings of juice. When preparing juice in quantity, add contents of each can to 3 3/4 quarts of cold water and stir briskly.

5.4.2 Shipping container. The shipping container shall be marked in accordance with MIL-STD-129.

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

6. NOTES

6.1 Ordering data. Acquisition documents should specify the following:

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

* 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 4030.28/AFR 71-6/MCO 4030.33A/DLAR 4145.7.

* 6.3 Subject term (key word) listing.

Dehydrated
Fruit juices
Orange juice, instant

6.4 Changes from previous issue. The margins of this document are marked with an asterisk (*) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only, and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content, as written, irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

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Army - MD, TS
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Army - GL

Project No. 8915-0804

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1 DOCUMENT NUMBER	2 DOCUMENT TITLE
MIL-J-35049E	Juice, Orange, Instant

3a. NAME OF SUBMITTING ORGANIZATION	4 TYPE OF ORGANIZATION *(Mark one)*
b ADDRESS *(Street, City, State, ZIP Code)*	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)* _____

5 PROBLEM AREAS

a. Paragraph Number and Wording

b Recommended Wording

c Reason/Rationale for Recommendation

6 REMARKS

7a NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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NATICK OP, 1 Apr 84