

INCH-POUND

PPP-C-96E

December 31, 1992

SUPERSEDING

Fed. Spec. PPP-C-96D

March 10, 1972 and

Amendment 3, Aug. 20 1976

and Mil Spec. MIL-L-43762

December 9, 1977

FEDERAL SPECIFICATION

CANS, METAL, 28 GAGE AND LIGHTER

The General Services Administration has authorized the use of this federal specification, for all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification and appendix thereto cover the requirements for new metal cans made of 28 gage and lighter sheet metal plate, and DOT 2P and 2Q metal containers suitable for packaging and packing items for shipment and storage and the packaging, packing, and marking of the filled cans. Also reclosure plastic lids.

1.2 Classification.

1.2.1 Cans. The cans shall be of the following types and shapes, as specified (see 6.1). Closures shall be of the following classes, as specified (see 6.1).

Type I - Round, square, oblong, or pear-shaped, open-top, double-seamed ends (see 3.3.1)

Class 1 - Key-opening (see 3.3.1.1)

Class 2 - Hand-opening (see 3.3.1.2)

Class 3 - Packer's can (see 3.3.1.3)

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

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

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- Type II - Round, soldered side and end seams, soldered vent hole closure (see 3.3.2 and 6.7)
- Type III - Round, open-top, double-seamed ends, key-opening band, with reclosure feature (see 3.3.3)
- Type IV - Round, oval or oblong one piece drawn body, open-top with crimped, soldered, double-seamed, lid, or lid crimped in position by means of an annular band with tear tab, or slip cover lid (see 3.3.4)
 - Class 1 - Key-opening (see 3.3.4.1)
 - Class 2 - Hand-opening (see 3.3.4.2)
 - Class 3 - Slip cover (see 3.3.4.3)
- Type V - Round, square, oval, or oblong, both ends double-seamed on (see 3.3.5)
 - Class 1 - With single friction plug (see 3.3.5.1)
 - Class 2 - With multiple friction plug (see 3.3.5.2)
 - Class 3 - With Newman seal (see 3.3.5.3)
 - Class 4 - With screw cap (see 3.3.5.4)
 - Class 5 - With snap-on (type which is opened by downward pressure in the center) cap (see 3.3.5.5)
 - Class 6 - With rigid spout closure (see 3.3.5.6)
 - Class 7 - With other closures (see 3.3.5.7)
 - Class 8 - With flexible spout closure (see 3.3.5.8)
 - Class 9 - With press-in closure with plastic push-pull spout (see 3.3.5.9)
- Type VI - Round, square, or oblong - bottom, end crimped or double-seamed on, with full friction plug, slip cover or hinged closure (see 3.3.6)
- Type VII - Round, flaring body (see 3.3.7)
 - Class 1 - Bottom end crimped or double-seamed on, with full friction plug or slip cover closure (see 3.3.7.1)
 - Class 2 - Open-top, key-opening, both ends double-seamed on, top end fitted with crown or screw cap closure (see 3.3.7.2)
- Type VIII - Round, dome or cone top, both ends double-seamed on, top end fitted with crown or screw cap closure (see 3.3.8)
- Type IX - Pressurized cans (see 3.3.9)
 - Class 1 - Round can, soldered or welded side seam, double-seamed concave top and bottom (see 3.3.9.1)
 - Class 2 - Round can, soldered or welded side seam, double-seamed concave bottom, double-seamed dome top with 1-inch opening (see 3.3.9.2)
 - Class 3 - Round can, drawn seamless body and dome top with 1-inch opening and double-seamed concave bottom (see 3.3.9.3)
 - Class 4 - Round metal container (DOT-2P) not to exceed 3 inches in diameter and 27.7 fluid ounces (see 3.3.9.4)
 - Class 5 - Round metal container (DOT-2Q) not to exceed 3 inches in diameter and 30.5 fluid ounces (see 3.3.9.5)

1.2.2 Can sizes. Cans shall be of commercial size specified (see 6.1).

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1.2.3 Lids reclosure plastic. Plastic reclosure lids included in this specification shall be of the following sizes, as specified (see 6.1):

Size 1 for 211 diameter can
 Size 2 for 303 diameter can
 Size 3 for 307 diameter can
 Size 4 for 401 diameter can
 Size 5 for 404 diameter can
 Size 6 for 502 diameter can
 Size 7 for 603 diameter can

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

A-A-888	- Can, Screw Cap 28 Gage and Lighter (Limited to Type V, Class 4)
QQ-A-250	- Aluminum and Aluminum Alloy Plate and Sheet; General Specification For
TT-C-495	- Coatings, Exterior, For Tinned Food Cans
TT-E-529	- Enamel, Alkyd, Semigloss Low VOC Content
TT-P-664	- Primer Coating, Alkyd, Corrosion Inhibiting, Lead and Chromate Free, VOC Compliant
PPP-B-576	- Boxes, Wood-Cleated Panelboard
PPP-B-601	- Boxes, Wood, Cleated-Plywood
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	- Boxes, Shipping, Fiberboard

Federal Standards:

FED-STD-101	- Preservation, Packaging, and Packing Materials; Test Procedures
FED-STD-123	- Marking for Domestic Shipment (Civil Agencies)
FED-STD-595	- Color

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

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(Single copies of this specification, and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications:

MIL-E-52891 - Enamel, Lusterless, Zinc Phosphate Styrenated Alkyd Type

Military Standards:

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

(Copies of Military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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

Federal Laws and Regulations

UNITED STATES CODE

Congressional and Administrative News. Public Law 94-580 - Resource Conservation and Recovery Act of 1976.

U.S. Department of Health and Human Services

Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder (21 CFR Parts 1-199). Department of Transportation Rules and Regulations Part 178 Subpart B Specification 2P and 2Q or 49CFR.

(Copies of the Code and Acts may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.)

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2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the non-Government documents which are current on the date of the solicitation.

American Society for Testing and Materials (ASTM)

- A 624 - Tin Mill Products
- A 625 - Standard Specification for Tin Mill Products, Black Plate, Single Reduced
- A 626 - Electrolytic Tin Plate
- A 630 - Standard Test Methods for Determination for Coating Weights for Hot Dip and Electrolytic Tin Plate
- A 657 - Specification for Single and Double-Reduced Black Plate Electrolytic Chromium-Coated Steel
- D 3951 - Standard Practice for Commercial Packaging
- D 4727 - Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Federal Government activities may obtain copies of those non-Government documents which have been indicated in the Department of Defense Index of Specifications and Standards from the DoD Single Stock Point, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Material. The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable, provided it meets the requirement specified. Recycled material shall not affect or be affected by the product being packaged or packed.

3.1.1 Metal. Cans shall be made of aluminum, tinplate, tin free steel, or blackplate, or any combination of these metals, as specified (see 6.1).

3.1.1.1 Aluminum. Aluminum shall conform to QQ-A-250.

3.1.1.2 Tinplate. Electrolytic tinplate shall conform to ASTM A 626, except that the coating weight shall be in accordance with the minimum lot average requirements in table I. The type, grade, and class shall be as

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specified (see 6.1). When specified (see 6.1 and 6.3.2), electrolytic tinplate shall be differentially coated with one side being more heavily coated than the other.

TABLE I. Metallic coating weights

Commercial designation	Nominal coating weight	Minimum lot average <u>1/</u>
<u>Electrolytic tinplate:</u>	<u>(Lbs./base box)</u>	<u>(Lbs./base box)</u>
No. 100	1.00	0.88
No. 75	0.75	0.67
No. 50	0.50	0.44
No. 25	0.25	0.20
No. 135/25	1.35/0.25	1.16/0.18
No. 100/25	1.00/0.25	0.88/0.18
No. 75/25	0.75/0.25	0.67/0.18
No. 50/25	0.50/0.25	0.44/0.18

1/ Individual 4-square-inch test pieces.

3.1.1.3 Tin free steel (TFS or ECLS). Tin free steel shall be in accordance with ASTM A 657 that is electrolytic chromium-coated.

3.1.1.4 Blackplate. Can making blackplate shall be in accordance with ASTM A 625. This plate shall be coated both sides with a baked organic coating.

3.1.1.5 Thickness of metal. Unless otherwise specified in the contract or order, thickness of metal used shall be 28 gage (0.0149 inch) (see 6.4.1) or lighter at the supplier's option and in accordance with established commercial practice for the type can or closure specified.

3.1.2 Gaskets, liners, seaming compounds, and side seam cements. Unless otherwise specified, seaming compounds used in double seams, cements used in side seams, and materials used for gasket or cap liners and facings shall comply with commercial standards.

3.1.3 Flux. The type of flux used and the method of application shall be such that corrosive flux residue is not left on the interior or exterior surfaces of the can. Traces of flux at the edge of the solder line usually encountered in good commercial can manufacture, but not enough to cause corrosion, shall be permitted.

3.1.4 Solder. Solder employed shall be compatible with the materials used in can construction, shall be lead free and be compatible with the material being packaged.

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3.1.5 Plastic, reclosure lids. Plastic, reclosure lids shall be made of material specified in 3.1.5.1 and of design specified in 3.3.1.2.1.1.

3.1.5.1 Plastic material. The plastic material shall be low density polyethylene with antioxidants or other substances incorporated in the plastic and shall conform to the provisions of the Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder. No changes of material initially used shall be permitted without prior approval of the contracting officer. There shall be no odor imparted by the material (see 3.1 and 4.5.1).

3.2 Protective coatings, cans.

3.2.1 Interior coatings. All containers, when used to package materials having a deleterious effect on the metals, or vice versa, shall be coated on the inside with a coating which shall neither affect, nor be affected by, the product packed. The supplier may provide a certificate of compliance that coating used complies with this requirement. Unless otherwise specified (see 6.1) cans with welded side seams shall be provided with an interior side seam stripe. The interior coating on cans used to store potable water and food stuffs shall conform to the Federal Food, Drug and Cosmetic Act and Regulations Promulgated Thereunder.

3.2.2 Exterior nonmetallic coatings. Cans shall be coated on the outside in accordance with one of the following plans, as specified (see 6.1 and 6.2).

3.2.2.1 Plan A. Cans, or parts of cans, made of tin free steel or blackplate shall have a commercial coating on the exterior. Cans, or parts of cans, made of aluminum or tinplate shall have no coating or may have a commercial coating on the exterior at the option of the supplier.

3.2.2.2 Plan B. Tops, bodies, and bottoms of nonfood cans shall be coated on the exterior with an olive drab, or olive green rust inhibiting primer coating conforming to TT-P-664 and overcoated with TT-E-529 or MIL-E-52891, or standard baking enamel used in the commercial production of cans at the option of the contractor. Commercial baking enamel shall be alkyd resin type cross-linked with amelinine or urea formaldehyde type resin. Cans calling for a baked interior lining, shall have exterior coating modified with polyester resin in place of alkyd coating. Exterior coating shall not be required on friction rings. Spot coatings on tops and bodies to facilitate soldering of trimmings shall be permitted. When specified (see 6.1), the side seam shall be striped with a corrosion-resistant coating. The color of the coating shall approximate Olive Drab No. 24087 or Olive Green No. 24004 of FED-STD-595.

3.2.2.3 Plan C. Cans shall be coated on the exterior with coatings conforming to TT-C-495. The type and class of coating required shall be as specified (see 6.1).

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3.3 Design and construction.

3.3.1 Type I. Type I cans shall be round, square, oblong, or pear-shaped, open-top style, with compound-lined, double-seamed ends.

3.3.1.1 Class 1. Type I, class 1 cans shall be provided with a scored key-opening band (tear strip) which shall be located near the top of the can body, as specified (see 6.1). The exact location shall be at the option of the can supplier or manufacturer. The can tear strip shall be formed by two or more scores cut into the inside surface of the can. The tongue of the tear strip shall be tapered and of sufficient length to allow for complete engagement of the key and centered between the score lines. A corrosion resistant metal key shall be furnished with and attached to one end of each can designed for key opening (see figures 1 and 4). The tear strip shall tear evenly, straight and separate completely from the can body without jagged edges when tested in 4.4.5.

3.3.1.2 Class 2. Type I, class 2 cans shall be suitably scored on one end to provide a tear strip with a hand or finger grip affixed to one end of the tear strip (see figure 2).

3.3.1.2.1 Plastic, reclosure lid. When specified (see 6.1), class 2 cans (round) shall have a plastic lid affixed to one end of the can. If the plastic lid is not transparent, it shall be affixed to the nonlabeled end of the can. The plastic lids shall conform to the requirements specified in 3.1.5 and of design specified in 3.3.1.2.1.1.

3.3.1.2.1.1 Design and construction. Lids shall be circular and flat. Lids may have depressed centers. Lids shall be designed to replace removable can tops. Lids shall have a ring on top which permits both lid and can stacking when tested as specified in 4.5.4. The lid skirt shall be designed to fit over the base of the can. Lids shall snap on and not become loose or fall off when tested as specified in 4.5.2. The lids shall not deform or curl when tested as specified in 4.5.3. The manufacturer's trademark or symbol shall be clearly and legibly marked on the top of each lid.

3.3.1.3 Class 3. Type I, class 3 cans shall be round, open-top style, with compound-lined, double-seamed ends.

3.3.2 Type II. Type II flush end cans shall be round, with soldered end and side seams, and fitted with a standard size soldered vent hole closure (see 6.7). The length of the skirt of the ends shall be long enough to provide an adequate solder bond (see figure 3).

3.3.3 Type III. Type III cans shall be round, open-top style, with compound-lined, double-seamed ends. The top shall be designed to fit into the body or over a collar following opening to provide for a reclosure. The body shall have a scored key-opening band near the top. A corrosion-resistant key shall be attached to one end of the can (see figure 4).

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3.3.4 Type IV. Type IV cans shall be round, oval, or oblong, with a one-piece drawn body. Cans shall be open-top style, hermetically sealed, with compound lined, double-seamed or crimped on lids, or soldered on lid; or a lid crimped in position by means of an annular band, or slip cover lid. Methods of opening for type IV cans shall be one of the following classes.

3.3.4.1 Class 1. Type IV, class 1 cans shall be furnished with a scored annular band to facilitate opening by means of metal key or another appropriate device. A corrosion-resistant metal key shall be furnished with and attached to one end of each can designed for key-opening (see figures 4 and 5).

3.3.4.2 Class 2. Type IV, class 2 cans shall be furnished with a top suitably scored to provide a tear strip with a hand or finger grip affixed to one end of the tear strip (see figures 2 and 5).

3.3.4.3 Class 3. Type IV, class 3 cans shall be furnished with a slip cover lid as specified in 3.4.8 (see figure 6).

3.3.4.4 Plastic, reclosure lids. When specified (see 6.1), type IV, class 1 or 2 cans shall have a close-fitting plastic lid affixed securely to one end of the can. The plastic lids shall conform to the requirements specified in 3.1.5 and 3.3.1.2.1.1.

3.3.5 Type V. Type V cans shall be round, square, oval, or oblong. Both ends shall be compound-lined double-seamed in position. Closures for type V cans shall be one of the following classes.

3.3.5.1 Class 1. Type V, class 1 cans shall be fitted with a single friction plug closure (see 3.4.1 and figure 7). When specified (see 6.1), both ends of type V, class 1 containers shall be double-seamed to the body with a dry seam (no compound). When specified (see 6.1), an opening lever device (see 6.4) shall be provided for opening the friction plug closure.

3.3.5.2 Class 2. Type V, class 2 cans shall be fitted with a multiple friction plug closure (see 3.4.1 and figure 8).

3.3.5.3 Class 3. Type V, class 3 cans shall be fitted with a Newman seal closure (see 3.4.2 and figure 9).

3.3.5.4 Class 4. Type V, class 4 cans shall be fitted with a screw cap closure as specified in A-A-888 and shown on figure 10.

3.3.5.5 Class 5. Type V, class 5 cans shall be fitted with a snap-on closure (see 3.4.4 and figure 11).

3.3.5.6 Class 6. Type V, class 6 cans shall be fitted with a rigid spout closure (see 3.4.5.1 and figure 12).

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3.3.5.7 Class 7. Type V, class 7 cans shall be fitted with a cork seal or special lever type or quarter turn (bayonet-lock) type closure, as specified (see 3.4.6, 3.4.7 and 6.1).

3.3.5.8 Class 8. Type V, class 8 cans shall be fitted with a flexible spout closure (see 3.4.5.2 and figures 13 and 14).

3.3.5.9 Class 9. Type V, class 9 cans shall be fitted with a press-in closure (see 3.4.5.3 and figure 15).

3.3.6 Type VI. Type VI cans shall be round, square, or oblong in shape (see 1.2). The can bottom shall be compound-lined, double-seamed, or crimped in position, or, when specified (see 6.1), shall be dry (no compound), double-seamed in position. The can shall be fitted with a full friction plug, slip cover, or hinged lid closure (see 3.4.1, 3.4.8, 3.4.10 and figures 16 and 17).

3.3.7 Type VII. Type VII cans shall be round and have a flaring body.

3.3.7.1 Class 1. Type VII, class 1 cans shall be compound-lined, double-seamed, or crimped bottom end. Cans shall be fitted with full friction plugs or slip cover closures (see 3.4.1, 3.4.8 and figure 18).

3.3.7.2 Class 2. Type VII, class 2 cans shall have compound-lined, double-seamed ends. The cans shall be open-top style with a key-opening band but without reclosure features. A corrosion-resistant key shall be attached to the end or body of the can (see figure 19).

3.3.8 Type VIII. Type VIII cans shall be round with compound-lined, double-seamed ends. One end of the can shall be dome-shaped or conical top and fitted with a screw cap or crown cap closure (see 3.4.3, 3.4.9 and figure 20).

3.3.9 Type IX. Pressurized cans shall be one of the following classes. Class 1, 2, and 3 cans shall not leak when tested as specified in 4.4.4.

3.3.9.1 Class 1. Type IX, class 1 cans shall be round shaped, concave top and bottom, having a valve opening diameter to fit the type of valve specified (see 6.1), with an outside welded side seam. Alternatively, the side seams may be soldered leaving a plain solder margin. The ends shall be compound-lined and double-seamed to the body. Unless otherwise specified (see 6.1), class 1 cans shall be furnished without protective caps (see figure 21).

3.3.9.2 Class 2. Type IX, class 2 cans shall be round shaped, rounded dome top, concave bottom, and with an outside welded side seam. Alternatively, the side seams may be soldered leaving a plain solder margin. The ends shall be compound-lined and double-seamed to the body. Cans shall be fitted with a 1 inch diameter valve and provided with metal or plastic caps to protect the valve (see figure 21).

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3.3.9.3 Class 3. Type IX, class 3 cans shall be round, drawn, seamless bodies and domes, with a 1 inch diameter opening and concave bottom. The bottom shall be compound-lined and double-seamed to the body. Cans shall be fitted with a 1 inch diameter valve and provided with metal or plastic caps to protect the valve (see figure 21).

3.3.9.4 Class 4. Type IX, class 4 (DOT-2P) container shall be seamless, or with seams, welded, soldered, brazed, double-seamed, or swaged. The containers shall meet the requirements of DOT-2P when tested in accordance with 4.4.4.1.

3.3.9.5 Class 5. Type IX, class 5 (DOT-2Q) container shall be seamless, or with seams, welded, soldered, brazed, double-seamed, or swaged. The containers shall meet the requirements of DOT-2Q when tested in accordance with 4.4.4.1.

3.4 Closures. Closures shall be one of the following, as specified (see 6.1).

3.4.1 Friction plugs. Friction plug closures shall be fabricated of the same normal coating weight material as that used in the body of the container. Unless otherwise specified (see 6.1), friction plugs shall be of the regular multiple friction plug type (see figure 8). When specified (see 6.1), friction plugs shall be: single friction plug (see figure 7) or raised multiple friction plug (see figure 8); or full friction plug type (see figure 16).

3.4.2 Newman seal. The Newman seal shall be fabricated from tinplate having the same nominal coating as that specified for the ends of the can. The seal shall be compound-lined and designed to be crimped over the neck which is drawn in the top end of the can so that the final seal is leak-proof (see figure 9).

3.4.3 Screwcaps. The cap and neck of the closure shall be fabricated from tinplate having a nominal tin coating weight of 0.50 pound or greater, or, when applicable (see 6.2), tinplate specified in 3.1.1.2. They shall have a minimum of a 1-1/2 rolled threads. The neck shall be soldered or crimped to the top of the container, or formed in a drawing operation. The top portion of the periphery of the cap shall be knurled to permit removal. Each cap shall be provided with a liner pad and facing. The facing shall be made of material that will provide a leakproof seal (see figure 10). When specified (see 6.1), leakproof plastic screwcaps shall be used. The screwcap and can neck openings shall be compatible. The openings shall be one of the following applicable outside diameters as specified (see 6.1). When the opening size is not specified in the contract or order, it shall be the option of the supplier.

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<u>Can volume</u>	<u>Outside Thread Diameter (Inches) (Nominal)</u>
1 pt.	1, 1-1/4
1 qt.	1, 1-1/4
1/2 gal.	1, 1-1/4
1 gal.	1, 1-1/8, 1-1/4, 1-3/4, 2-7/8
2 gal.	1-1/4, 1-1/2, 1-3/4
5 gal.	1-3/4, 2-7/8

3.4.4 Snap-on-cap. Snap-on closures, which are removed by downward pressure in the center, shall be fabricated from tinplate having a minimum nominal tin coating weight of 0.50 pounds or when applicable (see 6.2), tin free steel of minimum 128 pound base weight. Each cap shall be provided with a liner pad and facing. The facing shall be made of material that will provide a leakproof seal (see figure 11).

3.4.5 Spout closure.

3.4.5.1 Rigid spout closure. Rigid spout closures shall be made of either metal or plastic, as specified (see 6.1), and shall be not less than 7/16 inch nor more than 1-3/8 inches high. When installed, spouts shall be suitably sealed and shall be so constructed as to be opened by perforation, cutting, or other acceptable method. Metal spouts shall be designed for attachment to the can by clinching, rolling, or soldering, or by a threaded cap and gasket. The spout shall be fitted with a small, knurled, threaded, or friction cap capable of resealing the end of the spout after opening. Closures, spouts, liners, pads, and facings (when used) shall be made from materials which will provide a leakproof seal (see figure 12).

3.4.5.2 Flexible spout closure. Flexible spout closures shall be molded of commercial quality polyethylene or comparable plastic. A horizontal type cut off diaphragm of the same material shall be molded as an integral part of the pouring end of the spout. The portion of the spout closure attached to the can shall be molded so as to make a preloaded friction fit on the outside diameter of the sealing portion of the closure when pressed into a preformed opening in the can top end. The opening shall have a downward extruded lip. The spout closure shall have male threads on the pouring end to receive a cap molded of high density polyethylene, or comparable material, with female matching threads. The cap shall have two bails with molded-in-hinges for lifting the spout in the pouring position. The spout shall be either a small size spout (see 3.4.5.2.1), or an intermediate size spout (see 3.4.5.2.2), at the option of the supplier (see figure 14).

3.4.5.2.1 Flexible spout closure, small size. The small size opening shall be $1.365 \pm .003$ inches in diameter. The can top end shall be 95 pound commercial tinplate having a minimum temper of T-3. The spout closure, collapsed or in a shut position, with cap in place, shall stand not more than

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3/16 inch above the top of the can. The spout closure, in the open position and with cap removed, shall extend a minimum of 3/4-inch above the top of the can. The spout closure shall have a pouring opening of not less than 1/2 inch in diameter. The spout closure shall withstand a 25 pound pull without damage when tested in accordance with 4.4.3.

3.4.5.2.2 Flexible spout closure, intermediate size. The opening of intermediate size shall be $1.921 \pm .004$ inches in diameter. The can top end shall be 135 pound commercial tinplate having a minimum temper of T-3. The spout closure, collapsed or in a shut position, with cap in place, shall stand not more than 7/32 inch above the top of the can. The spout closure, in the open position and with cap removed, shall extend a minimum of 1-1/2 inches above the top of the can. The spout closure shall have a pouring opening of not less than 7/8 inch in diameter. The spout closure shall withstand a 30-pound pull without damage when tested in accordance with 4.4.3.

3.4.5.3 Press-in spout closure. The press-in closure shall be supplied in large or small size as specified (see 6.1). The closure shall be an all-plastic assembly, molded of commercial quality polyethylene or comparable plastic. A diaphragm of the same material shall be molded as an integral part of the nozzle portion of the assembly. This diaphragm shall have a finger grip for removal. A captive snap on cap shall complete the assembly (see figure 15). The pouring opening shall be not less than 1-1/2 inches in diameter for the large size and 1-1/32 inches for the small size. The assembly shall be recessed for clearance of the closed spout.

3.4.6 Cork seal. Cans designed for cork seal shall be provided with tapered nozzles to receive corks. The neck of the closures shall be fabricated from tinplate to having a tin coating weight of nominal 0.50 pound or, when applicable, tin free steel (see 3.1.1.3) and shall be soldered to the top of the container. The material shall not be of a lighter gage or weight than the container top in which it is inserted.

3.4.7 Special lever type or quarter-turn (bayonet-lock) type. Closure shall be a lever type or quarter-turn (bayonet-lock) type. Each cap shall be provided with a liner pad and facing. The facing shall be made of materials that will provide a leak proof seal. Lever or quarter-turn type closures shall be fabricated of the same nominal coating weight material as that used in the body of the container.

3.4.8 Slip cover. The cover shall be drawn and provided with a skirt that can be slipped over the top of the open body or neck of the can. When specified (see 6.1), covers shall be supplied with curled edges or special locking features, as specified. Slip cover closures shall be fabricated of the same nominal coating weight material as that used in the body of the container (see figures 6 and 16).

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3.4.9 Crown cap closure. Crown caps shall consist of a drawn shell with serrated skirt having a minimum nominal tin coating weight of 0.25 pound, enameled inside and outside. The shell shall be lined with a pad of flexible plastic or composition cork which shall be supplied plain or when specified (see 6.1), with an adhered metal or coated paper spot, as specified (see figure 20).

3.4.10 Hinged closure. When specified, an overlapping wireless hinged cover shall be hinged on one of the long edges of the upper rim of the can body. Hinged covers shall be fabricated of the same nominal coating weight material as that used in the body of the can (see figure 17).

3.5 Seams.

3.5.1 Top and bottom seams. Unless otherwise specified herein, top and bottom seams shall be crimped and soldered, double-seamed and soldered, or compound lined and double-seamed.

3.5.2 Side seams. Unless otherwise specified, side seams shall be soldered or welded in a continuous and uniform way throughout the length of the seam. Soldered seams shall be wiped to remove excess solder and flux in such a manner as to prevent excess removal of the tin coating which would make the side seam susceptible to corrosion. When specified (see 6.1), cemented, locked "bumped" side seam, or dry (no compound) side seams shall be furnished.

3.6 Handles.

3.6.1 Wire handles. Handles shall be galvanized, plated or coated to resist corrosion.

3.6.2 Type V cans. When specified (see 6.1), 1/2 and one gallon type V cans shall be provided with either a wire handle, attached to the can body by soldered, clinched, spun, or riveted ears, or a formed bridge type handle securely affixed to the top. The wire used for the handle shall have a nominal diameter of not less than 0.1055 (12 gage). Two and five gallon containers shall be provided with either a wire handle or a formed bridge type handle centrally located and securely affixed to the top. The wire used for the handle of the two and five gallon cans shall have a nominal diameter of not less than 0.1350 inch (10 gage). Handles for the 2- and 5-gallon cans shall have a minimum opening of 2-1/2 by 3/4 inch.

3.6.3 Types VI and VII can. When specified (see 6.1), 10 pound, one gallon, and larger types VI and VII cans shall be furnished with a wire handle. The wire used for the handle shall have a nominal diameter of not less than 0.1055 (12 gage). The handle shall be attached to the can body by soldered ears, or when specified (see 6.1) by clinched ears or buttons.

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3.7 Leakage. When specified (see 6.1), cans and closures shall be tested for leakage.

3.7.1 Cans. Cans which are required to be hermetically sealed or liquid tight shall be tested as specified in 4.4.1.1.

3.7.2 Closures. Closures shall not leak when tested as specified in 4.4.1.2.

3.8 Filled containers. Filled containers furnished under this specification shall be closed, packaged, packed, and marked in accordance with the appendix of this specification.

3.9 Identification. Cans shall be marked and labeled as specified in the contract or order (see 6.1).

3.10 Workmanship. Metal components shall be free of laminations, blisters, slivers, rolled-in scales, tears, cracks, cuts, splits, fractures, buckling, dents, wrinkles, or die marks. Finishes shall be free of imbedded foreign matter, chipping, flaking or evidence of corrosion. Plated finishes shall be free of porosity and pits. Coated finishes shall be the color specified, and shall not be tacky. Soldering shall be continuous and adherent. Closures shall fit and shall be operable. Gaskets, liners, or capseals shall not be broken, torn, chipped, or cracked and shall be properly applied.

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 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 specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Unless otherwise specified (see 6.1), acceptance of all components, seals and coatings as specified for the various containers shall be supported by a certificate of compliance from the component manufacturer. The certificate of compliance shall report quantitatively the analysis of those characteristics required by the applicable material specification and table I of this specification. The Government reserves the right to inspect and test all components to determine the validity of the certification.

4.2 Inspection. Sampling for inspection shall be in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

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

4.2.1.1 Visual examination. Examination of the end item cans and reclosure lids shall be made in accordance with the defects in 4.2.1.2. The lot shall be all cans of one type, class and size or reclosure lids offered for inspection at the same time. The sample unit shall be one can or lid. The inspection level shall be II, with an acceptable quality level (AQL) of 4.0, expressed in terms of defects per hundred units.

4.2.1.2 Defects.

4.2.1.2.1 Cans.

- 101 Type, class, shape, size, and type of closure (when applicable) not as specified.
- 102 Material (plate) incorrect; finish not uniform, not free from laminations, blisters, slivers, rolled-in scale, or corrosion.
- 103 Thickness of plate (gage of metal) not within requirements.
- 104 Construction not as specified; container incomplete; components missing, nonconforming, malformed, improperly fitted or positioned; not secure or attached where permanent attachment is required.
- 105 Metal parts not free from cracks, tears, cuts, splits, fractures, buckled body metal, body dents, wrinkles, machine or die marks.
- 106 Type of seam incorrect or improperly formed; open or broken; not sound, incomplete.
- 107 Soldering or welding (where applicable) missing, not continuous, nonadherent; evidence of excessive solder or flux.
- 108 Closure malformed or fails to fit properly; too loose, inoperable, thread missing, crossed, or stripped, thread length less than required (as applicable).
- 109 Dispenser (when applicable) inoperable or fails to function as intended.
- 110 Can not scored to facilitate opening with key; evidence that opening in key will not fit the tab on band; key not corrosion resistant; not positioned and secured as required (when applicable).
- 111 Handle (when required) nonconforming; not secured as specified; wire diameter or handle opening (as applicable) less than the allowable minimum; wire not coated to resist corrosion.
- 112 Gasket, liner, or cap seal not of specified material or broken, cut, torn, chipped, or cracked; improperly fitted or applied.
- 113 Metallic plated finish missing or not as designated; not smooth and uniform; evidence of imbedded foreign matter; not free from chipping, porosity, bare spots, deep scratches, heavy cracks, pits, or corrosion (when applicable).

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- 114 Coated finish missing, incorrect color to type finish; not smooth and uniform; evidence of imbedded foreign matter; not free from tackiness, bare spots, chipping, or flaking (when applicable).
- 115 Marking or label on can missing; incorrect; illegible; or not permanent (when applicable).

4.2.1.2.2 Plastic lids.

- 116 Lid not flat (except for depressed center, when furnished).
- 117 Not circular.
- 118 Ring on top of lid missing.
- 119 Ring not concentric with outer edge of lid.
- 120 Markings not clear, illegible, not located as specified, or not permanent.
- 121 Workmanship, poor, with pits, gouges, burns, tears, or with frayed edges.
- 122 Not size to fit can.

4.2.1.3 Testing of the end item. Tests shall be performed on sample and items applicable to each lot or batch in accordance with table II for the characteristics specified herein. The inspection level shall be S-1. The AQL shall be 4.0, expressed in terms of defects per hundred units. All characteristics are applicable to requirements for individual units, cans, or lids.

TABLE II. (see 4.4.5)

Characteristic	Requirement paragraph	Test procedure
Leakage (cans)	3.7 and 3.7.1	4.4.1.1
Leakage (closures)	3.7 and 3.7.2	4.4.1.2
Tin coating weight	3.1.1.2	4.3.1.1 (lot average)
Base weight of metal	3.1.1.5	4.3.1.2
Bursting strength (pressurized cans)	3.3.9	4.4.4
Flexible spout closure (when required)	3.4.5.2.1 or 3.4.5.2.2	4.4.3
Lids reclosure	3.1.5.1 and 3.3.1.2.1.1	4.5.1, 4.5.2, 4.5.3, and 4.5.4
Tear strip	3.3.1.1	4.4.5

4.2.2 Examination of preparation for delivery. The applicable item shall be examined to determine compliance with the packaging, packing and marking requirements (see section 5). Defects shall be as indicated in the following table. The sample unit shall be one shipping container fully prepared for

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delivery. The lot size shall be the number of containers offered for inspection. The inspection level shall be S-2. The AQL shall be 4.0, expressed in terms of defects per hundred units.

	<u>Examination</u>	<u>Defect</u>
101	Markings (exterior and interior)	Incorrect; missing; illegible; of improper container size, location, sequence, or method of application.
102	Materials	Any nonconforming component; component missing, damaged, or otherwise defective affecting serviceability.
103	Workmanship	Inadequate application of components such as incomplete closure of container flaps; loose strapping; inadequate stapling; bulging or distortion of containers.
104	Weight (exterior container)	Gross weight exceeds requirements.
105	Quantity	Number of lids per interior package or shipping container not as specified.

4.3 Material tests. Tests shall be conducted as follows.

4.3.1 Testing of components. In addition to the quality assurance provisions of the applicable specifications, tests shall be performed on components and materials listed below for the characteristics specified herein.

4.3.1.1 Determination of coating weight.

4.3.1.1.1 Applicability of requirements. The determination of average coating weight requirements of table I for bodies, ends, or other parts of containers shall be made separately for each part.

4.3.1.1.2 Determination of compliance with requirements. Determination of weight of coating shall be made in accordance with the procedure set forth in 4.4.2. However, for referee testing the procedures set forth in 4.4.2 shall be followed. The sample unit for analysis shall be one piece of 4-square inches, except for those parts of containers which are too small. For such parts, the 4-square inches of material shall be obtained by grouping specimens from a number of containers to form each sample unit. For No. 25 electrolytic tinplate, the 4-square inch pieces may be taken from the same lot or batch of sheet metal from which the cans are fabricated.

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4.3.1.2 Determination of base weight of metal. Base weight of metal shall be determined in accordance with ASTM A 624, ASTM A 626 and ASTM A 657, as applicable.

4.4 Tests.

4.4.1 Leakage.

4.4.1.1 Cans. Cans shall be subjected to an internal air pressure of 3 pounds per square inch gage in accordance with Method 5009 of FED-STD-101. Any loss of gage pressure over a 30 minute period shall be cause for rejection. When a water-soap solution or immersion is used, evidence of air leakage indicated by soap bubbles increasing in size or being blown away by escaping air, or evidence of a steady stream or a recurring succession of bubbles from any surface shall be cause for rejection. Rejected cans may have the affected area(s) repaired by a method or process equivalent to that used in the original manufacture and retested.

4.4.1.2 Closure. Cans furnished with closures shall be filled with a penetrating oil having a viscosity of 20 and closure secured. The filled can shall be suspended in an inverted position for four hours at a temperature of 120°F. Alternatively, the closures may be tested by substitution of the product being packaged for the oil and following the same procedure.

4.4.2 Determination of tin coating weight. The tin coating weight shall be determined by one of the following methods of ASTM A 630 (only method B is applicable for testing differentially coated plate):

- A. Bendix test method
- B. Electrolytic method
- C. Sellars method
- D. Titration method

4.4.3 Test for retention of flexible spouts. Affix air-driven test apparatus (see 6.5) to flexible spout and activate to exert required pressure (see 3.4.5.2.1 and 3.4.5.2.2) against can top. Failure to meet the requirement of 3.4.5.2.1 or 3.4.5.2.2, as applicable, shall be cause for rejection of the lot.

4.4.4 Pressure test of type IX, classes 1, 2, and 3 containers. Testing shall be in accordance with standard commercial practice. The test pressure shall be 140 lbs. at 130°F.

4.4.4.1 Bursting strength of type IX, classes 4 and 5. The containers shall be tested as specified in DOT specifications 2P or 2Q as applicable. Bursting below specified pressure shall constitute failure of this test (see 3.3.9.4 and 3.3.9.5).

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4.4.5 Tear strip test. The key shall be engaged with the tongue of the tear strip and rotated clockwise around the circumference of the can to completely remove the tear strip.

4.5 Reclosure lid tests.

4.5.1 Odor test. Odor test shall be as specified in method 4018 of FED-STD-101, except that the sample shall be five lids. Evidence of odor shall constitute failure of this test.

4.5.2 Looseness test. The top of a commercial can of the proper size shall be removed by a can opener and the specified size lid placed on the can. The can shall be inverted. Failure of the lid to snap onto, or stay on, the can shall constitute failure of this test.

4.5.3 Hot water test. The lids shall be placed in $190^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($87.7^{\circ}\text{C} \pm 3^{\circ}\text{C}$) water for a period of 15 ± 1 minute. Evidence of deformation or curling shall constitute failure of this test.

4.5.4 Stacking test. The lid shall be placed on the proper size can. The can shall be placed on top of another can of the same size. Failure to stack properly shall constitute failure of this test.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Reclosure lids shall be packaged level A or C, as specified (see 6.1).

5.1.1 Level A. Fifty reclosure lids shall be placed in one stack and packaged in a tight-fitting plastic bag. The lids shall fit in the bag or the bag may be shrunk to keep the stack in line. The minimum thickness of the film shall be 0.75 mils (0.02 mm). Bag closure shall be by heat seal or mechanical tie.

5.1.2 Level C. The reclosure lids shall be packaged to afford adequate protection against deterioration, contamination or physical damage during shipment from supply source to receiving activity. The package and the quantity per package shall be the same as that normally used by the contractor for retail distribution.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.1).

5.2.1 Level A.

5.2.1.1 Packing of unfilled cans. Unless otherwise specified, unfilled cans and closure devices of the same quantity shall be packed together in wood-crested plywood, wood-crested panelboard or fiberboard boxes conforming to overseas type of PPP-B-601, type I or III class overseas, type I or III style A or B of PPP-B-576 or grade V2s, style RSC of PPP-B-636 respectively.

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Fiberboard separators conforming to ASTM D 4727, type CF, class weather-resistant, variety SW, grades V3c or W5c shall be used between tiers of metal containers. When specified (see 6.1) boxes shall conform to overseas type of PPP-B-601 or overseas type of PPP-B-621. Boxes shall not exceed the size and weight limitations of the applicable box specification. Shipping containers shall be closed and strapped in accordance with the appendix of the applicable box specification.

5.2.1.2 Packing of lids reclosure. Unless otherwise specified, 40 bags, containing two thousand lids, of one size only, packaged as specified in 5.1, shall be packed in a snug-fitting fiberboard box conforming to style RSC-L, V2s of PPP-B-636. When specified (see 6.1) boxes shall conform to overseas type of PPP-B-601 or overseas type of PPP-B-621. The inside of each fiberboard container shall be fitted with a box liner conforming to type CF, class weather-resistant, variety DW, grade V15c of ASTM D 4727. Each box shall be closed in accordance with method III, waterproofed in accordance with method V and reinforced in accordance with the appendix of PPP-B-636.

5.2.2 Level B.

5.2.2.1 Packing of unfilled cans. Unless otherwise specified, unfilled cans and closure devices of the same quantity shall be packed together in wood-crested panelboard boxes conforming to type I or III, style A or B, class domestic of PPP-B-576, or fiberboard boxes conforming to type CF or SF, class domestic, style RSC of PPP-B-636, respectively. Fiberboard separators conforming to type CF, class weather-resistant, variety SW, grade V3c or V5c of ASTM D 4727 shall be used between tiers of metal containers. Boxes shall not exceed the size and weight limitations of the applicable box specification. Shipping containers shall be closed and strapped in accordance with the appendix of the applicable box specification. When specified (see 6.1), fiberboard shipping container, when used, shall be a grade V3c, V3s, or V4s box fabricated in accordance with PPP-B-636 or class overseas of PPP-B-576 and closed in accordance with the appendix thereto.

5.2.2.2 Packing of lids reclosure. Unless otherwise specified, two thousand lids of one size only, packaged as specified in 5.1, shall be packed in a snug-fitting fiberboard box conforming to style RSC-L, type CF, variety SW or type SF, class domestic of PPP-B-636. Each shipping container shall be securely closed in accordance with method II as specified in the appendix of PPP-B-636. When specified (see 6.1), the shipping container shall be a grade V3c, V3s, or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with method III as specified in the appendix of PPP-B-636.

5.2.3 Level C.

5.2.3.1 Packing of unfilled cans. Unfilled cans and closure devices of the same quantity shall be packed together in a manner to insure carrier

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acceptance and safe delivery at destination at the lowest transportation rate for such supplies in accordance with ASTM D 3951.

5.2.3.2 Packing of lids reclosure. Lids, preserved-packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the contractor for retail distribution. Containers shall be in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Civil agencies. Shipping containers shall be marked in accordance with ~~FED-STD-123~~.

5.3.2 Military requirements. Shipping containers shall be marked in accordance with ~~MIL-STD-129~~.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

- (a) Title, number, and date of this specification.
- (b) Type, class, and shape of can and type closure required (see 1.2 and 3.4).
- (c) Size of can (see 1.2.2).
- (d) Metal required (see 3.1.1). If tinplate is required state type, grade, class and if electrolytic tinplate shall be differentially coated (see 3.1.1.2).
- (e) Metallic coating weight required (see table I).
- (f) Exterior nonmetallic coating plan required (see 3.2.2). If plan C is required, state type and class coating required (see 3.2.2.3).
- (g) When welded side seams do not require interior side seam stripes or when soldered side seams require exterior side seam stripes (see 3.2.1 and 3.2.2.2).
- (h) Location of key-opening scored band for type I, class 1 (see 3.3.1.1).
- (i) When plastic reclosure lids are required for type I, class 2 or type IV, class 1 or 2 cans (see 3.3.1.2.1 and 3.3.4.4) and quantity and size (see 1.2.3) required to be shipped with filled cans and required as a separate item.
- (j) When dry double seams (no compound) are required (see 3.3.5.1 and 3.3.6).
- (k) When opening lever device is required for type V, class 1 cans (see 3.3.5.1).

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- (l) Type of valve and size of can opening for type IX cans (3.3.9.1). Aerosol valves may be classified under the following categories based upon the method desired for dispensing the product: Spray, foam, steam, metering, or drop dispensing.
- (m) Type closure required (see 3.4), diameter of neck.
- (n) Plastic screw cap when required (see 3.4.3).
- (o) Whether rigid spout closure shall be plastic or metal (see 3.4.5.1).
- (p) When curled edges or special locking features are required on slip cover cans (see 3.4.8).
- (q) When closure is supplied with an adhered metal or coated paper spot (see 3.4.9).
- (r) When cemented or locked or dry side seams are required (see 3.5.2).
- (s) Size of pouring spout (see 3.4.5.3).
- (t) Handles when required and method of attachment to type V, VI, and VII cans (see 3.6.2 and 3.6.3).
- (u) Leakage test when required for cans or closures (see 3.7).
- (v) Identification markings required on cans (see 3.9).
- (w) When certificate of compliance is not satisfactory (see 4.1.1).
- (x) Level of packing unfilled cans with closures and if weather-resistant fiberboard boxes, cleated plywood or nailed wood boxes are required for level A or B (see 5.2.1.1 thru 5.2.2).
- (y) Soldered plugs or plastic overseals when required (see 30.1.1 and 30.1.3).
- (z) Innerseals when required (see 30.2).
- (aa) Level of packaging and packing of filled cans (see 40.1 and 50.1), and if weather-resistant fiberboard boxes, nailed wood or cleated plywood boxes are required for level A or B packing (see 50.1.1.1, 50.1.2.1 and 5.1.2.2).
- (bb) When sleeve or pads are required (see 50.1.1.1, 50.1.2.1, 50.1.2.1.1 and 50.1.2.2).
- (cc) When palletization is required (see 50.1.4).
- (dd) Whether other than regular multiple friction plug should be used (see 3.4.1).
- (ee) Outside thread diameter of necks for screwcap cans (see 3.4.3).

6.2 Application of plans A, B, and C for exterior coatings.

6.2.1 Plan A. Plan A exterior coatings should be used when extremes of moisture-protection, extreme climatic conditions and extended outside storage are not anticipated.

6.2.2 Plan B. Plan B exterior coatings should be used for all non-food cans where a high degree of moisture protection is required and when extreme climatic conditions and extended outside storage are anticipated.

6.2.3 Plan C. Plan C exterior coating should be used for food cans.

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6.3 Plate base weight and thickness and tin coating thickness (see 3.1.1.5).6.3.1 Plate base weight and thickness.

Base weight* (pounds)*	Theoretical thickness (inch)
135	0.0149
128	0.0141
107	0.0118
100	0.0110
95	0.0105
90	0.0099
85	0.0094
80	0.0088
75	0.0083
70	0.0077
65	0.0072
60	0.0066
55	0.0061

*Weight of standard "base box" containing 112 sheets - 14 x 20 inches. For base weights not included above, the theoretical thickness can be calculated by multiplying the base weight by 0.00011.

6.3.2 Tin coating thickness. Tin coatings in the classes most frequently used are extremely thin. One pound of tin per base box is equivalent to approximately 0.000060 inch on each surface. Accordingly, the thickness equivalent for 0.25 lb. per base box is approximately 0.000015 on each surface. The thickness equivalent for differentially coated plate of 1.00/.25 lb. per base box is approximately 0.000060 inch for the heavier coated surface and 0.000015 for the lighter coated surface.

6.4 Opening device for type V, class 1 cans. The "Lev-A-Lift" friction plug opening device manufactured by the Lev-A-Lift Company, 277 Broadway, New York, NY 10007, has been found suitable for this purpose.

6.5 Device for testing retention of flexible spouts. The "Pull Tester" retention tool manufactured by Rieke Corporation, 500 West 7th Street, Auburn, IN 46706, has been found suitable for this purpose (see 4.4.3).

6.6 Subject term (key word) listing.

Can closure
Double seamed ends
Drawn body

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Friction plug
Hand opening
Key opening
Packers can
Lids reclosure
Lid
Slip cover
Rigid spout
Snap-on
Screw cap

6.7 Type II. Type II is not readily manufactured but may be procured by special order.

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

MILITARY INTERESTS:

Custodians:

Army - GL
Navy - SA
Air Force - 69

Review activities:

Army - ME, MI, SL
Navy - AS, SH, YD
Air Force - 68, 70, 99

User activities:

Army - AV, AT
Navy - MC
DSA - DP

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS
COM

PREPARING ACTIVITY:

Army - GL

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APPENDIX

REQUIREMENTS FOR CLOSURE, PACKAGING, PACKING,
AND MARKING OF FILLED CONTAINERS

10. GENERAL

10.1 Filled containers furnished under this specification shall be closed, packaged, packed, and marked in accordance with the procedures outlined in this appendix.

20. APPLICABLE DOCUMENTS

20.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this appendix to the extent specified herein.

Federal Specifications:

- | | |
|-----------|---------------------------------------|
| PPP-B-585 | - Boxes, Wood, Wirebound |
| PPP-B-601 | - Boxes, Wood, Cleated Plywood |
| PPP-B-621 | - Boxes, Wood, Nailed and Lock-Corner |
| PPP-B-636 | - Boxes, Shipping, Fiberboard |

Federal Standard:

- | | |
|-------------|--|
| FED-STD-101 | - Preservation, Packaging and Packing Materials, Test Procedures |
| FED-STD-123 | - Marking for Domestic Shipment (Civil Agencies) |

Military Standard:

- | | |
|-------------|--|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-129 | - Marking for Shipment and Storage |
| MIL-STD-147 | - Palletized and Containerized Unit Loads 40" x 48" Pallets, Skids, Runners, or Pallet-type Base |

20.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

American Society for Testing and Materials (ASTM) Standards

- | | |
|--------|---|
| D 775 | - Method of Drop Test for Shipping Containers |
| D 3951 | - Standard Practice for Commercial Packaging |

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D 4727 - Specification for Corrugated and Solid Fiberboard
Sheet Stock (Container Grade) and Cut Shapes

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

30. CLOSURE

30.1 Filled can closure. Closure of the filled cans covered by this specification shall be accomplished as indicated in the following paragraphs.

30.1.1 Multiple-friction plugs. When specified (see 6.1), after filling the cans with a specific product being packed, plugs on containers shall be spot soldered to the friction ring at three points equidistant from each other around the periphery of the plug. Alternatively, safety clips, overseals, lugging of plugs after sealing, or any other method of preventing the plug from becoming loose and leaking when filled cases are subject to the drop test specified in 60.2.1, will be acceptable (see 3.4.1).

30.1.2 Newman seal. The Newman seal shall be compound-lined and crimped over the neck, drawn in the top end of the can, to effect a leakproof final seal (see 3.4.2).

30.1.3 Screwcap closure. Screwcaps shall be secured by automatic mechanical means or by cap wrenches. Hand tightening will not be permitted. When specified (see 6.1), self-shrinking plastic overseals shall be applied to provide a tamperproof package (see 3.4.3).

30.1.4 Snap-on closure. Snap-on closure shall be secured by means of fully automatic, semi-automatic, or hand-band closing with crimping tools. The seal shall be protected by tear type metal band made from nominal 0.25 pound tinplate. The band shall cover the sides and partially cover the top of the cap. The band shall be crimped or pierced to provide a tamperproof, shockproof, and leakproof overseal (see 3.4.4).

30.1.5 Spout closure. Spout closure shall be applied to the can neck by rolling, clinching, pressing within the opening, or soldering to prevent leakage (see 3.4.5).

30.1.6 Cork seal. Cork seals shall be firmly seated. The seal shall be protected by a tear type band, nominal 0.25 pound tinplate, or when applicable, tin free steel (see 3.1.1.3), overseal crimped securely over the nozzle (see 3.4.6).

30.1.7 Crown cap. The crown cap seal shall be secured by clinching the cap around the locking ring of the cone top (see 3.4.9).

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30.1.8 Special lever type or quarter-turn (bayonet-lock) type. Lever type or quarter-turn (bayonet-lock) type closures shall be secured by automatic mechanical means or by cap wrenches. Hand tightening will not be permitted (see 3.4.7).

30.2 Innerseal. When innerseals are specified for use with screwcap, snap-on, spout, crown cap, and lever or quarter-turn (bayonet-lock) type closures (see 6.1), the seals shall conform to commercial standards and shall be rolled or tapped firmly into place so as not to damage the liner pad or facing.

30.3 Leakage test. Hermetically sealed cans shall not leak when tested in accordance with 60.2.2.

40. PACKAGING

40.1 Filled cans shall be packaged level A, B, or C as specified (see 6.1).

40.1.1 Level A. Filled cans in the sizes, quantity, and arrangement specified in table Ia shall be packaged in snug-fitting fiberboard boxes conforming to grade W5c, W6c, or W6s, style RSC of PPP-B-636. Boxes shall be closed in accordance with the appendix of PPP-B-636.

40.1.1.1 Cushioning.

40.1.1.1.1 Snug-fitting, full-height half-slotted style interlocking partitions and filler strips of sufficient thickness to form a tight pack, of the same material as used in the box, shall be used.

TABLE Ia. Interior packaging arrangement

Metal cans	Arrangement in Interior box		Total metal cans
	Floored	Tiers	
2 oz. oblong cans	3 by 8	2	48
2 oz. oval cans	3 by 8	2	48
4 oz. oblong cans	4 by 6	1	24
4 oz. oval cans	4 by 6	1	24
4 oz. round friction plug cans	3 by 2	4	24
8 oz. oblong cans	2 by 6	1	12
8 oz. round friction plug cans or square cans	3 by 4	1	12
1 pt. cans (except friction plug)	2 by 6	1	12
Pressurized cans	4 by 6	1	24

40.1.1.2 Two and four ounce cans. Tiers of 2 and 4 ounce cans shall be separated by pads of fiberboard of the same material as used in the box.

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40.1.1.3 Cans with spouts or protruding closures. Protection of the spouts or protruding closures shall be accomplished by providing top cell spaces or buffer pads, formed from scored sheets of the same material as the box. Design, number, and placement of pads shall eliminate movement of the cans and provide a slight clearance between the projecting spouts and caps and the inner walls of the box.

40.1.2 Level B. Filled cans shall be packaged as specified in 40.1.1, except that the boxes, partitions, filler strips, spacers, and pads shall conform to type CF, variety SW, class domestic, grade 175, style RSC of PPP-B-636.

40.1.3 Level C. Filled cans shall be packaged to afford adequate protection against damage during shipment from the supply source to the first receiving activity. The supplier may use his standard practice when it meets the requirements of ASTM D 3951.

50. PACKING

50.1 Filled cans shall be packed level A, B, or C, as specified (see 6.1).

50.1.1 Level A.

50.1.1.1 Packaged cans. Filled cans, packaged as specified in 40, shall be packed in snug-fitting containers conforming to style RSC, grade V2s of PPP-B-636; class 3 of PPP-B-585; class 2 of PPP-B-621, or overseals type style A or B of PPP-B-601. When specified (see 6.1), fiberboard boxes shall be provided with top and bottom pads fabricated from fiberboard conforming to type CF or SF, class weather-resistant, variety SW, grade W6 or W5 of ASTM A 4727. When specified (see 6.1), the fiberboard box shall be provided with a sleeve as specified in PPP-B-636. When specified (see 6.1), filled cans, packaged as specified in 40, shall be packed in snug-fitting containers conforming to class 3 of PPP-B-585; class overseals of PPP-B-621, or class overseals, style A or B of PPP-B-601. Cans shall be packed in the quantity and arrangement indicated in table IIa. Boxes shall be closed and reinforced in accordance with the appendix to the applicable box specification.

50.1.1.2 Unpackaged cans. Filled unpackaged cans shall be packed in containers specified in 50.1.1.1 in quantities and arrangement indicated in table IIa. Cans with spouts, protruding closures, bridge type handles, or fold-over handles shall be protected as specified herein. When filled cans are packed in tiers, a fiberboard pad made of material specified for pads in 50.1.1.1 shall be placed between the tiers. Shipping containers shall be closed and reinforced in accordance with the appendix of the applicable box specification.

50.1.1.2.1 Cans with protruding spouts or closure. Filled cans shall be packed as specified in 50.1.1.2. The cans shall be arranged with closures placed toward the outside of the box. A wood filler strip, built up

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fiberboard pads, half slotted interlocking fiberboard partitions, or top cell fiberboard spacers of sufficient height shall be used to provide a minimum clearance of 1/4 inch between the top of the spout or closure and the interior surface of the top of the closed box. The wood filler strip shall be not less than 3-1/2 inches wide. The built up pads, half slotted partitions, or cell spacers shall be made from material specified for pads in 50.1.1.1.

50.1.1.2.2 Cans, type V, one-half gallon and larger cans with bridge type handles. One-half gallon and larger type V filled cans shall be packed as specified in 50.1.1.2. Cans shall be placed and protected as specified in 50.1.1.2.1.

50.1.1.2.3 Cans, type V, one-half gallon and larger with fold-over type wire handles. One-half gallon and larger type V filled cans with fold-over type handles and without protruding spouts or closures shall be packed as specified in 50.1.1.2. A fiberboard pad as specified in 50.1.1.1 shall be placed over the cans.

50.1.2 Level B.

50.1.2.1 Packaged cans. Unless otherwise specified, filled cans, packaged as specified in 40, shall be packed in a snug-fitting fiberboard box conforming to type CF or SF, class domestic, style RSC of PPP-B-636. When specified (see 6.1), the shipping container shall be class overseas of PPP-B-636 and top and bottom pads shall be fabricated from fiberboard conforming to type CF, or SF, class domestic, 200 pound test of ASTM D 4727 and when specified (see 6.1), shall be class weather-resistant V3c. Cans shall be packed in the quantity and arrangement indicated in table IIa. Boxes shall be closed in accordance with the appendix to PPP-B-636.

TABLE IIa. Exterior packing arrangement

Metal container	Interior packages required	Number	Floored	Tiers	Total metal containers
Types I, II, III, IV, VI, VII, and IX					
4 oz. (oblong)	Yes	4	1 by 2	2	96
8 oz. (oblong)	Yes	6	1 by 3	2	72
1 pt. (oblong)	Yes	4	1 by 2	2	48
1 qt.	No	---	4 by 3	2	24
1 qt. (oblong)	No	---	4 by 3	2	24
1 gal.	No	---	2 by 2	1	4
1 gal. (oblong)	No	---	2 by 3	1	6
5 qt.	No	---	2 by 2	1	4
2 gal. (oblong)	No	---	2 by 2	1	4

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TABLE IIa. Exterior packing arrangement (cont'd)

Metal container	Interior packages required	Number	Floored	Tiers	Total metal containers
Types V and VIII - Except friction plug cans					
2 oz.	Yes	4	1 by 2	2	192
4 oz.	Yes	4	1 by 2	2	96
6 oz.	Yes	6	1 by 3	2	72
1 pt.	Yes	4	1 by 2	2	48
1 qt.	No	4	4 by 6	1	24
1 gal.	No	---	2 by 3	1	6
2 gal.	No	---	2 by 2	1	4
5 gal.	No	---	1 by 2	1	2
Type V - Friction plug cans					
4 oz.	Yes	4	1 by 2	2	96
8 oz.	Yes	6	1 by 2	3	72
1 lb.	No	---	4 by 6	2	48
5 lb.	No	---	3 by 2	2	12
1 pt.	No	---	4 by 4	2	48
1 qt.	No	---	3 by 2	2	12
1 gal.	No	---	2 by 2	1	4

50.1.2.1.1 When specified (see 6.1), the fiberboard shipping container shall be grade V3c, V3s, or V4s box conforming to PPP-B-636 and closed in accordance with the appendix thereto and the fiberboard pads shall be weather-resistant.

50.1.2.2 Unpackaged cans. Unless otherwise specified, filled unpackaged cans shall be packed in containers specified in 50.1.1.2 in quantities and arrangement indicated in table IIa. Cans with protruding spouts or closures, bridge type handles, and fold-over handles shall be protected as specified in 50.1.1.2, except that the fiberboard shall conform to type CF or SF, class domestic, grade 200 of ASTM D 4727. When cans are packed in tiers, a fiberboard pad made of material specified herein, shall be placed between the tiers. When specified (see 6.1), class weather-resistant fiberboard shall be used.

50.1.3 Level C. Filled cans shall be packed in a manner to insure acceptance by common carrier and safe delivery at destination at the lowest transportation rate for such supplies and in accordance with ASTM D 3951.

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50.1.4 Palletization. When specified (see 6.1), filled cans packed as specified shall be palletized in accordance with load type I of MIL-STD-147. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means K and L. Pallet patterns shall be in accordance with the appendix of MIL-STD-147. Interlocking of loads shall be effected by reversing the pattern of each course. If the container is of a size which does not conform to any of the pallet patterns specified in MIL-STD-147, the pallet pattern used shall first be approved by the contracting officer.

50.1.5 Marking.

50.1.5.1 Civil agencies. In addition to any special marking required by the contractor or order, interior packages and shipping container shall be marked in accordance with FED-STD-123.

50.1.5.2 Military requirements. In addition to any special marking required by the contract or order, interior packages, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129.

60. INSPECTION AND TEST PROCEDURES

60.1 Inspection. Examination shall be made to determine that cans are closed, packaged, packed, palletized and marked as required by this appendix. Inspection level shall be S-2 of MIL-STD-105 with an AQL of 4.0, expressed in terms of defects per hundred units. The lot shall be all of the items offered for inspection at one time.

60.1.1 Closure. The sample unit for this examination shall consist of one filled closed can of each type, class, and size. Defects shall be as indicated in table IIIa.

TABLE IIIa. Examination of closure

Examination	Defect
Closure	Does not fit properly.
Innerseal (when required)	Missing, not seated, damaged.

60.1.2 Packaging, packing, and marking. The sample unit for this examination shall be one shipping container fully prepared for delivery. Defects shall be as indicated in table IVa.

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TABLE IVa. Examination of packaging, packing, and marking

Examination	Defect
Markings, interior and exterior	Omitted, incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Component missing or damaged or otherwise defective, such as pads, sleeves, etc., when required.
Workmanship	Inadequate application of components, such as bulging or distortion of containers.
Contents	Quantity and arrangement of cans in interior and exterior containers not as specified.
Packaging and packing	Level not as specified.

60.1.3 Palletization. The sample unit for this examination shall be one palletized unit load ready for shipment. Defects shall be as indicated in table Va.

TABLE Va. Examination of palletization

Examination	Defect
Finished dimension	Length, width, or height exceeds specified maximum requirement.
Palletization	Pallet pattern not as specified. Interlocking of loads not as specified. Load not bonded with required straps specified.
Weight	Exceeds maximum load limits.
Marking	Omitted; incorrect; illegible; of improper size, location, sequence or method of application.

60.2 Tests.

60.2.1 Drop test for alternate method of secured multiple-friction plugs. Five shipping containers packed with alternate method of secured multiple-friction plug sealed cans containing the commodity specified in the contract or order shall be dropped from a height of 18 inches on a solid surface successively on one corner, all three radiating edges and all six flat

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surfaces as specified in ASTM Standard D775. The ability of all plugs to withstand this handling without becoming removed from the friction ring shall be considered sufficient evidence to warrant adoption of the alternate method chosen.

60.2.2 Leakage. The seams of hermetically sealed cans shall be tested for leakage in accordance with method 5009 of FED-STD-101. Cause for rejection shall be as specified in 4.4.1.1.

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SECTION A-A

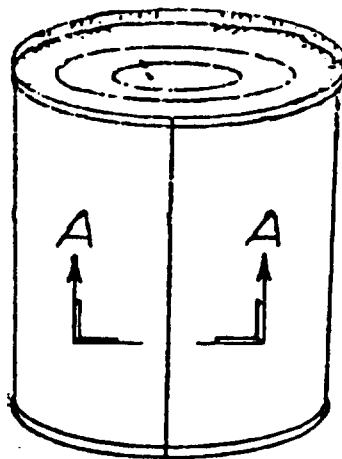


FIGURE 1. TYPE I, CLASS 1, OPEN TOP STYLE, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH KEY OPENING.

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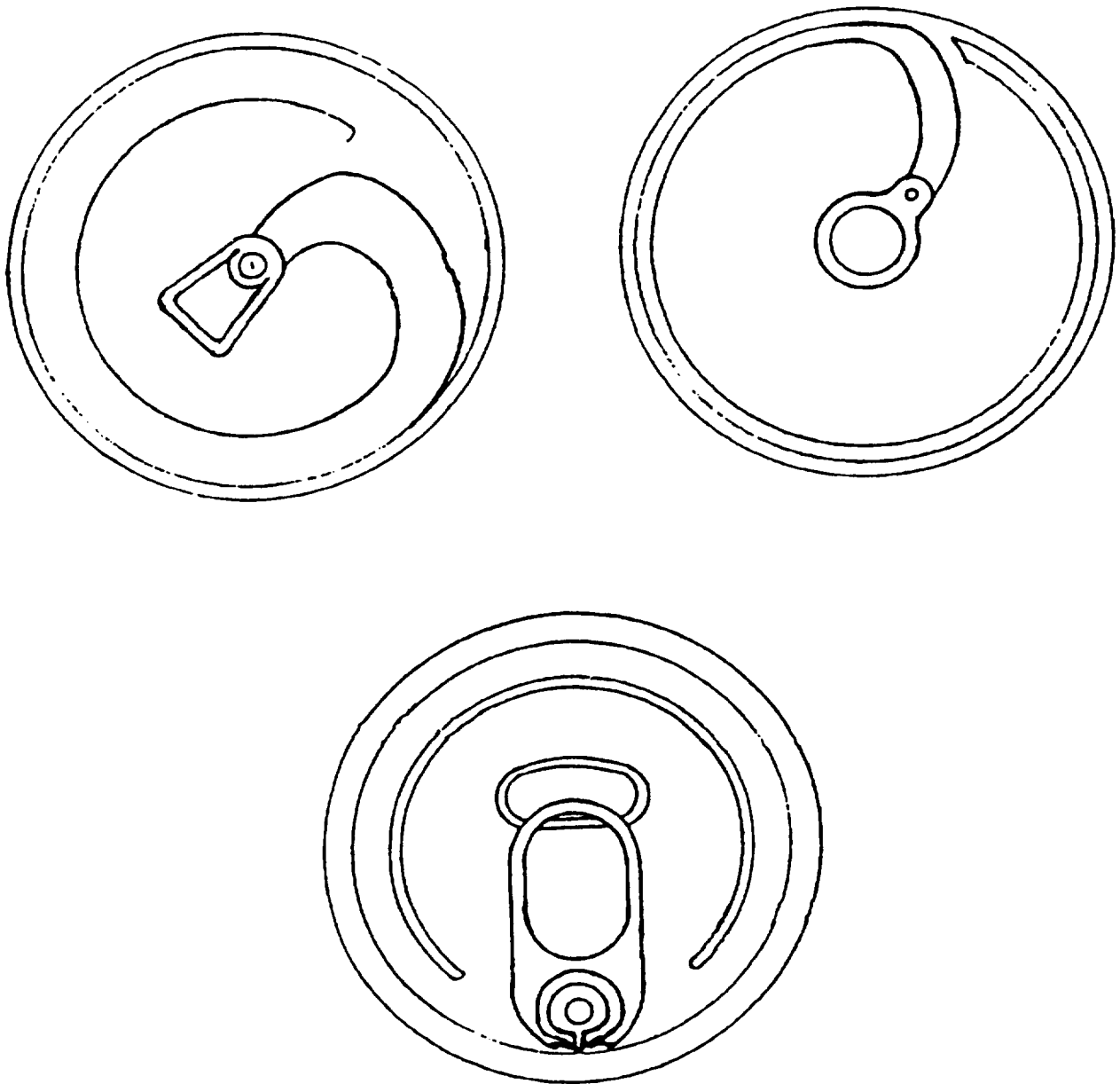


FIGURE 2. TYPE I, CLASS 2, OPEN TOP STYLE, COMPOUND LINED, DOUBLE-SEAMED ENDS, HAND OPENING, TEAR STRIP WITH HAND OR FINGER GRIP AFFIXED TO ONE END FOR HAND OPENING.

PPP-C-96E

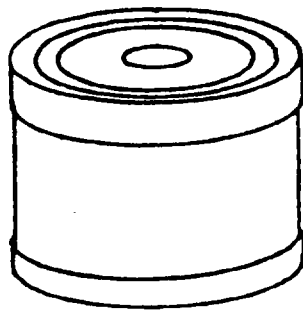


FIGURE 3. TYPE II, SOLDERED SIDES AND END SEAMS.

PPP-C-96E

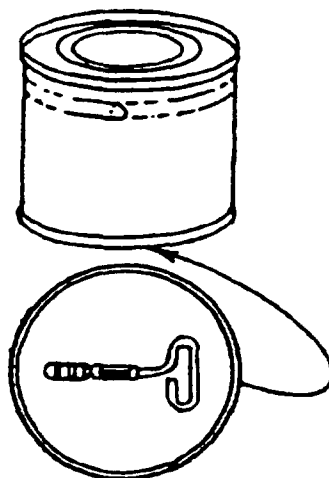
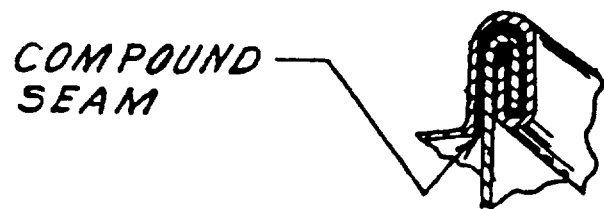


FIGURE 4. TYPE III, OPEN TOP STYLE, KEY OPENING BAND, RECLOSURE FEATURE, COMPOUND-LINED DOUBLE-SEAMED ENDS.

PPP-C-96E



SECTION A-A

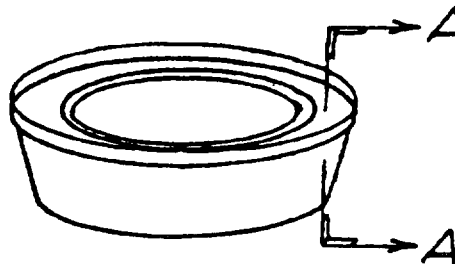


FIGURE 5. TYPE IV, OPEN TOP STYLE, COMPOUND-LINED, DOUBLE-SEAMED END DRAWN BODY.

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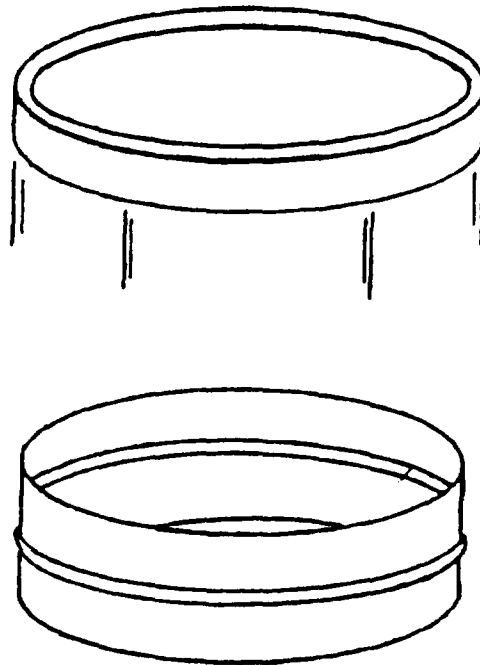
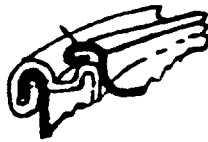


FIGURE 6. TYPE IV, CLASS 3, OPEN TOP STYLE, DRAWN BODY, SLIP COVER.

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SECTION A - A.

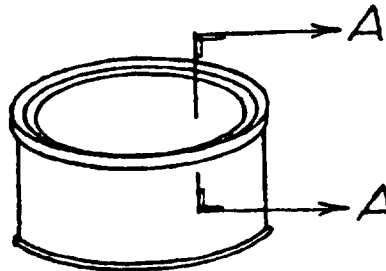
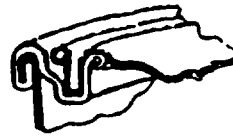
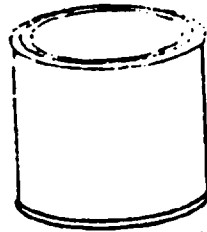
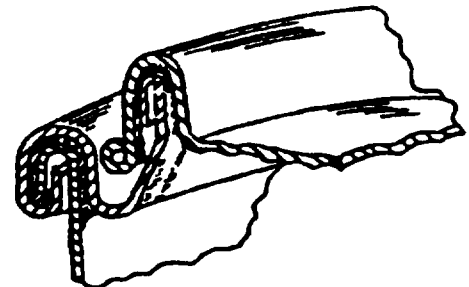
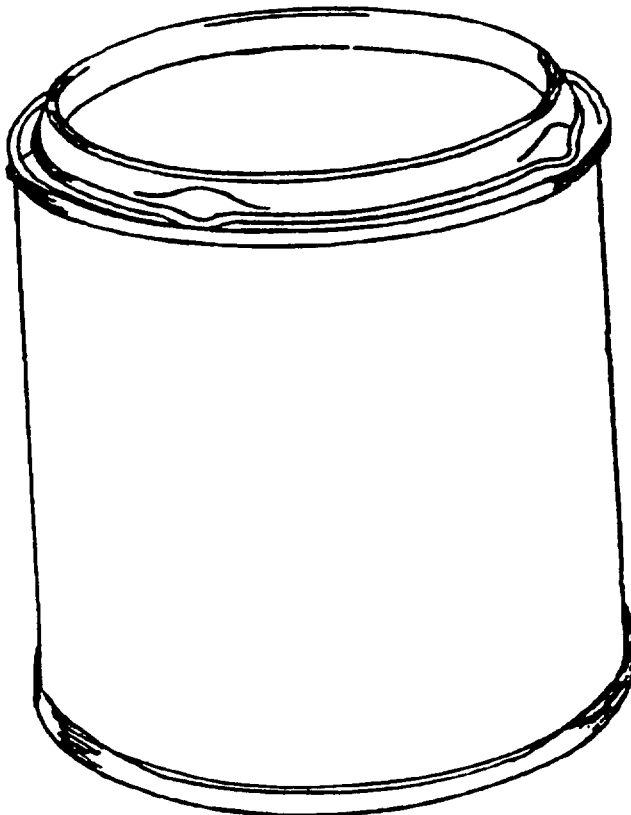


FIGURE 7. TYPE V, CLASS 1, COMPOUND-LINED, DOUBLE SEAMED
ENDS WITH SINGLE FRICTION PLUG CLOSURE.

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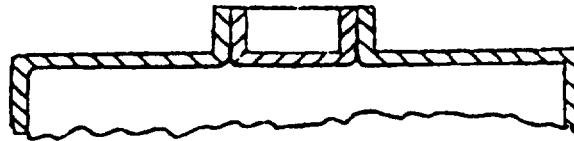
*REGULAR MULTIPLE
FRICTION CLOSURE*



*RAISED MULTIPLE
FRICTION CLOSURE*

**FIGURE 8, TYPE V, CLASS 2, COMPOUND LINED, DOUBLE-
SEAMED ENDS WITH MULTIPLE FRICTION CLOSURE.**

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SECTION A-A

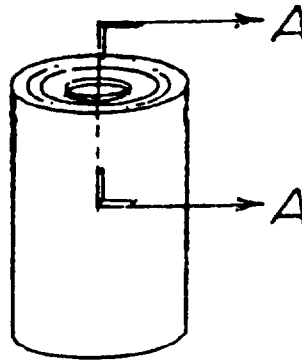


FIGURE 9. TYPE V, CLASS 3, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH NEWMAN SEAL CLOSURE.

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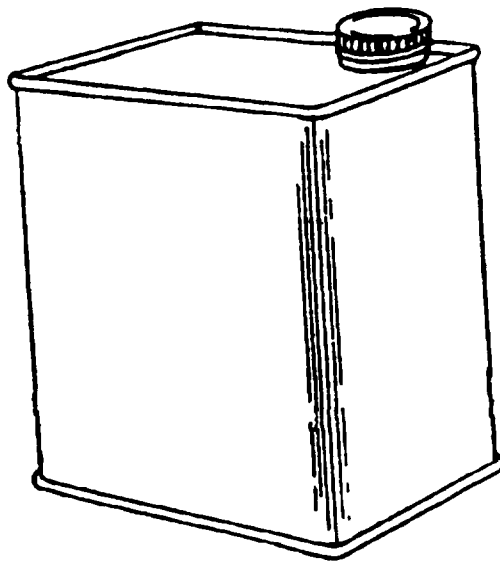


FIGURE 10. TYPE V, CLASS 4, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH SCREW CAP CLOSURE.

PPP-C-96E

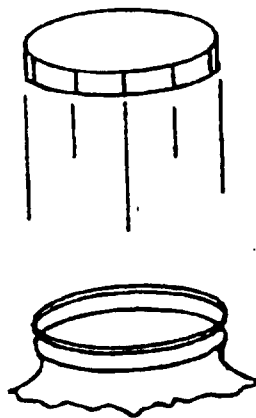


FIGURE 11. TYPE V, CLASS 5, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH SNAP-ON CLOSURE.

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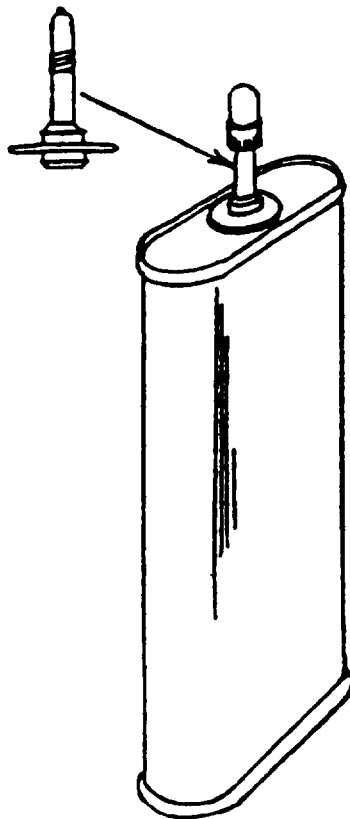


FIGURE 12. TYPE V, CLASS 6, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH RIGID SPOUT CLOSURE.

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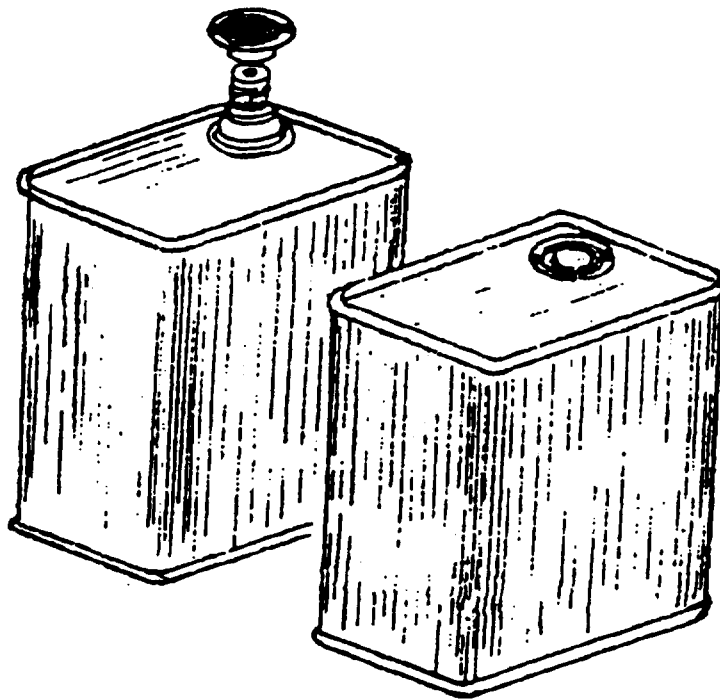


FIGURE 13. TYPE V, CLASS 8, COMPOUND-LINED, DOUBLE-SEAMED ENDS WITH FLEXIBLE SPOUT CLOSURE.

PPP-C-96E

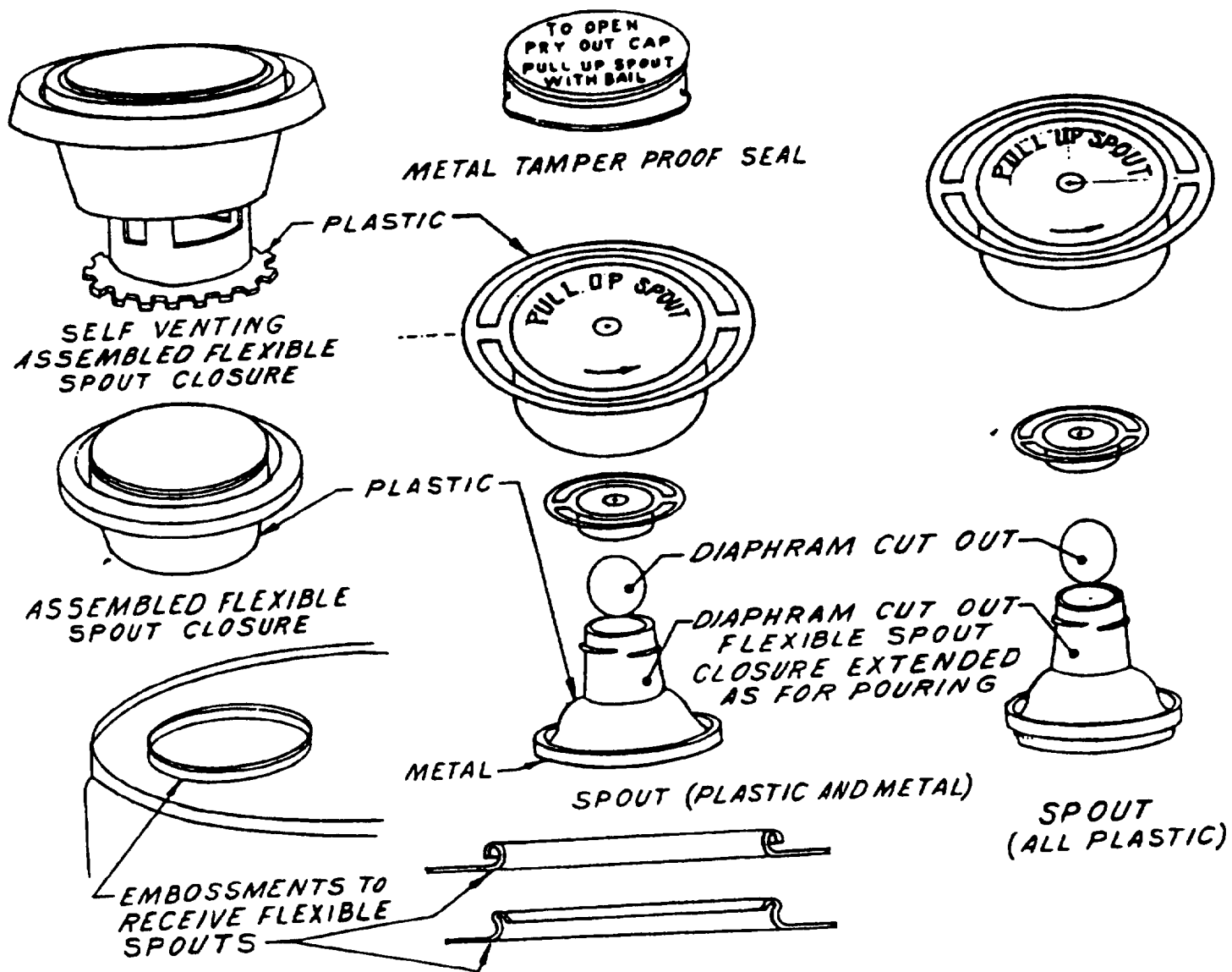


FIGURE 14. FLEXIBLE SPOUTS.

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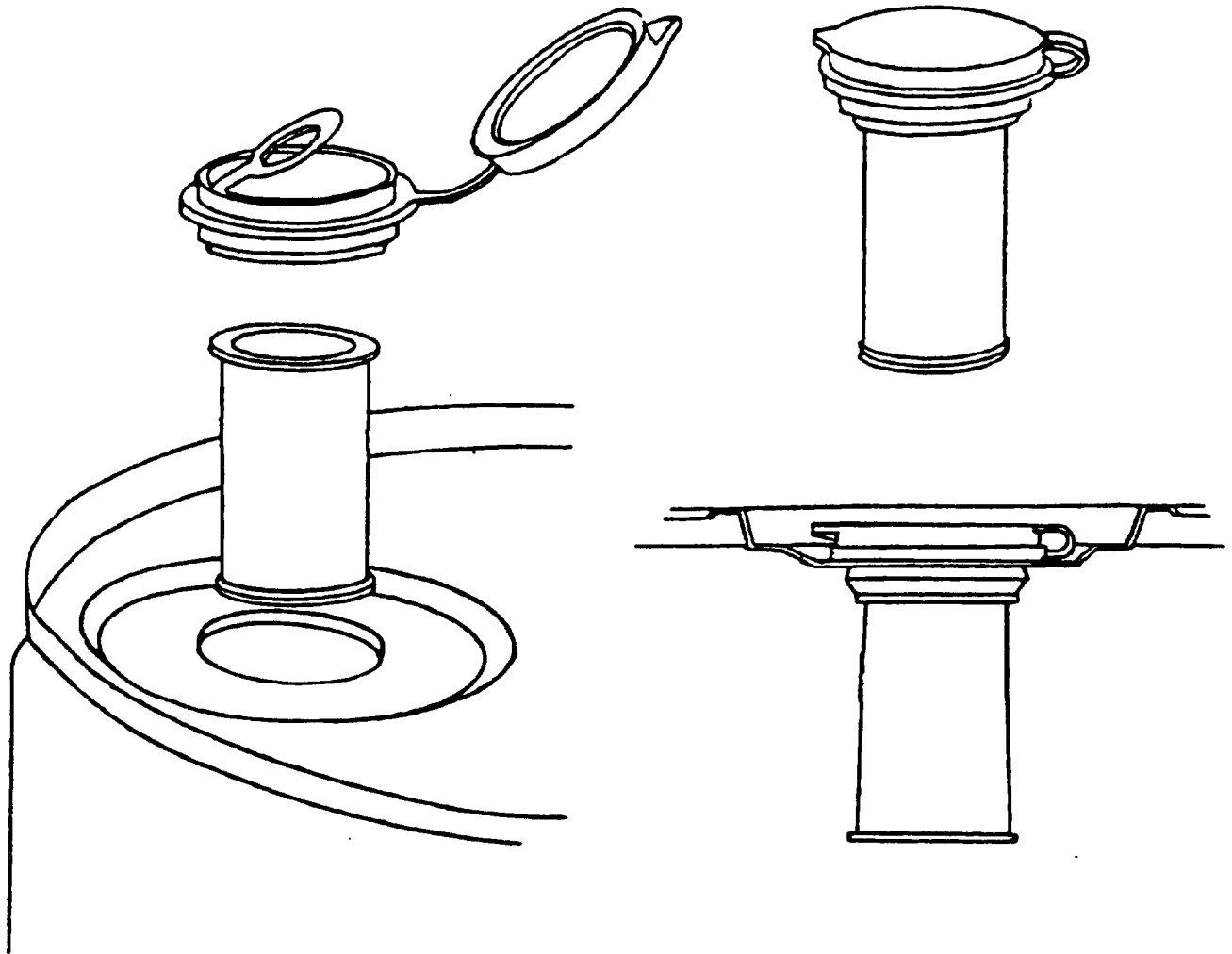


FIGURE 15. TYPE V, CLASS 9, CLOSURE WITH PLASTIC PUSH-PULL SPOUT.

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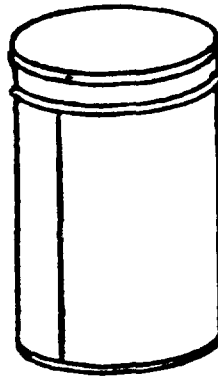


FIGURE 16. TYPE VI, COMPOUND-LINED, DOUBLE-SEAMED ENDS
WITH SLIP COVER OR FULL FRICTION PLUG CLOSURE.

PPP-C-96E

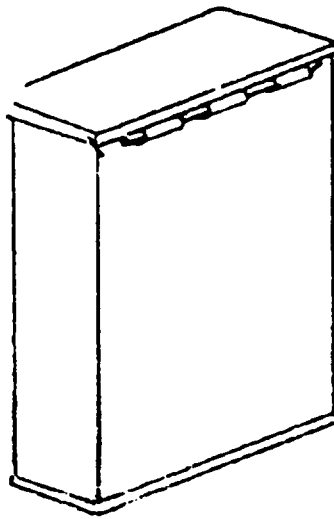


FIGURE 17. TYPE VI, DRY DOUBLE-SEAMED END WITH HINGED CLOSURE.

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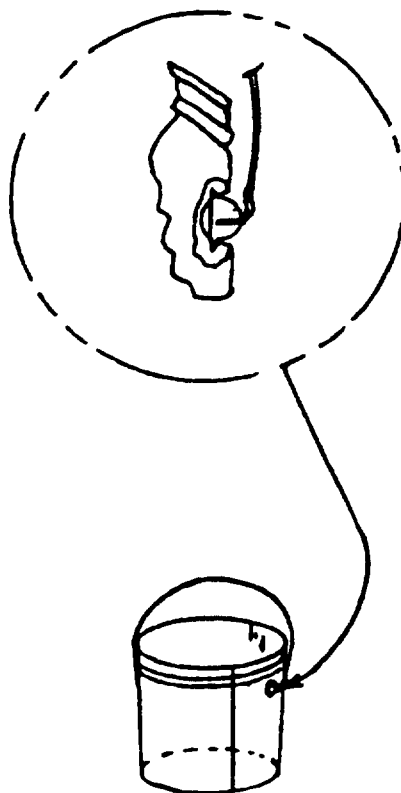


FIGURE 18. TYPE VII, CLASS 1, ROUND FLARING BODY, COMPOUND-LINED, DOUBLE-SEAMED END WITH FULL FRICTION OR SLIP COVER CLOSURE.

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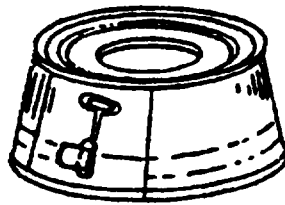


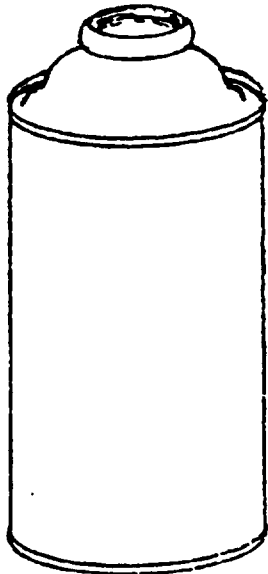
FIGURE 19. TYPE VII, CLASS 2, ROUND, FLARING BODY COMPOUND-LINED,
DOUBLE-SEAMED ENDS WITH KEY ATTACHED.

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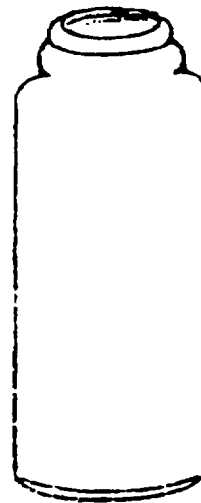


FIGURE 20. TYPE VII, COMPOUND-LINED, DOUBLE-SEAMED
ENDS, CROWN CAP OR SCREW CAP.

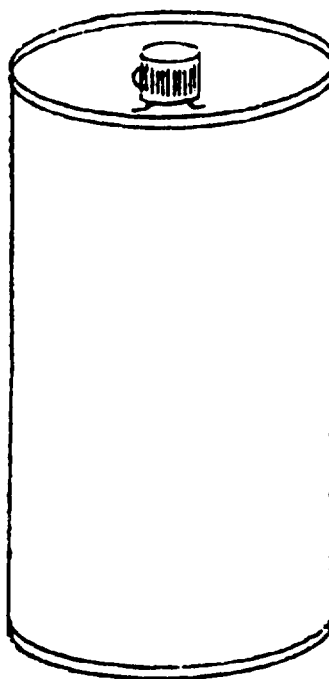
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*CLASS 2
DOME TOP, CONCAVE
BOTTOM*



*CLASS 3
DOME TOP, CONCAVE
BOTTOM, DRAWN
SEAMLESS BODY*



*CLASS 1
CONCAVE TOP AND BOTTOM*

FIGURE 21. TYPE IX, PRESSURIZED CANS.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

RECOMMEND A CHANGE:	1. DOCUMENT NUMBER PPP-C-96E	2. DOCUMENT DATE (YYMMDD) 1992 December 31
	3. DOCUMENT TITLE CANS, METAL, 28 GAGE AND LIGHTER	
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		

5. REASON FOR RECOMMENDATION

4. SUBMITTER		
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (3) (If Applicable)	e. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME U.S. Army Natick RD&E Center	b. TELEPHONE (Include Area Code) (1) Commercial 508-651-4501	(2) AUTOVON/DSN 256-4501
c. ADDRESS (Include Zip Code) Commander, U.S. Army Natick RD&E Center ATTN: SATNC-WTP Natick, MA 01760-5018	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	