MIL-C-11198K
28 September 1984
SUPERSEDING
MIL-C-11198J
18 May 1977

MILITARY SPECIFICATION

CHEST, ICE STORAGE

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

1. SCOPE

1.1 Scope. This document covers the requirement for an ice storage chest.

1.2 Classification. Ice storage chest shall be of the following sizes, as specified (see 6.2).

Size 2 - 200-pound capacity
Size 4 - 400-pound capacity

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

A-A-631	-	Pick, Ice
A-A-711	-	Dry Cleaning Solvent
MM-L-736	-	Lumber; Hardwood
MMM-A-181	-	Adhesives, Phenol, Resorcinol or Melamine Base

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 and Development 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.

QQ-A-225/7 - Aluminum Alloy Bar, Rod, and Wire, Rolled, Drawn or Cold Finished, 5052
QQ-A-225/8 - Aluminum Alloy 6061, Bar, Rod, Wire, and Special Shapes; Rolled, Drawn, or Cold Finished
QQ-A-250/2 - Aluminum Alloy 3003, Plate and Sheet
QQ-A-250/8 - Aluminum Alloy 5052, Plate and Sheet
TT-E-516 - Enamel, Lusterless, Quick Drying, Styrenated Alkyd Type
TT-P-1757 - Primer Coating, Zinc Chromate, Low-Moisture-Sensitivity
TT-I-1795 - Ink, Marking, Stencil, Opaque (Porous and Non-Porous Surfaces)

MILITARY

MIL-P-116 - Preservation, Methods Of
MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible
MIL-C-5541 - Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-W-8604 - Welding, Fusion; Aluminum Alloys; Process and Performance Of
MIL-S-12204 - Solder, Lead-Tin Alloy
MIL-E-46096 - Enamel, Lustreless, Quick Drying, Styrenated Alkyd Type, Solar Heat Reflecting
MIL-C-52950 - Crates, Wood, Open and Covered

STANDARDS

FEDERAL

FED-STD-H28 - Screw Thread Standards for Federal Services
FED-STD-595 - Colors

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-130 - Identification Marking of U.S. Military Property

DRAWINGS

U.S. ARMY NATICK RESEARCH AND DEVELOPMENT CENTER

5-13-2341	-	Chests, Ice Storage, 200 lb. and 400 lb; Assemblies
5-13-2342	-	Chests, Ice Storage, 200 lb. and 400 lb; Sections and Details
5-13-2343	-	Chests, Ice Storage, 200 lb. and 400 lb.; Sections
5-13-2344	-	Chests, Ice Storage, 200 lb. and 400 lb.; Misc. Details I
5-13-2345	-	Chests, Ice Storage, 200 lb. and 400 lb.; Misc. Details II

OTHER GOVERNMENT DOCUMENTS

UNITED STATES DEPARTMENT OF COMMERCE

PS-1 - Construction and Industrial Plywood

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

(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.)

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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

E 84 - Surface Burning Characterstics of Building Materials

D 3951 - Standard Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(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 4.3, 6.2 and 6.3).

3.2 Materials and components. Materials (see 6.4), and components shall be as specified on the applicable drawings and as specified herein. For materials or components for which it is stated "or equal", if the contractor proposes to use an item considered to be equal to the material or component specified, prior to its use the contractor shall furnish a sample of the material or component, with supporting data to the contracting officer for subsequent evaluation by the responsible Military agency. The supporting data required shall prove the functional equivalence and design compatibility of the item proposed to be used.

3.2.1 Aluminum. Aluminum specified on the drawings shall conform to the following applicable requirements.

3.2.1.1 Bar, rod, and wire. Aluminum alloy bar, rod, and wire shall conform to QQ-A-225/7 or QQ-A-225/8.

3.2.1.2 Plate and sheet. Aluminum alloy plate and sheet shall conform to QQ-A-250/2 or QQ-A-250/8.

3.2.2 Insulation. Insulation shall be foam-in-place self-extinguishing polyurethane material and have a manufacturer's rated "K" factor of not more than 0.15 as specified in ASTM E 84. The insulation shall be fire retardent and self-extinguishing (see 6.5). No insulation sample shall burn for a distance greater than 2-1/4 inches from the end exposed to the test flame. No dripping, flaming particles or droplets shall emit from the samples. Insulation shall have a free rise density of not less than 1.7 pounds per cubic foot when tested as specfied in 4.4.2.2 or an in-place density of not less than 2 pounds per cubic foot when tested as specified in 4.4.2.3.

3.2.3 Wood. Wood members shown on the drawings shall conform to the following applicable requirements.

3.2.3.1 Lumber. All lumber shall be select grade hardwood and conform to type II of MM-L-736.

3.2.3.2 Plywood. Plywood shall be exterior type, group 1, grade B-C, structural II, conforming to PS-1.

3.2.4 Wood preservative. Wood preservative shall contain 99 percent dry-cleaning fluid conforming to type II of A-A-711, and 1 percent solubilized copper-8-quinolinolate, by weight. The solubilized copper-8-quinolinolate shall be free of amines, napthenic acid or its derivative.

3.2.5 Adhesive. Adhesive shall conform to type I, grade A of MMM-A-181.

3.2.6 Primer. The primer for metal surfaces to be painted shall conform to type I, color Y, of TT-P-1757. Prior to primer application, metal surfaces shall be treated as specified in class 1A of MIL-C-5541.

3.2.7 Finish coat for metal surfaces. Unless otherwise specified (see 6.2), the primed surfaces shall be coated with enamel conforming to class g or 1 of TT-E-516 followed by solar heat reflecting olive drab enamel conforming to MIL-E-46096, color No. 34087 of FED-STD-595.

3.2.8 Fastening devices. Bolts, screws, nuts, washers and nails shall conform to the material, type and dimensions as specified on Drawing 5-13-2341. Threads shall be class 2 fit and conform to FED-STD-H28.

3.3 Design. The design of the ice storage chest and all components shall conform to the material, design, and dimensions of this document, assembly Drawing 5-13-2341 and supporting drawings referenced thereon. The storage capacity of each chest shall be based on a standard 300-pound block of ice being cut into three 100-pound pieces approximately 11 by 22 by 15 inches. The size 2 chest shall hold two of these pieces, and the size 4 chest, four of these pieces. The completely fabricated inner liner shall not leak when tested as specified in 4.4.2.4.

3.3.1 Ice picks. Each chest shall be provided with two ice picks conforming to A-A-631.

3.4 Construction.

3.4.1 Wood framing. Wood framing for the body and lid of the ice storage chest shall be fabricated from the lumber specified in 3.2.3.1. Each wood member shall be accurately shaped and joined as indicated on the applicable drawing. The adhesive (see 3.2.5) shall be applied as recommended by the manufacturer, to insure rigid joints of maximum strength. Joints shall be further secured with cement coated nails driven as soon as the pieces are cemented and assembled. Screws shall be countersunk slightly below the wood surface. Before fabrication, wood shall be immersed in the wood preservative as specified in 3.2.4, for not less than 15 minutes and air dried until free of solution. All members trimmed or cut after treatment shall be solution brushed or dipped and dried, prior to assembly.

3.4.2 Welding. The surfaces of parts to be welded shall be cleaned of scale or other foreign matter. All scale and flux deposits shall be removed from the finished welds as specified in MIL-W-8604.

3.4.3 Insulation installation. All space within the inner and outer liner shall be completely filled with foamed-in-place insulation as shown on applicable drawings and as specified in 3.2.2. Prior to foaming, the inner and outer liner bonding surfaces shall be treated in accordance with the manufacturer's standard commercial practice to insure permanent bonding of the insulation.

3.4.4 Finish. All exterior metal surfaces, including cap (top of walls) shall be finished.

3.4.4.1 Inside surfaces. The exposed inner aluminum skin surface of the chest and lid shall not require a protective treatment or finish.

3.4.4.1.1 Cleaning, conditioning and surface preparation. All exposed outer skin surfaces shall be thoroughly cleaned, conditioned and prepared for painting in accordance with class 1A of MIL-C-5541.

3.4.4.1.2 Priming. All metal surfaces prepared for painting shall receive a coat of primer as specified in 3.2.6.

3.4.4.1.3 Finished coat. All surfaces to be painted shall be thoroughly coated with semi-gloss enamel as specified in 3.2.7. The enamel shall be a smooth and uniform film, free from runs, wrinkles, drips and areas of thin or no film.

3.5 Marking for identification. The following markings shall appear on each unit in black, waterproof ink, No. 37038, type I or III of TT-I-1795 located as shown on Drawing 5-13-2341 and in accordance with MIL-STD-130: the letters "U.S." in characters 2 inches high; nomenclature of the item, and manufacturer's name, trade name, or trademark of such known characters as to be easily identifiable with the manufacturer.

3.6 Workmanship. All components and assemblies of the ice chest shall be free from foreign and extraneous material, burrs, slivers, rough die, tool and grind marks, dents and cracks. Castings, molded parts and stampings, if used, shall be free of sand, flashing, pits, blow holes and sprues. External surfaces shall be free from sharp edges and corners, except where corners are required.

3.6.1 Soldering. Seams to be soldered shall be filled and wiped smooth after soldering. Flux shall not be retained by the seam after soldering is completed. Residual flux shall be inhibited by a hot water rinse (see 3.4.2). Solder shall not be used on surfaces of equipment with which unpacked, edible food may come in contact during the normal use of the equipment. Solder shall be type I or II, composition B, conforming to MIL-S-12204. Welding shall be acceptable wherever soldering is specified (see 3.4.2).

3.6.2 Metal fabrication. Metal used in the fabrication of the ice storage chests shall provide for original quality surface finish and shall be free of kinks and unspecified bends. Forming and shearing shall not cause damage to the metal. Corners shall be square and true and all bonds shall be made with dies or fixtures to insure uniformity of size and shape.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

a. First article inspection (see 4.3).
b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for the defects specified in 4.4.3 and 4.4.4. The presence of any defect shall be cause for rejection of the first article.

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

4.4.1 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.

4.4.2 In-process inspection.

4.4.2.1 In-process examination. Examination shall be made to determine that there is no deviation from the following specified requirements. Whenever non-conformance is noted, correction shall be made to the affected item and process.

a. Wood preservative, to determine conformance with method and application of preservative as specified in 3.4.1.

b. Welding, to determine that welding is in conformance with 3.4.2, and applicable drawings.

c. Insulation installation, to determine that the insulation is installed in accordance with 3.4.3 and the applicable drawings.

d. Adhesive, to determine that adhesive is applied as specified in 3.4.1.

e. Metal surfaces; cleaning and conditioning, to determine that the preparation and procedure is as specified in 3.4.4.1.1.

f. Metal surfaces; priming, to determine that primer is applied as specified in 3.4.4.1.2.

g. Framing; construction of the frame, body and lid interiors for conformance with all visual and internal dimensional requirements, of this document and applicable drawings.

4.4.2.2 Free rise denisty test for insulation. Prior to each days production, one free foam sample 8-inch cube shall be taken from the center of the insulation referenced in 3.2.2 and a sample 6-inch cube from it's center shall be cut and weighed. The density shall be determined as follows:

Weight of 6-inch cube in pounds x 8 = Density (pounds per cubic foot)

Inability of samples to conform to the density requirements of 3.2.2 shall constitute failure of the test.

4.4.2.3 In-place density test for insulation. Prior to each day's production the first chest of each size to be foamed shall be identified, weighed and the weight recorded. The chest shall then be foamed and upon completion weighed and the weight recorded. Divide the total pounds of foam (weight differential before and after foaming) by the interior volume of the insulated space to determine conformance with the in-place density requirements of 3.2.2. Inability to conform to the in-place density requirement shall constitute failure of this test.

4.4.2.4 Inner liner leak testing. Prior to being inserted in the frames, the inner liners shall be tested as follows for conformance to the leakage requirement specified in 3.3. The inner liner with plug in place, shall be placed in a jig or frame, filled with water and examined for leakage. Any inner liner showing leakage shall constitute test failure. The lot size shall be expressed in units of inner liners. The sample unit shall be one inner liner. The inspection level shall be S-2 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 6.5.

4.4.3 End item visual examination. The end item shall be examined for the defects listed in table I. The lot size shall be expressed in units of chests of one size only. The sample unit shall be one chest. The inspection level shall be II and the AQL, expressed in terms of defects per hundred units, shall be 2.5 for major defects and 6.5 for total (major and minor combined) defects.

TABLE I. End item visual defects

Examine	Classification Defect	Major	Minor
Finish	Color of finish not as specified		X
	Type of finish not as specified	X	
	Peeled, chipped or scratched, or area of no film		X
	Sharp edges or corners, burrs, or slivers	X	
Construction and general workmanship (applicable to all components and assemblies)	Any part missing, loose, wrinkled, buckled, or not in proper alignment or in place as specified	X	
Rivets	Broken, cracked, loose, missing or improperly formed	X	
Welding	Non-conforming, insufficient, scale or flux deposits not removed	X	
Soldering	Non-conforming, insufficient or flux deposits not removed	X	
Marking	Missing, incomplete, illegible, not as specified or improperly applied		X

4.4.4 End item dimensional examination. The end item shall be examined for conformance to the dimensions specified on the drawings. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of chests of one size only. The sample unit shall be one chest. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 4.0.

4.4.5 Packaging inspection. An examination shall be made to determine that preservation, packing and marking complies with the section 5 requirements. Defects shall be scored in accordance with table II. The sample unit shall be one shipping container fully packaged. The lot size shall be the number of containers in the inspection lot. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

TABLE II. Packaging defects

Examine	Defect
Markings	Missing; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing, damaged or otherwise defective.
Workmanship	Bulged or distorted container.

5. PACKAGING

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

5.1.1 Level A. Each ice chest shall be preserved in accordance with method III of MIL-P-116 as specified herein. The two ice picks shall be placed in their respective holders. A strip of greaseproof barrier material conforming to type I, grade A, class 2 of MIL-B-121 shall be placed between the rubber gasket on the lid and the body of the chest to prevent the gasket from sticking.

5.1.2 Commercial. Ice chests shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or Commercial as specified (see 6.2).

5.2.1 Level A packing. Each chest, preserved as specified in 5.1, shall be packed in a crate conforming to type I, style A of MIL-C-52950. A minimum of 1 inch clearance shall be maintained between projecting parts of the ice chest and interior surfaces of the crate. Anchoring and waterproofing of contents, closure and strapping of the crate shall be in accordance with the appendix of MIL-C-52950.

5.2.2 Level B packing. Each chest, preserved as specified in 5.1, shall be packed as specified in 5.2.1, except that waterproofing shall not be required.

5.2.3 Commercial packing. The ice chests, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951.

5.3 Marking. In addition to any special marking by the contract or purchase order, shipping containers shall be marked in accordance with MIL-STD-129, or ASTM D 3951, as applicable.

6. NOTES

6.1 Intended use. The chests are intended to be used for storage of ice at Military installations.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this document.
b. Size of chests required (see 1.2).
c. When a first article is required (see 3.1, 4.3, and 6.3).
d. If enamel or color is other than required (see 3.2.7).
e. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

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 consisting of one complete ice storage chest. The contracting officer should include specific instructions in all acquisition instruments, regarding arrangements for inspection, test, and approval of the first article.

6.4 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of the document (see 3.6.1).

6.5 Burning characteristics. To meet the relative burning characteristics of this document, the words fire retardant and self-extinguishing shall be construed to mean that the flame shall extinguish within 60 seconds after removal of the burner (see 3.2.2).

6.6 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
Air Force - 99

Review activities:

Army - MD
Air Force - 82
DLA - GS

User activities:

Army - MI
Mavy - MC

Preparing activity:

Army - GL

Project No. 4110-0348

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-C-11198K	Chest, Ice Storage

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

DD FORM 82 MAR 1426

NATICK OP, 1 Apr 84