QUARTERMASTER CORPS
TENTATIVE
SPECIFICATION

C.Q.D. No. 19D
July 8, 1942
Superseding
C.Q.D. No. 19C
February 9, 1942

UNITED STATES ARMY FIELD RATION D

A. APPLICABLE SPECIFICATIONS.

A-1. The following current specifications, in effect on date of invitation to bid, shall form a part of this specification:

Federal Specification C-M-351-b - Milk, dry, powdered, skimmed and whole.

Federal Specification JJJ-S-791 - Sugar, Beet or Cane, Type I.

Tentative U. S. Army Specification No. 22-42 - "Supplies, Subsistence for the United States Army, Conditions Governing the Purchase of."

U. S. Army Specification No. 100-2, "Standard Specifications for Marking Shipments."

Quartermaster Corps Tentative Specification OQMG No. 12-A, "Packing for Overseas Shipment, Canned Fruits and Vegetables and Other Items of Subsistence; General Specifications for."

B. TYPE AND GRADE.

B-1. Type and Grade. - The product shall be of one type and grade as specified.

C. MATERIAL AND WORKMANSHIP.

C-1. Material. - The ingredients shall conform in all respects to the following:

C-1a. Chocolate, plain. - All cacao beans used shall be of quality not less than that of Main Crop Accra beans. On a moisture-free basis, the nibs shall test not less than 54 percent cacao fat, and on a moisture-and-fat-free basis, not more than 8 percent total ash; not more than 0.4 percent ash insoluble in hydrochloric acid; and not more than 7 percent crude fiber. Ground nibs shall contain not over 1 percent of shell.

C-1b. Milk, dry, powdered, skimmed. - Shall conform to Type I, Federal Specification C-M-351-b.

C-1c. Sugar. - Shall conform to Federal Specification JJJ-S-791, as amended May, 1935, for sugar, Beet or Cane, Type I.

C-1d. Cacao Fat. - Added cacao fat shall be only that obtained by hydraulic pressure from a good grade of roasted cacao beans. Fat obtained by chemical extraction, or by any process other than that prescribed, shall not be used.

C-1e. Oat Flour. - Shall be made from sound white milling oats of best quality. The flour shall be of such fineness in texture, whether produced by bolting or pulverizing, that 100 percent shall pass through a U. S. Bureau of Standards' sieve No. 20 and 90 percent shall pass through a U. S. Bureau of Standards' sieve No. 88.

C-1f. Vanillin. - Shall be U. S. P. grade. In lieu of vanillin, Ethyl Vanillin of best commercial grade may be used.

C-1g. Thiamin Hydrochloride (Vitamin B_1) - Shall be U. S. P. grade.

C-2. The completed Field Ration D shall be of smooth texture throughout, free from sugar graininess, air bubbles, grit and extraneous material.

C-3. The wrapped finished product shall remain semi-solid and free from stickiness and shall not adhere to the wrapper at a temperature of 120 degrees F.

C-4. The Field Ration D shall be prepared in accordance with best commercial practice, under strictly sanitary conditions.

D. GENERAL REQUIREMENTS.

D-1. All deliveries shall conform, in every respect, to the provisions of the Federal Food, Drug and Cosmetic Act, and regulations promulgated thereunder.

E. DETAIL REQUIREMENTS.

E-1. Shall be prepared from the following ingredients only, in proportion by weight as follows:

a.	Chocolate, plain, adjusted to 54 percent cacao fat...	160 parts
b.	Sucrose.....	160 parts
c.	Milk, dry, powdered, skimmed.....	70 parts
d.	Added cacao fat.....	30 parts
e.	Oat flour, raw.....	20 parts
f.	Vanillin.....	1/2 part, or
	Ethyl Vanillin.....	1/6 part
g.	Thiamin Hydrochloride (Vitamin B_1) See paragraph E-4.	

E-2. Each unwrapped cake shall conform to the shape and size shown by Figure 1, and shall weigh approximately 4 ounces net, tolerance not to exceed 1/8 ounce.

E-3. Sufficient Thiamin Hydrochloride shall be added to the Field Ration D formula to give not less than 0.45 milligrams of Vitamin B_1 to each four-ounce bar.

F. METHODS OF SAMPLING, INSPECTION AND TEST.

F-1. Sampling. - Samples of any materials, components, etc., not furnished by the U. S. Government, entering into the manufacture of the article covered herein shall be selected from time to time by the Government inspector and carefully examined and tests made to determine if they are in accordance with this specification.

F-2. Inspection. - Inspection may be made throughout the entire process of manufacture. The passing as satisfactory of any material shall not relieve the contractor of responsibility for faulty workmanship or materials which may be

discovered at any time prior to final acceptance. Final inspection of the finished article shall be made either at point of production or at point of delivery designated in the contract or purchase order or procuring agency. In case of factory inspection, every facility shall be afforded inspectors, by the manufacturer, for the prosecution of their work.

F-3. Tests for consistency: The finished product, when submitted to the penetrometer test outlined below shall not show a penetration in excess of 6.5 mm.

a. An unwrapped bar shall be softened by submitting it to a warming oven temperature of 120 degrees F. for a period of not less than one hour. When properly softened, the bar shall sustain a weight of 205.15 grams during a 20-second interval with a maximum penetration of 6.5 mm.

b. The penetrometer cone shall be made of red brass and shall conform to the dimensions as prescribed in Figure 2.

F-4. Thiamin Hydrochloride (Vitamin B_1) analysis. - Thiamin shall be determined by the method described by Hennessy, Industrial and Engineering Chemistry, Analytical Edition, Volume 13, Page 216, 1941.

G. WRAPPING, PACKAGING, LABELING, PACKING AND MARKING.

G-1. Wrapping. - Each individual bar shall be placed in a bag made from .0013 inch thick cellophane of a moisture-resistant heat-sealing type. These bags shall be either of the following types:

a. Straight-line-sealed or tube-formed, or
b. Flat preformed bag.

In all instances the longitudinal seal of the bags shall be a heat-sealed bond 3/8 inch in width; a double heat-sealed bond, each bond of which shall be 1/8 inch in width; an adhesive seal 3/8 inch in width; or a combination of adhesive and heat sealing. All longitudinal seams shall be flat and run the full length of the bag. The width of the heat-seal or adhesive bonds on end closures or seams shall be not less than that of the longitudinal seams. The ends shall be sealed in such a manner that they project straight out from the ends of the bar, or the package may be preformed as a flat bag for insertion of the bar with the bottom end sealed completely and the open end sealed as described. The side folds of the bag shall not be sharply creased, but shall be in a rounded condition when delivered for use. The bag shall fit snugly around both the short and long axes of the bar so that there shall be no folding or overlapping of the cellophane wrap when the wrapped bars are later inserted in cartons. If an adhesive is used, the bags shall be aerated so that no solvent odors or flavors will be absorbed by the bar.

G-2. Packaging. - Packages for U. S. Army Field Ration D shall be of two types as follows:

Type I - One cellophane-wrapped D Ration bar packaged in a paperboard carton coated with wax.

Type II - Three (3) cellophane-wrapped D Ration bars packaged in a paperboard carton coated with wax.

G-2a. Type I. - One each of the individually wrapped four-ounce D Ration bars shall be placed in a paperboard carton. This container shall have inside dimensions of approximately 2-3/16" x 13/16" x 3-7/8". (If it is necessary to vary dimensions slightly to accommodate various methods of folding the wrapper around the bar, any increase shall be such that the bar will not shift or fit loosely in the container). The container shall be of a "seal-end" style of carton. The manufacturer's joint and both ends shall be sealed with a moisture-resistant adhesive. This adhesive shall be a converted starch product of low reducing sugar content and shall be free from added glucose, glycerin, glycol and other hygroscopic ingredients. The product may be alkaline and borated.

This carton shall be manufactured of paperboard of quality, strength, and thickness of not less than that of kraft-lined chip .020 inch in thickness, No. 3 finish, with no loose fibers exposed. The kraft top liner shall be dark in color, shall withstand a 180 degree bend without breaking and shall be on the outside of the carton. The top liner and surface of the board (outside of carton) shall be treated to retard impregnation by the wax. The liner shall show no discoloration when the board is dipped in the wax described below, at 175 degrees F., for two seconds. The paperboard shall have a minimum Mullen bursting strength of 90 pounds per square inch for the finished board.

After the individually wrapped bar has been placed in the carton, the open ends shall be sealed with the moisture-resistant adhesive described above. The whole carton then shall be dipped in a thermoplastic wax. The thermoplastic wax shall have a melting point of not less than 140 degrees F. and at 20 degrees below zero F. it shall not crack, chip or otherwise become separated from the surface on which applied. The wax shall be odorless, tasteless and non-toxic. It shall consist of a mixture of 50 percent of wax "A" and 50 percent of wax "B". The wax "A" shall be a "Fully Refined (Paraffin) Wax" having a melting point not less than 130 degrees F. by the ASTM-D87-37 method. Wax "B" shall be a refined, filtered, odor-free, ductile petroleum wax containing a high percentage of crystallization inhibitor so that when blended with wax "A" in the proportions herein specified, the resulting blend shall be dense, stable, and microcrystalline in structure, and shall be ductile at 20 degrees below zero Fahrenheit without being tacky at 120 degrees F. Wax "B" shall conform to the following physical and chemical specifications:

Specific Gravity at 212 degrees F. (Liquid).....	.78 to .82
Melting Point (ASTM-D 127-30).....	155° F. Min.
Needle Penetration at 25° C. (ASTM-D5-25).....	15 to 35
Viscosity at 90° C., Centistokes (ASTM-D445-39T).....	8.75 to 16.85
Flash Point (ASTM-D92-33).....	235° C. Min.
Color (ASTM-D-155-39T).....	No darker than 4 dilute.
Saponification Number.....	1 Maximum
Neutralization Number.....	0.2 Maximum

In lieu of the wax mixture described above, the microcrystalline type wax may be a mixture of waxes, or a mixture of waxes and a crystallization inhibitor which shall give as a final product a microcrystalline type of wax having a melting point of not less than 135° F., and which shall not crack, chip, or otherwise become separated from the surface on which applied when subjected to 20 degrees below zero Fahrenheit. It shall not block at 120° F. The product shall be odorless, tasteless, and non-toxic.

G-2b. Type I (a). - In lieu of the "seal-end" style paperboard carton described under G-2a, above, the following type of package may be substituted:

The four-ounce D Ration bar shall be placed in a set-up, full-telescoping, slip-cover carton, manufactured of paperboard of quality, strength and thickness not less than that of non-blending chip, .020 inch in thickness. The corners of the cover of the box shall be stayed with 30-point or heavier kraft paper. After placing the bar in the carton and closing, the carton shall be overwrapped with 30-pound or heavier kraft paper. This overwrap shall be completely covered with adhesive on the inside and shall be applied as a tite-wrap. The overwrap may be die-cut to fit the carton if desired. The overwrapped carton then shall be dipped in the thermoplastic wax described under G-2a, Type I. The completed carton shall bear the printing prescribed under Paragraph G-3a.

G-2c. Type II. - Three of the individually wrapped four-ounce D Ration bars shall be placed side by side in a paperboard carton. The center bar shall be inverted with respect to the two end bars, so that the surfaces at the edges of the bars shall be parallel. This container shall have inside dimensions of approximately 3-7/8" x 27/32" x 6-1/4". The carton shall be "seal-end" style. If it is necessary to vary dimensions slightly to accommodate various methods of folding the wrapper around the bar, any increase shall be such that the bars will not shift or fit loosely in the carton. The manufacturer's joint and both ends shall be sealed with the moisture-resistant adhesive described in Paragraph G-2a. This carton shall be manufactured of paperboard of quality, strength, and thickness, not less than that of kraft-lined chip .024 inch in thickness, and shall have a No. 3 finish with no loose fiber exposed.

The kraft top liner shall be dark in color, shall withstand a 180° bend without breaking and shall be on the outside of the carton. The top liner and surface of the board (outside of carton) shall be treated to retard impregnation by the wax. The liner shall show no discoloration when the board is dipped in the wax described in paragraph G-2a at 175 degrees F. for two seconds. The paperboard shall have a minimum Mullen bursting strength of 110 pounds per square inch for the finished board.

After the three individually wrapped D Ration bars have been placed in the carton, both ends shall be sealed with the moisture-resistant adhesive described in paragraph G-2a above and the whole carton then shall be dipped in the thermoplastic wax described in paragraph G-2a.

G-3. Labeling. -

G-3a. Each carton described under G-2a and G-2b containing one four-ounce D Ration bar shall be printed in black ink on one major surface as follows:

U. S. ARMY FIELD RATION D

To be eaten slowly (in about a half hour).
Can be dissolved by crumbling into a cup
of boiling water if desired as a beverage.

INGREDIENTS: Chocolate, Sugar, Skim Milk Powder, Cocoa Fat, Oat Flour, Artificial Flavoring, 0.45 mg. Vitamin B_1 (Thiamin Hydrochloride).

4 OUNCES NET - - - - 600 CALORIES

Packaged by: - - - -

First line shall be printed in 14-point type, all capitals. Remainder in 10-point type. All type to be extra bold.

If the company that packages the D Ration bars is not the manufacturer, the name of the manufacturer may be printed on one edge of the carton in 10-point type. The printing of the manufacturer's name under these conditions is optional.

G-3b. Each carton described under G-2c containing three of the individually wrapped bars shall be printed in black ink on one major surface as follows:

U. S. ARMY FIELD RATION D
Contains three (3) 4-ounce bars.
To be eaten slowly (in about a half hour).
Can be dissolved by crumbling into a cup
of boiling water if desired as a beverage.

INGREDIENTS: Chocolate, Sugar, Skim Milk Powder, Cocoa Fat, Oat Flour, Artificial Flavoring, 0.45 mg. Vitamin B_1 (Thiamin Hydrochloride)

12 OUNCES NET - - - - - - 1800 CALORIES

Packaged by: - - - - - -

The first line shall be printed in 14-point type, all capitals. The remainder to be printed in 10-point type. All type to be bold.

If the company that packages the D Ration bar is not the manufacturer, the name of the manufacturer may be printed on one edge of the carton in 10-point type. The printing of the manufacturer's name under these conditions is optional.

G-4. Packing. -

G-4a. Twelve (12) cartons, (Type I above), one (1) bar each, shall be placed in a container of quality, strength and thickness not less than that of bending chipboard "extra-hard-sized", .030 inch in thickness, or may be chipboard wax-impregnated, .030 inch in thickness. If "extra-hard-sized" bending chipboard is used, it shall meet the following test for water resistance:

> The absorption of water in a strip 25 mm. by 150 mm. placed vertically to a depth of 50 mm. in water at a temperature of 70 degrees F. shall not exceed a rise of 6 mm. above the surface of the water.

This container shall be a folding carton of regular slotted style, 5-9/16" x 4 9/16" x 4-1/8" inside dimensions. This carton shall be closed in one of the two following methods:

(1) Each carton shall be taped completely around the long axis and over the carton closure in such a manner that the tape will overlap at least 2-1/2 inches. The tape shall be 60-pound kraft gummed tape of not less than 2 inches in width and must be securely applied to the carton. If desired, the top and bottom flaps may be secured with separate pieces of tape. In such a case, however, the gummed tape must overlap at least 2-1/2 inches.

(2) In lieu of tape, the carton may be secured with a moisture-resistant adhesive. In this instance, however, the flaps on the long dimension of the openings shall overlap at least 1 inch.

Each carton when taped or glued shall bear the following label or imprint in black ink:--

U. S. ARMY FIELD RATION D

Twelve (12) 4-ounce Bars in Individual Cartons.

Packaged by (Name)
(Address)
(Date) 194

The first line shall be printed in 24-point type, all capitals. The remainder shall be printed in 18-point type. All type shall be bold.

If the D Ration is packaged by the manufacturer, the above label may read:
Prepared by: (Name) in lieu of Packaged by: (Name).

G-4b. Eight (8) cartons, (Type II above), three (3) bars each, shall be placed in a container approximately 7-3/4" x 4" x 6-1/2" inside dimensions. This container shall be a folding carton of regular slotted style manufactured from paperboard of quality, strength and thickness not less than that of bending chip "extra-hard-sized", .030 inch in thickness, or bending chip, wax impregnated, .030 inch in thickness. This carton shall be closed in one of the two methods described in paragraph G-4a (1) and (2).

Each carton when taped or glued shall bear the following label or imprint in black ink:--

U. S. ARMY FIELD RATION D

Eight cartons of Three (3) 4-Ounce Bars.

Packaged by (Name)
(Address)
(Date) 19

The first line shall be printed in 24-point type, all capitals. The remainder shall be printed in 18-point type. All type shall be bold.

If the D Ration is packaged by the manufacturer, the above label may read: Prepared by: (Name) in lieu of Packaged by: (Name).

G-4c. Twelve (12) cartons of twelve (12) bars each, as described in G-4a. above, shall be, unless otherwise specified in the invitation to bid, packed in Nailed Wooden Boxes, Type C, of Quartermaster Corps Tentative Specification OQMG No. 12A. These shipping cases shall be approximately 14-1/4" x 11-3/8" x 8-5/8", inside dimensions.

G-4d. Six (6) cartons of twenty-four (24) bars each, as described in G-4b, above, shall be, unless otherwise specified in the invitation to bid, packed in Nailed Wooden Boxes, Type C, of the Quartermaster Corps Tentative Specifications OQMG No. 12-A. These shipping cases shall be approximately 12-5/8" x 13-1/2" x 8", inside dimensions.

G-5. **Marking.** - Unless otherwise specified in the invitation to bid, shipping containers shall be marked on one end with ink which shall take on fiber or wood and shall be water-fast and sun-fast, as follows:

FIELD RATION D.
144 bars. _____ bars per Carton.
Date of Packing
Contract Number
Name and Principal Address of Contractor.
Cubic Displacement _____ Gross Weight _____