INCH-POUND

MIL-W-10430D
22 March 1994
SUPERSEDING
MIL-W-10430C
11 February 1985
(See 6.10)

MILITARY SPECIFICATION

# WELDING RODS AND ELECTRODES; PACKAGING OF

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

## 1. SCOPE

1.1 Scope. This specification covers the requirements for the packaging of covered and bare welding rods and electrodes as required for each level of protection (see 6.5.1).

1.2 Classification. The classes of unit containers are as follows, as specified (see 6.2).

| Classes of unit containers | Unit form | Container net weight |
|---|---|---|
| Class 1a Metal container | Covered electrodes - cut lengths | 12 pounds and under |
| Class 1b Metal container | Covered electrodes - cut lengths | 50 pounds and under |
| Class 1c Vacuum package | Covered electrodes - cut lengths | 20 pounds and under |
| Class 2 Fiber container | Covered electrodes - cut lengths | 1 pounds and under |
| Class 3a Spools | Bare electrodes and rods - continuous length | 2-1/2 pounds or less |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 03Q42, 2531 Jefferson Davis Highway Arlington, VA 22242-5160 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A AREA PACK

| Classes of unit containers | Unit form | Container net weight |
|---|---|---|
| Class 3b Spools | Bare electrodes and rods - continuous length | 750 pounds or less |
| Class 3c Rims | Bare electrodes and rods - continuous length | 25, 50, or 60 pounds (as specified) |
| Class 3d Coils | Bare electrodes and rods - continuous length | 65 pounds and under |
| Class 3e Coils | Bare electrodes and rods - continuous length | Over 65 pounds |
| Class 4 Drums | Bare electrodes and rods - continuous length | (as specified by the purchaser) |
| Class 5 (see 3.6.1.1.1.5) | Covered or bare electrodes - cut lengths | 50 pounds and under |
| Class 6a Fiberboard box | Bare electrodes and rods - cut lengths | 5 or 10 pounds |
| Class 6b Fiberboard box | Bare rods - cut lengths | 25 pounds |
| Class 6c Fiberboard box | Bare rods - cut lengths | 50 pounds |
| Class 6d Spiral-wound fiber tube | Bare electrodes and rods - cut lengths | 5 or 10 pounds |
| Class 7 Bundles | Bare rods - 36-inch cut lengths | 5, 10, 25, or 50 pounds |
| Class 8 Plastic | Bare electrodes and rods - cut lengths | 3 or 10 pounds |
| Class 9 Sacks, drums, and metal containers | Flux - granular | See 3.6.1.1.1.9 and 6.2 |

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and Supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

| | |
|---|---|
| TT-E-485 | - Enamel, Semigloss, Rust-Inhibiting. |
| UU-S-48 | - Sacks, Shipping, Paper. |
| MMM-A-260 | - Adhesive, Water-Resistant, (for Sealing Waterproofed Paper). |
| PPP-B-566 | - Boxes, Folding, Paperboard. |
| PPP-B-576 | - Boxes, Wood, Cleated, Veneer, Paper Overlaid. |
| PPP-B-585 | - Boxes, Wood, Wirebound. |
| PPP-B-591 | - Boxes, Shipping, Fiberboard, Wood-Cleated. |
| PPP-B-601 | - Boxes, Wood, Cleated-Plywood. |
| PPP-B-621 | - Boxes, Wood, Nailed and Lock-Corner. |
| PPP-B-636 | - Boxes, Shipping, Fiberboard. |
| PPP-B-640 | - Boxes, Fiberboard, Corrugated, Triple-Wall. |
| PPP-B-676 | - Boxes, Setup. |
| PPP-B-1055 | - Barrier Material, Waterproofed, Flexible. |
| PPP-D-723 | - Drums, Fiber. |
| PPP-P-704 | - Pails, Metal: (Shipping, Steel, 1 Through 12 Gallons). |

MILITARY

| | |
|---|---|
| MIL-P-116 | - Preservation, Methods of. |
| MIL-B-117 | - Bags, Sleeves and Tubing. |
| MIL-C-3955 | - Cans, Composite, Spirally Wound. |
| MIL-D-6054 | - Drum, Metal, Shipping and Storage. |
| MIL-P-15011 | - Pallets, Material Handling, Wood Post Construction, 4-Way Entry. |
| MIL-L-19140 | - Lumber and Plywood, Fire-Retardant Treated. |
| MIL-T-43036 | - Tape, Pressure-Sensitive Adhesive, Plastic Film, (for Sealing Fiber Containers and Cans). |

STANDARDS

MILITARY

| | |
|---|---|
| MIL-STD-109 | - Quality Assurance Terms and Definitions. |
| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-147 | - Palletized Unit Loads. |
| MIL-STD-1186 | - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods. |

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

Code of Federal Regulations, Title 29
Part 1910 - Occupational Safety and Health Standards.

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

2.2 Non-Government Publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
MH15.1 - Glossary of Packaging Terms.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
D 775 - Standard Test Method for Drop Test for Loaded Boxes.
D 996 - Standard Terminology of Packaging and Distribution Environments. (DoD adopted)
D 997 - Standard Test Method for Drop Test for Loaded Cylindrical Containers.
D 999 - Standard Methods for Vibration Testing of Shipping Containers.
D 1185 - Standard Test Methods for Pallets and Related Structures Employed in Materials Handling and Shipping.
D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)
D 3953 - Standard Specification for Strapping, Flat Steel and Seals. (DoD adopted)
D 4675 - Standard Guide for Selection and Use of Flat Strapping Materials. (DoD adopted)
D 4727 - Standard 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.)

AMERICAN WELDING SOCIETY (AWS)
Z49.1 - Safety in Welding and Cutting. (DoD adopted)

(Application for copies should be addressed to the American Welding Society, 550 N.W. LeJeune Road, P.O. Box 351040, Miami, FL 33135.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Definitions or explanation of packaging terms. Definitions or explanation of packaging terms applicable to this specification shall be as stated in 6.5. For definitions or explanation of packaging terms not specified therein, ANSI MH15.1 and ASTM D 996 shall apply.

3.2 Order of precedence. When welding rods or electrodes are acquired in conformance to a commodity specification having detailed packaging or preparation for delivery requirements which differ from this specification, the packaging or preparation for delivery requirements specified in the commodity specification shall apply.

3.3 Materials. Materials shall be as specified herein (see 6.7 and 6.8). Material not definitely specified shall be of commercial quality and entirely suitable for the purposes for which used. Materials for packaging shall be free from defects and imperfections that will affect the service-ability of the package product.

3.3.1 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.3.2 New materials. The use of newly developed packaging materials or procedures are encouraged and recommended and will be permitted under the conditions specified herein, provided they are equal or better than the specified materials or procedures (see 6.3 and 6.7). The packing material shall not increase the use of plastic materials for Navy and all materials shall be of a fire retardant (see 3.3.4) variety.

3.3.3 Asbestos material. Asbestos or items containing asbestos material shall not be used in the packaging of welding rods, wire, and electrodes.

3.3.4 Navy fire-retardant requirements.

(a) Lumber and plywood. When specified (see 6-2), all lumber and plywood including laminated veneer materials used in shipping container and pallet

construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated materials conforming to MIL-L-19140 as follows:

Level A and B - Type II - weather resistant
Category I - general use.
Level C - Type I - non-weather resistant
Category I - general use.

(b) Fiberboard. Fiberboard used in the construction of unit containers shall conform to the class domestic/fire retardant or class-weather resistant/ fire retardant materials as specified (see 6.2), in accordance with ASTM D 4727.

3.4 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

3.5 Packaging details. Packaging details shall be as specified in 3.6 through 3.8 (see 6.2, 6.3, and 6.9).

3.6 Packaging.

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

3.6.1.1 Level A.

3.6.1.1.1 Unit pack (containers). The unit containers shall be in accordance with the classes specified in table I. When one or more classes are specified in table I, the class selection shall be restricted to the weight limitations specified herein.

TABLE 1. Summary of level A packaging weights for electrodes (covered and bare) and rods (bare).

| Covered electrodes - cut length (except aluminum) [1] | | | | |
|---|---|---|---|---|
| Lengths (inches) | Class unit container Net weight (pounds) [11] | | | |
| | 1a and 1c | 1b | 2 | 5 |
| 9 | [2] 5, 6 or 10 | - | - | 25 |
| 12 | [2] 8 or 10 | [2] 25, 40 or 50 | [2] 5 or 10 | [2] 25, 40 or 50 |
| 14 | [2] 9 or 10 | [2] 25 or 50 | [2] 5 or 10 | 50 |
| 18 | [2] 12 or 20 | 50 | 12 | 50 |

| Bare electrodes and rods - continuous length | | | | | | |
|---|---|---|---|---|---|---|
| | Class unit container net weight (pounds) [3], [11] | | | | | |
| | 3a | 3b | 3c | 3d | 3e | 4 |
| Wounds on: | | | | | | |
| Spools | X[4] | X[5] | - | - | - | - |
| Rims | - | - | X[6] | - | - | - |
| Coils | - | - | - | X[7] | X[8] | - |
| Drums | - | - | - | - | - | X[9] |

| Bare electrodes and rods - cut lengths | | | | | | |
|---|---|---|---|---|---|---|
| | Class unit container net weight (pounds) [11] | | | | | |
| | 5 | 6a and 6d | 6b | 6c | 7 | 8 |
| Tubular electrodes (cutting) | 50 | - | - | - | - | 3 or 10 |
| Carbon electrodes | - | [10] 5 or 10 | - | - | - | 3 or 10 |
| Bare rods (surfacing) | - | [10] 5 or 10 | - | - | - | 3 or 10 |
| Bare rods, 36 inches | - | [10] 5 or 10 | 50 | 50 | [10] 5, 10, 25 or 50 | 3 or 10 |

[1] Aluminum electrodes shall be packaged in class 1a, unit weight of 5 pounds or class 2 (5-pound unit weight), when specified (see 6.2).
[2] Container weight is optional with the manufacturer.
[3] Net weight of electrodes wound on spools, rims and coils shall be as specified in the applicable commodity specification or in the acquisition document (see 6.2).
[4] Small size, 2-1/2 pounds or less.
[5] Large size, 750 pounds or less.
[6] Weight shall be 25, 50, or 60 pounds, as specified (see 6.2).
[7] 65 pounds and under.
[8] Over 65 pounds.
[9] As specified by the purchaser.
[10] Container weight is optional with purchaser.
[11] Weight tolerance per container shall conform to AWS requirements for the product being packaged.

3.6.1.1.1.1 Class I container. Covered electrodes (iron-powder, low hydrogen and so forth) shall be protected from damage by inserting fiberboard or other cushioning in each end of the unit container to restrict end-wise movement of the electrodes. Cushioning materials shall be dry and in equilibrium with the electrode covering.

3.6.1.1.1.1.1 Class 1a. The net weight of class 1a containers shall be 12 pounds and under (see table I). If fabricated of steel, the rigid container shall be fabricated from not less than 0.0094 inch thickness sheet steel. The container shall be hermetically sealed. The side seam of the body shall be lock-seamed and soldered the entire length, except for a short distance at each end which shall be sealed with a satisfactory lining compound. Alternatively the body may be seamed the entire length by overlapping the body blank edges and applying a continuous electrical seam weld. A skip in the weld at the tear strip is permitted and the seam completed by soldering as specified herein. Container opening may be by top opening tear strip or a tear strip formed by two scores on the inside surface near the top end of the body. The top opening tear strip shall be provided with a hand or finger grip affixed to one end of the tear strip. The tongue of the annular band tear strip shall be centered between the score lines and shall be free of solder for a length of not less than 5/16 inch to facilitate openings of the containers with a key, pliers or other suitable tools. The depth of the scores shall be not greater than 40 percent of the thickness of the sheet. The exterior of the container shall be completely coated with a corrosion-resistant paint conforming to TT-E-485 or, when specified (see 6.2), shall be coated with a clear lacquer which provides a coating suitable for the intended purpose. Containers shall pass the tests specified in 4.5.1.1.1. Close fitting plastic lids affixed securely to one end of the container may be furnished at the supplier's option.

3.6.1.1.1.1.1.1 Class 1a alternate requirements. Alternatively, class 1a containers may be fabricated from seamless aluminum and formed in two sections. The top section will be flared slightly to provide a friction fit when joined with the bottom section, in a telescopic manner, with not less than 3/4-inch overlap. The wall thickness of the container shall be approximately 0.014 inch, the end thickness approximately 0.058 inch, and the inner diameter approximately 2-3/4 inches. The joint of each container shall be completely and securely sealed with not less than 3/4-inch wide pressure sensitive tape in accordance with MIL-T-43036 or other tape which meets the requirements of MIL-T-43036. The net weight shall be 12 pounds and under. Exterior coating of aluminum cans will not be required. Containers shall be capable of passing the test specified in 4.5.1.1.1.

3.6.1.1.1.1.2 Class 1b. The net weight of class 1b containers shall be 50 pounds and under (see table I). Unit containers shall be as specified in 3.6.1.1.1.1.1 or 3.6.1.1.1.1.1.1. Alternatively, the side seam of the body may be overlapped 0.159 +/- 0.005 inch with the seam welded the entire body length. Tear strips are not required on the class 1b container.

3.6.1.1.1.1.3 Class 1c vacuum package (see figure 1). The net weight of class 1c containers shall be as specified in table I. Class 1c vacuum packages shall be of a three-step construction, consisting of an inner tray, vacuum drawn moisture- vaporproof barrier (vacuum pouch), and an outer protective container.

3.6.1.1.1.1.3.1 Inner tray. The inner tray shall provide a snug fitting nonshifting load. The tray shall be fabricated from one of the following materials and methods at the option of the contractor:

(a) Paperboard, minimum 0.030 inch bending chip; with two scored 1-inch flanges.
(b) One piece injection molded minimum 1/16-inch low-density polyethylene with rounded edges and corners.

3.6.1.1.1.1.3.2 Vacuum pouch. The vacuum pouch shall be fabricated from a high-density plastic fiber substrate carrying not less than 0.00035-inch aluminum foil, by means of a 0.001-inch extrusion-coated, low-density plastic and 0.003 inch of extrusion-coated plastic over the foil to provide a sealing coat. The pouch shall be vacuum formed and heat sealed under absolute pressure of 21 +/- 5 inches of mercury. The pouch shall be in accordance with type 1, class E, style I of MIL-B-117 and shall pass the vacuum test specified in 4.5.1.1.2.

3.6.1.1.1.1.3.3 Unit container. Each vacuumed package shall be placed in a container in accordance with any one of the following specifications at the option of the contractor:

PPP-B-566 - Boxes, Folding, Paperboard, Variety 2.
PPP-B-636 - Boxes, Shipping, Fiberboard, Class Weather Resistant. (see 3.3.4)
PPP-B-676 - Boxes, Setup, Variety 2.

Paperboard boxes shall be not less than 0.030 inch in thickness. Container closure and sealing shall be in accordance with the appendix to the applicable box specification with method V closure applicable to PPP-B-636 boxes or equipment process as required for automated packaging equipment.

3.6.1.1.1.2 Class 2 container. The net weight of class 2 containers shall be 5, 10, or 12 pounds. Spirally wound fiber cans shall be constructed in accordance with MIL-C-3955, type I, grade B, class 1 or 2 as specified (see 6.2), except that the first (inner) ply, of grease-proof barrier material, is not required. Other nonmetal tubular containers may be used that pass the test requirements of MIL-C-3955 for grade B cans.

3.6.1.1.1.3 Class 3 container.

3.6.1.1.1.3.1 Class 3a and 3b spools - general requirements. Flange and barrel material shall be nonconductive, and of such construction to carry the net weight of specified electrode and retain stability under handling, shipment, storage, stowage, and use. Spool dimensions shall conform to figures 2 and 3 as applicable. Spools shall be clean and dry to maintain cleanliness of the contained product. Electrode shall be so wound as to avoid producing kinks, waves, or sharp bends, and be free to unwind without restrictions caused by overlapping or wedging. As an alternative to figures 2 and 3, the spool of electrode may be wound on a cylindrical wire, frame which is protected from grounding to the wire feeder by being mounted on a non-conducting adapter hub.

3.6.1.1.1.3.1.1 Class 3a and 3b - spool wrapping requirements. Each spool shall have the periphery of the electrodes wrapped with kraft-paper-backed aluminum foil (minimum 0.00035-inch thick foil laminated to 30-pound basis weight (24 by 36 by 500 kraft paper) in a manner to prevent direct contact between the foil and electrodes. The wrapping shall be held in place with tape. In lieu of the paper-foil-backed method of wrapping, each spooled electrode alloy may be sealed in polyethylene bags as follows:

(a) Class 3a (small spools). 0.003-inch thick, extruded, gusset bag, heat sealed at bottom. Top shall be heat sealed after filling.
(b) Class 3b (large spools). 0.004-inch thick, extruded, gusset bag, heat sealed at bottom. Top shall be heat sealed after filling.

3.6.1.1.1.3.1.2 Class 3a spools - packaging requirements. Class 3a spools shall weigh 2-1/2 pounds or less (see table I). Class 3a spools shall be individually packaged in boxes in accordance with any one of the following specifications at the option of the contractor:

PPP-B-566 - Boxes, Folding, Paperboard, Variety 2.
PPP-B-676 - Boxes, Setup, Variety 2.

Closure and sealing of paperboard boxes shall be in accordance with the appendix to the applicable box specification. Twenty class 3a spools shall be intermediate packaged in a fiberboard box in accordance with PPP-B-636, type CF, class weather-resistant (see 3.3.4). Fiberboard box closure and waterproofing shall be in accordance with method V of the appendix to PPP-B-636.

3.6.1.1.1.3.1.3 Class 3b spools - packaging requirements. Class 3b spools shall weigh 750 pounds or less (see table I). Each wrapped spool (see 3.6.1.1.3.1.1) shall be packaged in a fiberboard box in accordance with PPP-B-636, type CF, class weather-resistant (see 3.3.4). Box closure and waterproofing shall be in accordance with method V of the appendix to PPP-B-636. Alternatively, when specified (see 6.2), five individually wrapped spools shall be placed in a fiber drum in accordance with PPP-D-723 as follows:

(a) Type II, grade A, or type III, grade A, class selection at the contractor's option.
(b) Type I, grade A, class selection at the contractor's option.

Fiber drums shall pass the test specified in 4.5.2.

3.6.1.1.1.3.2 Class 3c - rims. Weight of class 3c rims shall be 25, 50, or 60 pounds as specified (see table I). Rims shall be expendable and of construction sufficient to carry the specified weight of wound material during handling, shipment, storage, and use. Each rim shall be packaged in a fiberboard box in accordance with PPP-B-636, type CF class weather-resistant (see 3.3.4). Box closure and waterproofing shall be in accordance with method V of the appendix to PPP-B-636.

3.6.1.1.1.3.3 Class 3d - coils. Class 3d coils shall weigh 65 pounds and under (see table I). Coils shall be tied with four equally spaced, double ties (two turns) of either 16- or 18-gauge soft, galvanized or coppered, steel binding wire; or steel straps not less than 3/8 inch width by 0.015 inch thick. Alternatively, tie wires may be of 5/64-inch or 3/32-inch soft uncoated steel. Galvanized steel binding wire shall not be used for nickel base alloys. When specified (see 6.2), coil liner shall be in double kraft lined fiberboard, not less than 0.08 inch thick, and not narrower than 1/4 inch less than the maximum width of the coil. End of coil shall be secured to the liner. Coils shall be individually packed in fiberboard boxes meeting the requirements of 3.6.1.1.1.3.1.3. Alternatively, coils may be individually wrapped with one or more layers of waterproof, barrier material in accordance with PPP-B-1055. The

barrier material shall have an overlap of not less than 50 percent, in such a manner that maximum protection is afforded. The final lap shall be secured with a double tie of not less than 5/64-inch diameter medium or soft tempered steel wire. In lieu of fiberboard boxes or coil wrapping, coils may be placed directly in fiber drums meeting the requirements of 3.6.1.1.1.3.1.3. When required, drums may be palletized (see 3.7.3.3.1).

3.6.1.1.1.3.3.1 Alternate class 3d - coils. The coils of electrode shall be wound on a cylindrical wire frame which is protected from the wire feeder by being mounted on a rigid, non-conducting adaptor hub. Each coil shall then be sealed in a bag meeting the requirements of 3.6.1.1.1.3.1.1 (b), and unit packed in a fiberboard box meeting the requirements of 3.6.1.1.1.3.1.3.

3.6.1.1.1.3.4 Class 3e - coils. Class 3e coils shall weigh over 65 pounds (see table I). Coils shall be tied with not less than four equally spaced, double ties (two turns) of either 16- or 18-gauge, soft, galvanized or coppered, steel, binding wire. Alternatively, tie wires may be either 5/64-inch or 3/32-inch soft uncoated steel. Galvanized steel binding wire shall not be used for nickel based alloys. When specified (see 6.2), coil liner shall be double kraft lined fiberboard, not less than 0.08-inch thick and not narrower than 1/4 inch less than the maximum width of the coil. End of coil shall be secured to the liner. Coils shall be individually wrapped with one or more layers of waterproof barrier material in accordance with PPP-B-1055. The barrier material shall have an overlap of not less than 50 percent in such a manner that maximum protection is afforded. The final lap shall be secured with a double tie of not less than 5/64-inch or 3/32-inch diameter, medium or soft tempered steel wire. Coils do not require additional containers for shipment. When required, coils may be palletized (see 3.7.3.3.1).

3.6.1.1.1.4 Class 4 - drums. For use with fixed installation, fully automatic welding equipment only, bare welding electrode in wire form of the weight as specified by the purchaser (see table I) shall be furnished in fiber drums in accordance with PPP-D-723 as follows:

(a) Type II, grade A, or type III, grade E. Class selection at the contractors' option.
(b) Type I, grade E. Class selection at the contractors' option.

Except where 7/16-inch plywood heading is specified, 3/8-inch thickness of the bottom heading is permissible. Drums shall be provided with cores fabricated from convolutely wound kraft linerboard not less than 0.012-inch thick. When specified (see 6.2), cores shall be fitted with a slinger ring attachment. Wire shall be of continuous length, coiled in unstressed loops as to lay flat, and be capable of removal for use from the top of drum. Drums shall be closed by means of a lever locking band. When required, drums may be palletized (see 3.7.2.5 and 3.7.3.4).

3.6.1.1.1.5 Class 5 - container. The net weight of class 5 containers shall be 50 pounds and under (see table I). Any containers which pass the vibration and drop test (see 4.5.1.2) shall be considered acceptable as class 5 containers.

3.6.1.1.1.6 Class 6 - container.

3.6.1.1.1.6.1 Class 6a, 6b and 6c. The net weight of class 6 containers shall be 5, 10, 25, or 50 pounds (see table I).

3.6.1.1.1.6.1.1 Fiberboard boxes. Fiberboard boxes shall be in accordance with PPP-B-636, type CF, class weather-resistant (see 3.3.4). The net weight of contents shall be not greater than 50 pounds. Boxes shall be provided with not less than two thickness of fiberboard against each end of the rods and of the same material as the box. Box closure and waterproofing shall be in accordance with method V of the appendix to PPP-B-636. Containers shall pass the tests specified in 4.5.1.2.

3.6.1.1.1.6.1.2 Class 6d - spiral wound fiber container. The net weight of class 6d containers shall be 5 or 10 pounds. The containers shall be a spiral wound fiber tube with a wall thickness of not less than 0.100 inch. The tube shall be constructed from not less than two layers of waterproof duplex or polycoated kraft paper or equivalent. End closure shall be snug fitting, flexible, polyethylene caps reinforced and sealed with waterproof tape (see 3.6.1.1.1.1.1.1). Containers shall pass the test specified in 4.5.1.1.1 and, when packed as specified in 3.7, shall pass the test specified in 4.5.1.2.1.

3.6.1.1.1.7 Class 7 - bundles. Unless otherwise specified (see 6.2), rods shall be furnished in secured bundles. Weight of bundle shall be 5, 10, 25, or 50 pounds, as specified (see 6.2).

3.6.1.1.1.8 Class 8 - plastic containers. Unless otherwise specified (see 6.2), electrodes and rods may be furnished in rectangular (oblong) or cylindrical plastic containers. The unit containers, less the overpack (shipping container), shall pass the test specified in 4.5.1.1.1, and in the overpacked state, when specified (see 6.2), shall pass the test specified in 4.5.1.2.2.

3.6.1.1.1.9 Class 9 - flux. Flux shall be furnished (see 6.2) in moisture-proof containers (paper sacks, fiber or metal drums) as follows:

(a) Paper sacks in accordance with UU-S-48, type and style optional, sack number 8-8X M84 for 50 to 60 pounds; 13-13X MB4 for 61 to 80 pounds; 15-15X MB4 for 81 to 110 pounds.
(b) Fiber drums in accordance with PPP-D-723, type II or III, grade A, 50 to 110 pound capacity.
(c) Metals drums in accordance with MIL-D-6054 or PPP-P-704, maximum weight 110 pounds. Containers shall be full open head/dish/cover/bolt nut ring.

When required, sacks and drums may be palletized (see 3.7.2.5 and 3.7.3.4).

3.6.1.2 Level C. Preservation of welding rods and electrodes shall be as specified for level A except that paperboard and fiberboard containers shall be as follows:

(a) The paperboard containers shall be of the domestic or non-weather-resistant type, class, or variety, as applicable.
(b) The fiberboard box shall be of the class-domestic or class-domestic/fire-retardant material (see 6.2 and 3.3.4). The box closure shall be in accordance with the appendix to the

box specification, method I, using pressure sensitive tape.

3.6.1.3 Commercial. Commercial preservation of welding rods and electrodes shall be in accordance with ASTM D 3951.

3.7 Packing. Packing shall be level A, B, C, or commercial, as specified (see 6.2).

3.7.1 General Racking requirements.

3.7.1.1 Container size. The minimum size of a shipping container shall be 1 cubic foot ($ft^3$). When a total shipment, including parcel post displaces less than 1 $ft^3$, the container shall be of minimum size required for the material being shipped.

3.7.1.2 Container contents. Shipping containers shall contain identical items. However, when the total number of identical items will not fit the smallest size authorized container (1 $ft^3$), multiple packing shall be permitted. Unit containers of like items in a multiple packed container shall be packaged together by cartonizing or wrapping and identifying.

3.7.1.3 Palletization. In lieu of the palletization requirements of figures 4 and 5 herein, packed electrodes may be palletized in accordance with MIL-STD-147 utilizing shrink film or stretch wrap bonding. The pallet deck size shall be commensurate with the load and may be less than the 40-inch by 48-inch dimension specified in MIL-STD-147. When specified (see 6.2), for multiple course packs, except for shrink or stretch wrapped pallets, horizontal fiberboard or wood separators shall be used between courses. Strapping of shrink or stretch wrapped pallet loads or individual courses is not required.

3.7.2 Level A.

3.7.2.1 Class 1a and 1c containers. Class 1a and 1c unit containers packed as specified in 3.7.3.1.1 and 3.7.3.1.3, respectively, shall be overpacked in shipping containers in accordance with any one of the following specifications at the option of the contractor:

| Specification | Classification |
|---|---|
| PPP-B-585 | Class 3 |
| PPP-B-601 | Overseas type |
| PPP-B-621 | Overseas class 2 |

Boxes shall be closed, strapped, or banded in accordance with the applicable box specification or appendix thereto. Steel strapping shall be zinc-coated. The gross weight of boxes shall be not greater than 200 pounds. Shipping containers greater than 200 pounds gross weight shall be modified to include a skid type base in accordance with PPP-B-601 providing a minimum clearance of 2-1/2 inches.

3.7.2.1.1 Caseliners. When specified (see 6.2), shipping containers shall have waterproof caseliners in accordance with MIL-STD-1186. Caseliners shall not be required as follows:

(a) When shipping containers are packed with interior containers in accordance with PPP-B-636 type SF, class weather-resistant (see 3.3.4), closed, and waterproofed.
(b) When shipping containers are packed with metal containers having all external surfaces coated in accordance with 3.6.1.1.1.1.1.
(c) When shipping containers are packed with commercial packages that are wrapped with barrier material in accordance with PPP-B-1055 and sealed with water-resistant adhesive in accordance with MMM-A-260.

3.7.2.1.2 Class 1b.

3.7.2.1.2.1 Class 1b cylindrical containers. Class 1b cylindrical containers specified in table I (50-pound net weights), shall be palletized in accordance with figure 4. In lieu of palletization, boxes (see 3.7.2.1) may be used at the option of the contractor.

3.7.2.1.2.2 Class 1b rectangular containers. Class 1b rectangular containers specified in table I (50-pound net weights), shall be palletized as specified on figure 5. When specified (see 6.2), the wood- frame type pallet shall be enclosed (top, ends, and sides) in corrugated fiberboard in accordance with PPP-B-636 or PPP-B-640.

Fiberboard shall conform to the type CF, class weather-resistant requirements of the applicable specification. Strapping and edge protectors shall be in accordance with ASTM D 4675 and MIL-STD-147. In lieu of palletization, boxes 3.7.2.1) may be used at the option of the contractor.

3.7.2.1.2.3 Class 1c vacuum package. Class 1c vacuum package shall be as specified in 3.7.2.1.

3.7.2.2 Class 2 unit containers. Class 2 unit containers shall be packed as specified in 3.7.2.1.

3.7.2.3 Class 3 containers.

3.7.2.3.1 Class 3a and 3c containers. Class 3a and 3c containers shall be packed in boxes specified in 3.7.2.1.

3.7.2.3.2 Class 3b containers. Class 3b containers shall be packed as follows:

(a) Fiberboard containers in boxes specified in 3.7.2.1.
(b) Fiber drums either in boxes specified in 3.7.2.1 or palletized in accordance with MIL-STD-147.

3.7.2.4 Class 3d and 3e coils. When specified (see 6.2), class 3d and 3e coils shall be palletized in accordance with MIL-STD-147.

3.7.2.5 Class 4 (fiber drums). Class 4 (fiber drums) shall require no additional packing. When specified (see 6.2), fiber drums shall be palletized in accordance with MIL-STD-147.

3.7.2.6 Class 5 (except wood or wood-cleated boxes). Class 5 containers, except wood and wood-cleated boxes shall be packed as specified in 3.7.2.1.2.

3.7.2.6.1 Class 5 (wood or wood-cleated boxes). Class 5 wood or wood-cleated boxes shall require no additional packing. When specified (see 6.2), wood or wood-cleated boxes shall be palletized in accordance with MIL-STD-147.

3.7.2.7 Class 6a and 6d unit containers. Class 6a and 6d unit containers shall be packed as specified in 3.7.2.1.

3.7.2.7.1 Class 6b and 6c unit containers. Class 6b and 6c unit containers shall be packed as specified in 3.7.2.1.2.

3.7.2.8 Class 7 bundles. Unless otherwise specified (see 6.2), class 7 bundles shall be packed in containers as specified in 3.7.2.1.

3.7.2.9 Class 8 plastic containers. Unless otherwise specified (see 6.2), class 8 plastic containers shall be packed as specified in 3.7.2.1.

3.7.2.10 Class 9 flux containers. Unless otherwise specified (see 6.2), class 9 flux containers shall be packed as specified in 3.7.2.1.

3.7.3 Level B.

3.7.3.1 Class 1.

3.7.3.1.1 Class 1a unit containers. Class 1a unit containers, with the exception of top opening tear strip containers, shall be packed in weather-resistant fiberboard (see 3.3.4) boxes conforming to figures 6, 7, 8, or 9 view A or B, at the option of the contractor. Top opening tear strip unit containers shall be packed in weather-resistant fiberboard (see 3.3.4) boxes conforming to figure 10. Fiberboard box closure shall be in accordance with the appendix to PPP-B-636 method V. The number of cells within the shipping container shall be not less than 4 nor more than 12. The gross weight shall be not greater than 75 pounds.

3.7.3.1.2 Class 1b cylindrical containers. Class 1b cylindrical containers (50-pound net weights) shall be palletized in accordance with figure 4. In lieu of palletization, wood or wood-cleated boxes (see 3.7.3.3) may be used at the option of the contractor.

3.7.3.1.2.1 Class 1b rectangular containers. Class 1b rectangular containers (50-pound net weights) shall be stacked on ends and palletized as specified on figure 5. When specified (see 6.2), the wood- frame type pallet (excluding pallet) shall be enclosed (top, ends, and sides) in corrugated fiberboard shall in accordance with PPP-B-636 or PPP-8-640 at the option of the contractor. Fiberboard shall conform to the class domestic or nonweather-resistant requirements of the applicable specification. Strapping and edge protectors shall be in accordance with MIL-STD-147. In lieu of palletization, wood or wood-cleated boxes (see 3.7.3.3) may be used at the option of the contractor.

3.7.3.1.3 Class 1c unit containers. Class 1c unit containers shall be packed in weather-resistant fiberboard (see 3.3.4) boxes (see figure 9, view C) with the following exceptions:

(a) Flute media may be view A or C.
(b) When the unit containers are fiberboard (see 3.6.1.1.1.1.3.3), inner packing forms may be omitted.
(c) Three 20-pound unit packages per box.

3.7.3.2 Class 2 unit containers. Class 2 unit containers shall be packed as specified in 3.7.3.1.1.

3.7.3.3 Class 3a. 3b, and 3c. Fiberboard boxes, as specified in 3.6.1.1.1.3.1.2, 3.6.1.1.1.3.1.3, and 3.6.1.1.1.3.2, shall be packed in shipping containers in accordance with any one of the following specifications at the option of the contractor:

| Specification | Classification |
|---|---|
| PPP-B-576 | Class 2-overseas |
| PPP-8-585 | Class 2 |
| PPP-B-591 | Weather-resistant |
| PPP-B-601 | Domestic type |
| PPP-B-621 | Domestic-class 1 |
| PPP-B-636 | Weather-resistant |
| PPP-B-640 | Weather-resistant |

Boxes shall be closed, reinforced or banded in accordance with the applicable container specification or appendix thereto, except that method V closure is applicable to boxes in accordance with PPP-B-636. When specified (see 6.2), caseliners (see 3.7.2.1.1) shall be furnished. The gross weight of wood, wood-cleated or triple wall fiberboard boxes shall be not greater than 200 pound fiberboard boxes in accordance with PPP-B-636 shall not exceed the weight limitation of the box specification. Shipping containers greater than 200 pounds gross weight shall be modified to include a skid type base as specified in 3.7.2.1.

3.7.3.3.1 Class 3d and 3e coils. When specified (see 6.2), class 3d and 3e coils shall be palletized in accordance with MIL-STD-147.

3.7.3.4 Class 4 (fiber drums). Class 4 (fiber drums) shall require no additional packing. When specified (see 6.2), drums shall be palletized in accordance with MIL-STD-147.

3.7.3.5 Class 5. Class 5 unit containers, except rectangular cans, shall require no additional packing. When specified (see 6.2), class 5 unit containers, except rectangular cans, shall be palletized in accordance with MIL-STD-147.

3.7.3.5.1 Class 5 rectangular cans. Class 5 rectangular cans (50-pound net weights) shall be palletized as specified on figure 4. In lieu of palletization, boxes in accordance with any one of the following specifications may be used at the option of the contractor:

| Specification | Classification |
|---|---|
| PPP-B-576 | Class 2 |
| PPP-B-585 | Class 2 |
| PPP-B-591 | Weather-resistant |
| PPP-B-601 | Domestic type |
| PPP-B-621 | Class 1 |

Box closure, reinforcement, gross weight, skid and caseliner requirements shall be as specified in 3.7.3.3 and when case liners are required (see 6.2).

3.7.3.6 Class 6.

3.7.3.6.1 Class 6a and 6d unit containers. Class 6a and 6d unit containers shall be packed in shipping containers as specified in 3.7.3.1.1.

3.7.3.6.2 Class 6b and 6c unit containers. Class 6b and 6c unit containers shall require no additional packing. When specified (see 6.2), fiberboard boxes shall be palletized in accordance with MIL-STD-147.

3.7.3.7 Class 7 bundles. Unless otherwise specified (see 6.2), class 7 bundles shall be packed in containers as specified in 3.7.3.3.

3.7.3.8 Class 8 plastic containers. Unless otherwise specified (see 6.2), unit packs of class 8 containers shall be packed in containers as specified in 3.7.3.3.

3.7.3.9 Class 9 flux containers. Unless otherwise specified (see 6.2), class 9 flux containers shall be packed in containers as specified in 3.7.3.3 or palletized in accordance with MIL-STD-147.

3.7.4 Level C. Unless otherwise specified (see 6.2), welding rods and electrodes preserved as specified in 3.6.1 shall be packed in containers or palletized as specified in 3.7.3, except that containers may be of the non-weather resistant domestic type or class and containers for top opening tear strip cans shall be as specified on figure 10. Case liners (see 3.7.2.1.1) are not required and closure shall be in accordance with the applicable container specification or appendix thereto with method I closure applicable to fiberboard boxes conforming to PPP-B-636.

3.7.5 Commercial. Commercial packing of welding rods and electrodes shall be in accordance with ASTM D 3951 except that welding and electrodes furnished in a top opening tear strip can shall be packed in commercial containers as specified on figure 10.

3.8 Marking. In addition to any special marking required (see 6.2), or herein, marking of interior (unit and intermediate) and exterior shipping packs and palletized unit loads shall be in accordance with MIL-STD-129 or ASTM D 3951, as applicable to the level of protection specified, and as specified in 3.8.1 through 3.8.3.2.2.

3.8.1 Unit containers:

(a) Specification number.
(b) Type, class and size.
(c) Quantity (net weight).
(d) Manufacturer’s or distributor’s brand or type designation.
(e) Date of manufacture (month and year).
(f) Lot or control number.
(g) Manufacturer’s or distributor’s name.

3.8.2 Shipping containers:

(a) Specification number.
(b) Lot, batch, or control number.
(c) Type, class, and size.
(d) Date of manufacturer (month and year).
(e) Manufacturer's or distributor's name (firm actually producing the electrode or rod).

3.8.3 Special markings.

3.8.3.1 Electrically conductive covered electrodes. Unit containers containing electrodes having coverings that are electrically conductive shall be identified in a conspicuous location on or near the manufacturer's label, and on any separate instructions which may be enclosed as follows:

"WARNING

Coverings are electrically conductive.
Use appropriate safeguards when welding."

3.8.3.2 Fumes and gases notice. Packages of welding materials or individually packaged units enclosed within a larger package shall carry the following precautionary label as applicable, as a minimum, prominently displayed and in legible type.

3.8.3.2.1 For all welding materials except oxyfuel rods.

"DO NOT REMOVE THIS LABEL

WARNING: Protect yourself and others. Read and understand this label.

FUMES AND GASES can be dangerous to your health. ARC RAYS can injure eyes and burn skin. ELECTRIC SHOCK can kill.

(a) Read and understand the manufacturer's instructions and your employer's safety practices.
(b) Keep your head out of the fumes.
(c) Use enough ventilation or exhaust at the arc, or both, to keep fumes and gases from your breathing zone, and the general area.
(d) Wear correct eye, ear, and body protection.
(e) Do not touch live electrical parts.
(f) See American Welding Society Z49.1 "Safety in Welding and Cutting", and OSHA REGULATION 29 CFR 1910."

3.8.3.2.2 For Oxyfuel rods.

"DO NOT REMOVE THIS LABEL

WARNING: Protect yourself and others. Read and understand this label.

FUMES AND GASES can be dangerous to your health. Infrared radiation (Heat Rays) from flame or hot metal can injure eyes.

(a) Read and understand the manufacturer's instructions and your employer's safety practices.
(b) Keep your head out of the fumes.
(c) Use enough ventilation or exhaust at the arc, or both, to keep fumes and gases from your breathing zone, and the general area.
(d) Wear correct eye, ear, and body protection.
(e) Do not touch live electrical parts.
(f) See American Welding Society Z49.1 "Safety in Welding and Cutting", and OSHA REGULATION 29 CFR 1910."

3.8.3.2.3 For class 8 plastic containers. In addition to the markings specified herein, interior and intermediate packs, and exterior (shipping) containers shall be marked, 'NOT FOR SHIPBOARD USE OR STOWAGE-DO NOT TAKE THIS PACKAGE ON BOARD SHIP.'

3.8.3.3 Toxicity and ventilation. Significant toxic constituents when present in the electrode in greater than trace amounts shall be identified on the warning label so that normal ventilation can be increased accordingly. These constituents include, but are not limited to, those specified in AWS Z49.1.

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 (examinations and tests) 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. 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. First article inspection shall consist of the examinations and tests specified in 4.5.

4.3.1 Recurring inspections. First article inspection shall be repeated when changes have been made in preservation and packing materials, processes, or designs.

4.4 Quality conformance inspection. Preservation and pack samples shall be selected and inspected and tested in accordance with 4.4.2 and 4.4.3 to determine conformance to 3.6 through 3.9.

4.4.1 Lot. For the purpose of quality conformance inspection and test sampling, a lot is defined as all the unit packs of the same weight and configuration, produced in one facility, using the same production processes and materials, and being offered for delivery at one time.

4.4.2 Sampling for preservation, packing and marking. As a minimum, the contractor shall randomly select a sample quantity of completed unit packs in accordance with Table II and inspect them for the defects listed in Table III. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the contractor has the option of screening 100% of the lot for the defective characteristic(s) or providing a new lot which shall be inspected in accordance with the sampling plan contained herein. The contractor shall maintain for a period of three years after contract completion, all records of inspections, tests, or any resulting rejections.

TABLE II. Sampling for preservation, packing, and marking inspection.

| | Sample Size | | |
|---|---|---|---|
| Lot Size | Critical | Major | Minor |
| 2 to 8 | All | All | 3 |
| 9 to 15 | All | 13 | 3 |
| 16 to 25 | 20 | 13 | 3 |
| 26 to 50 | 20 | 13 | 5 |
| 51 to 90 | 20 | 13 | 6 |
| 91 to 150 | 20 | 13 | 7 |
| 151 to 280 | 20 | 20 | 10 |
| 281 to 500 | 47 | 29 | 11 |
| 501 to 1200 | 47 | 34 | 15 |
| 1201 to 3200 | 53 | 42 | 18 |
| 3201 to 1000 [sic] | 68 | 50 | 22 |

4.4.3 Sampling for tests. As a minimum, the contractor shall randomly select two completed packages and subject them to the tests specified in 4.5. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the

contractor has the option of screening 100% of the lot for the defective characteristic(s) or providing a new lot which shall be tested in accordance with paragraph 4.5. The contractor shall maintain for a period of three years after contract completion all records of inspections, tests, or any resulting rejections.

Table III. Classification of defects in accordance with the definitions of MIL-STD-109.

| Categories | Defects |
|---|---|
| Critical: | |
| 1 | Warning markings or labels not provided. |
| Major: | |
| | Preservation: |
| 101 | Level not as specified. |
| 102 | Defective unit container. |
| 103 | Unit containers nonconforming. |
| 104 | Closure of unit containers, not as specified. |
| 105 | Spools and rims not as specified. |
| 106 | Wrapping of spools not as specified. |
| 107 | Coils, when required, not as specified. |
| 108 | Unit pack net weights, not as specified. |
| 109 | Container metal thickness (cans only) not as specified. |
| 110 | External coatings (metal cans) damaged. |
| 111 | Tray does not provide a snug fitting nonshifting load. |
| 112 | Vacuum not as specified. |
| 113 | Electrodes loose after vacuum pouch sealed. |
| 114 | Inner tray has sharp edges and corners. |
| 115 | Package not heat sealed. |
| 116 | Commercial preservation, when specified, nonconforming. |
| | Packing: |
| 117 | Level not as specified. |
| 118 | Containers nonconforming. |
| 119 | Closure, strapping or banding, not as specified. |
| 120 | Caseliner: missing, closure and sealing not as specified, punctured, utilized when not required. |
| 121 | Contents loose in shipping containers, resulting in |
| 122 | damage to the contents. |
| 123 | Incorrect weights (net and gross). |
| 124 | Incorrect contents. |
| | Mixed items. |
| 125 | Palletized unit loads not as specified. |
| 126 | Commercial packing, when specified, nonconforming. |
| 127 | Marking (interior and shipping packs): missing, incorrect, incomplete, not legible. |
| 128 | Inner packing forms not used when required. |
| Minor: | Preservation, packing and marking: |
| 201 | Metal container has nonharmful dents, scratches. |
| 202 | Closure of shipping containers not as specified. |

4.5 Test methods.

4.5.1 Unit packs.

4.5.1.1 Leakage. Samples shall be conditioned at ambient condition for not less than 4 hours prior to performing the hot water test and the submersion test. When the item and all processing materials have been maintained at ambient conditions during the processing period, process time may be considered a part of the conditioning period. In a like manner, if the item and all processing materials were also maintained at ambient conditions prior to processing, this period may also be considered as part of the conditioning time.

4.5.1.1.1 Hot water. The samples shall be immersed in water that has been heated to a temperature of not less than 50 degrees Fahrenheit (deg. F) above that of the packaged material (room temperature). The samples shall be immersed and rotated so that the surface under observation is 1 inch below the water level. The samples shall be immersed so that the greatest basic dimension is parallel to the water surface. A "leaker", which constitutes a failure, is indicated by a steady stream of air bubbles emanating from the container for at least 30 seconds. When specified (see 6.2), this test shall be performed upon completion of the rough handling test.

4.5.1.1.2 Vacuum. The amount of vacuum contained in the sealed vacuum package shall be determined for conformance to 3.6.1.1.1.3.2. Test procedures shall be as specified on figure 11 and notes thereto. The test shall be performed with the unit container removed and shall be accomplished not less than 1 hour after the package has been vacuumed and sealed. A failure is indicated when the vacuum on the package is not within the specified range of 21 +/- 5 inches of mercury.

4.5.1.2 Rough handling. Rough handling tests shall be performed as follows: vibration test, followed by the drop test or pallet load test, as applicable.

4.5.1.2.1 Vibration. Vibration test shall be in accordance with ASTM D 999, procedure A, except duration shall be 1/2 hour. Side rails and a fence shall be provided so that the test unit will not creep off the table during operation. When the box closure has been made on an end of the container, this end shall face toward the fence.

4.5.1.2.2 Drop. Tests shall be in accordance with ASTM standards as follows:

(a) ASTM D 775 - The container shall be dropped onto a rigid horizontal steel or concrete surface from a height of 30 inches, once on each of the ends, and once on each of the two adjacent sides of the container.

(b) ASTM D 997.

4.5.1.2.3 Pallet. Testing of pallets shall be in accordance with ASTM D 1185.

4.5.1.2.3.1 Alternate pallet test. In lieu of the test specified in 4.5.1.2.3, pallet loads may be subjected to either of the following shipping tests (see 6.3):

(a) Via rail freight as loose cargo for a distance of not less than 1500 miles in a railcar equipped with Association of American Railroad standard trucks.
(b) Via motor freight as loose cargo for a distance of not less than 1500 miles in a motor vehicle without air cushion suspension.

4.5.1.2.4 Evaluation. Failure shall be considered to have occurred when:

(a) Two or more electrodes have been thrown out of the container.
(b) Material packaged protrudes more than 1 inch.
(c) Electrode covering is damaged to the extent that the electrode will not meet the requirements of the applicable electrode specification.

4.5.2 Shipping containers and pallet loads.

4.5.2.1 Rough handling. Tests on shipping containers shall consist of the rough handling tests (see 4.5.1.2). Shipping container lots shall be considered to have passed the rough handling tests when they comply with the following:

(a) Visual examination indicates that the interior packs show no defects that would cause damage to the items.
(b) The shipping pack retains the unit packs within its confines.
(c) The unit packs show no visible evidence of breaks, tears, punctures, closure damage, or parting of seams.
(d) The material packaged shows no visible evidence of deformation or damage to electrode or electrode covering.

## 5. PACKAGING

This section is not applicable to this specification. Packaging (preservation, packing and marking) requirements are specified in Section 3.

## 6. NOTES

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

6.1 Intended use. This specification is intended for use in control of packaging of welding filler metals whether in rods or electrodes. The packaging and marking requirements specified herein are intended to ensure proper and safe storage, stowage, and transportation of electrodes and welding rods for direct shipment to Government activities; shipments processed at a military activity; as a reference in section 5 of commodity specifications; and for preparing packaging and marking requirements in acquisitioning documents.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number and date of this specification.
(b) Class of unit container required (see 1.2 and footnote [1] of table I).
(c) Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
(f) When a first article is required (see 3.4)
(d) When fire-retardant treated lumber and plywood are required (see 3.3.4 a).
(e) Class of fire-retardant fiberboard required (see 3.3.4 b).
(g) Levels of preservation and packing required (see 3.6.1 and 3.7).
(h) When aluminum electrodes are to be packaged in class 1a or class.
(i) Net weight of electrodes wound on spools, rims and coils (see footnotes [3] and [6] of table I).
(j) When class 1a containers are to be coated with clear lacquer.
(k) Class container required (see 3.6.1.1.1.2).
(l) When class 3b spools should be placed in fiber drums (see 3.6.1.1.1.3.1.3).
(m) When coil liners require double kraft lined fiberboard (see 3.6.1.1.1.3.3 and 3.6.1.1.1.3.4).
(n) When cores should be fitted with a slinger ring attachment (see 3.6.1.1.1.4).
(o) When other than secured bundles are required and weight of bundle required (see 3.6.1.1.1.7).
(p) When class 8 containers are other than as specified (see 3.6.1.1.1.8).
(q) When class 8 unit containers are to be tested as specified in 4.5.1.2.2 (see 3.6.1.1.1.8).
(r) Weight per Class 9 container (see 1.2 and 3.6.1.1.1.9).
(s) When horizontal wood or fiberboard separators are required.
(t) When caseliners are required (see 3.7.2.1.1, and 3.7.3.3).
(u) When wood frame pallets require enclosure (see 3.7.2.1.2.2).
(v) When class 3d and 3e coils require palletization (see 3.7.2.4).
(w) When class 4 fiber drums require palletization (see 3.7.2.5).
(x) When class 5 wood or wood-cleated boxes require palletization (see 3.7.2.6.1 and 3.7.3.5).
(y) Packing other than specified for class 7 bundles (see 3.7.2.8 and 3.7.3.7).
(z) Class 8 container packing other than specified (see 3.7.2.9 and 3.7.3.8).
(aa) Class 9 container packing other than specified (see 3.7.2.10 and 3.7.3.9).

(bb) When class 6b and 6c fiberboard boxes require palletization (see 3.7.3.6.2).
(cc) Packing other than specified for level C (see 3.7.4).
(dd) Special marking required (see 3.8).
(ee) When hot water leakage test is required upon completion of the rough handling test (see 4.5.1.1.1).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

| Reference Paragraph | DID Number | DID Title | Suggested Tailoring |
|---|---|---|---|
| 3.3.2 and 4.5.1.2.3.1 | DI-E-2121 | Certificate of compliance | ---- |
| 6.9 and appendix | DI-DRPR-80651 | Engineering drawings | ---- |
| 6.9 | DI-L-6147 | Preservation and packaging plan | Air Force Use |
| 6.9 | DI-PACK-80120 | Preservation and packing data | ---- |

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.4), and the number of items to be tested as specified in 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 Definitions or explanation of terms.

6.5.1 Levels of protection. The following levels of protection apply equally to preservation and packing.

6.5.1.1 Level A. This packaging provides maximum protection. It is needed to protect material under the most severe worldwide shipment, handling, and storage conditions. Preservation and packing will be designed to protect material against direct exposure to extremes of climate, terrain, and operations and transportation environments, without protection other than that provided by the pack. The conditions to be considered include, but are not limited to the following:

(a) Multiple handling during transportation and intransit storage from point of origin to final user.
(b) Shock, vibration, and static loading during shipment.
(c) Loading on shipdeck, transfer at sea, helicopter delivery, and offshore or over-the-beach discharge to final user.
(d) Environmental exposure during shipment or during intransit operations where port and warehouse facilities are limited or nonexistent.
(e) Outdoor storage in all climatic conditions for not less than 1 year.
(f) Static loads imposed by stacking.

6.5.1.2 Level B. This packaging provides intermediate protection. It is needed to protect material under anticipated favorable environmental conditions of worldwide shipment, handling, and storage. Preservation and packing will be designed to protect material against physical damage and deterioration during favorable conditions of shipment, handling, and storage. The conditions to be considered include, but are not limited to the following:

(a) Multiple handling during transportation and intransit storage.
(b) Shock, vibration, and static loading of shipments worldwide by truck, rail, aircraft, or ocean transport.
(c) Favorable warehouse environment for not less than 18 months.
(d) Environmental exposure during shipment and intransit transfers, excluding deck loading and offshore cargo discharge.
(e) Stacking and supporting superimposed loads during shipment and extended storage.

6.5.1.3 Level C. This packaging provides minimum protection. It is needed to protect material under known favorable conditions. The following criteria determine the requirements for this degree of protection:

(a) Use or consumption of the item at the first destination.
(b) Shock, vibration, and static loading during the limited transportation cycle.
(c) Favorable warehouse environment for not greater than 18 months.
(d) Effects of environmental exposure during shipment and intransit delays.

(e) Stacking and supporting superimposed loads during shipment and temporary storage.

6.5.1.4 Commercial packaging. The materials and methods used by the contractor to meet the requirements of the distribution systems serving both DoD and industrial consumers. ASTM D 3951 adopted by DoD is recognized as an acceptable standard for use.

(a) Items will be given the degree of protection normally employed by the contractor to afford protection against corrosion, deterioration, and damage during shipment.
(b) Protection will be that used for distribution directly to a using customer or subsequent redistribution, as required.
(c) Wholesale assembly bulk type practices, such as those used in inter- and intra-plant shipments or shipments to jobbers are not acceptable, unless they are the usual trade practices for selected commodities (for example, petroleum, coal, and textiles).

6.5.2 Packaging terms.

6.5.2.1 Commercial packaging. The materials and methods used by the supplier to meet the requirements of the distribution systems serving both DoD and industrial consumers.

6.5.2.2 Containerization. The use of transport containers (container express (CONEX)), military-owned demountable container (MILVAN), commercial or Government-owned (or leased) shipping container (SEA VAN), and roll on/roll off (RORO) trailer) to unitize cargo for transportation, supply, and storage. Containerization aids carriage of goods by one or more modes of transportation without the need for intermediate handling of the contents. Containerization incorporates supply, security, packaging, storage, and transportation into the distribution system from source to user.

6.5.2.3 Exterior pack. A container, bundle, or assembly that is sufficient by design and construction to protect unit and intermediate packs and contents during shipment and storage. This can be a unit pack or a container with any combination of unit or intermediate packs.

6.5.2.4 Intermediate-pack. A wrap, box, or bundle that contains two or more unit packs of identical items.

6.5.2.5 Marking. Application of numbers, letters, labels, tags, symbols, or colors for handling or identification during shipment and storage.

6.5.2.6 Military packaging. The materials and methods prescribed in Federal or military specifications, standards, drawings, or other authorized documents designed to provide the packaging necessary for the prescribed level of protection.

6.5.2.7 Packaging. The processes and procedures used to protect material from deterioration, damage, or both. It includes cleaning, drying, preserving, packing, marking, and unitization.

6.5.2.8 Packing. Assembling of items into a unit, intermediate, or exterior pack with necessary blocking, bracing, cushioning, weatherproofing, and reinforcement.

6.5.2.9 Preservation. Application of protective measures, including cleaning, drying, preservative materials, barrier materials, cushioning, and containers when necessary.

6.5.2.10 Reusable container. A shipping and storage container that is designed for reuse without impairment of its protective function. A shipping and storage container that can be repaired, refitted, or both to prolong its life or to adapt it for shipment of items other than that for which it was originally intended.

6.5.2.11 Unit pack. The first tie, wrap, or container applied to a single item, or a quantity thereof, or to a group of items of a single stock number, preserved or unpreserved, that constitutes a complete or identifiable package.

6.5.2.12 Unitization. Assembly of packs of one or more line items of supply into a single load so that the load can be handled as a unit through the distribution system. Unitization (unitized loads or unit loads) encompasses consolidation in a container, placement on a pallet or load base, or securely binding together.

6.6 Detailed information. Supplemental information on preservation, packaging, and packing may be found in the following manuals:

DSAM4145.2 Vol. 1, TM38-230-1, NAVSUP PUB 502, AFP 71-15,
MCO P4030.31B Packaging of Material Preservation
(Volume 1)(National Stock Number 0530-LP-050-2077)
DSAM4145.2, Vol. II, TM38-230-2, NAVSUP PUB 503, Vol II, AFR 71-16,
MCO P4030.21C Packing of Material-Packing
(Volume II)(National Stock Number 0530-LP-050-3211)
DSAM4145.7, TM38-236, NAVSUP PUB 504, AFP 15-01-3, AFP 71-8,
MCO P4030.30B Preparation of Freight for Air Shipment
(National Stock Number 0530-LP-050-4001)
DLAM4145.3, TM38-250, NAVSUP PUB 505, AFR 71-4,
NCO P4030.19D Preparation of Hazardous Materials For Military
Air Shipment (National Stock Number 0530-LP-050-5007)
Military Standardization Handbook, MIL-HDBK-304, Package
Cushioning Design

(Copies of the listed documents may be obtained from the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 or from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

6.7 Certification of materials. If the contractor desires to use materials or procedures other than those specified herein, he should furnish to the contracting activity documented evidence in the form of a certificate of compliance, certified by a testing laboratory, satisfactory to the contracting activity, that the material or procedure is equal to or exceeds the requirements specified herein. If, after a review of the material or procedure and the related certified documented evidence or the witnessing of the stipulated tests, it is

opinion of the contracting activity that the material or procedure meets or exceeds the requirements specified herein, authorization for use will be granted.

6.8 Technical data. Complete descriptive packaging details on drawings, test results, and packaging and transportation data requirements are not required when such were previously submitted and accepted by the contracting activity (see 3.5).

6.9 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.

6.10 Keyword listing.

Containerization
fiberboard
fiber drum
Spools

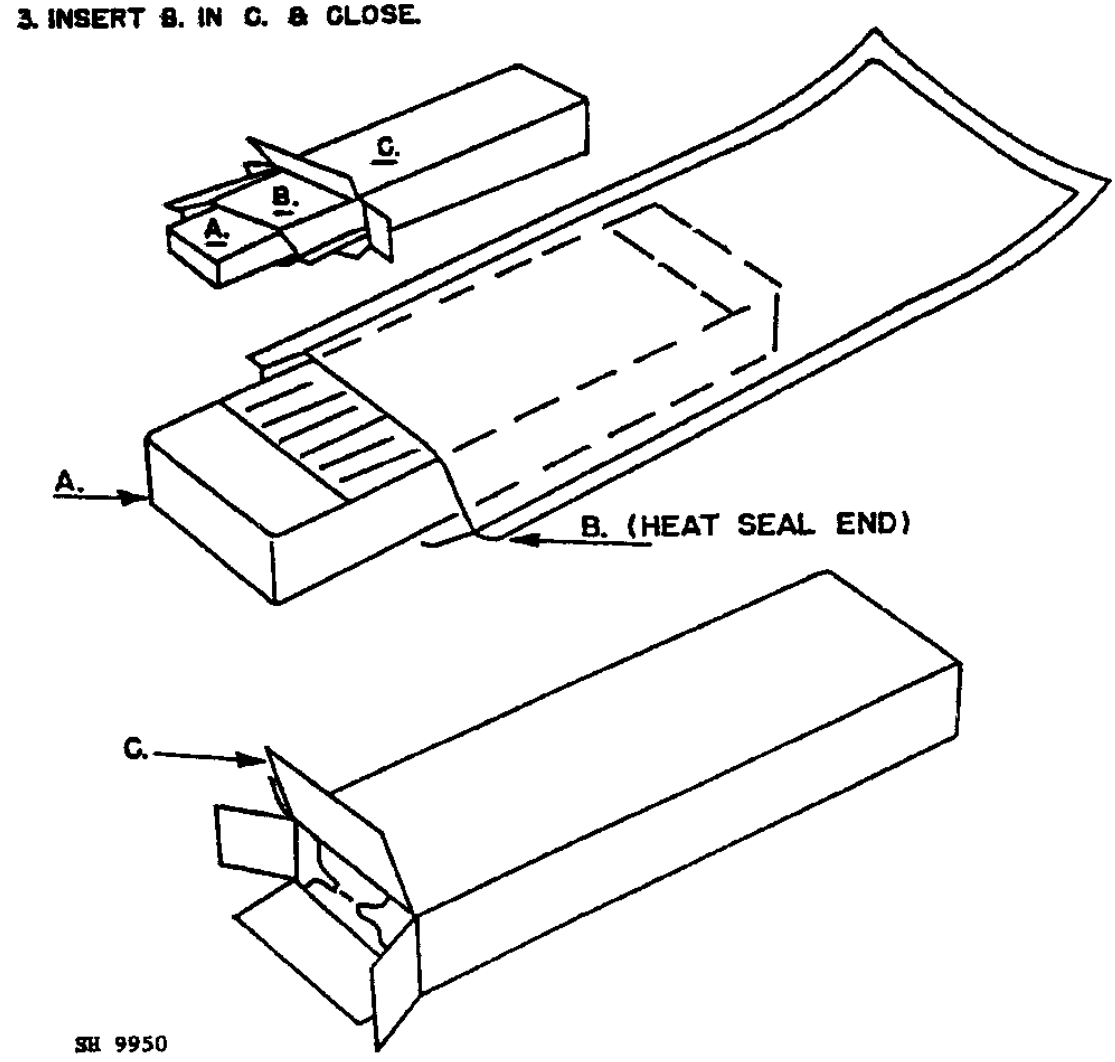
Custodians:
Army - AR
Navy - SH
Air Force - 99

Review activities:
Army - SM, MI, ME
Navy - AS, EC, SA, OS, YD
DLA - ES
DGSC - GS

User activity:
Navy - MC

Preparing activity:
Navy - SH
(Project PACK-0962)

MIL-W-10430D




A. Inner tray (see 3.6.1.1.1.1.3.1).
B. Moisture-vaporproof barrier (see 3.6.1.1.1.1.3.2).
C. Unit container (see 3.6.1.1.1.1.3.3).

FIGURE 1. Class 1c, vacuum package.

MIL-W-10430D

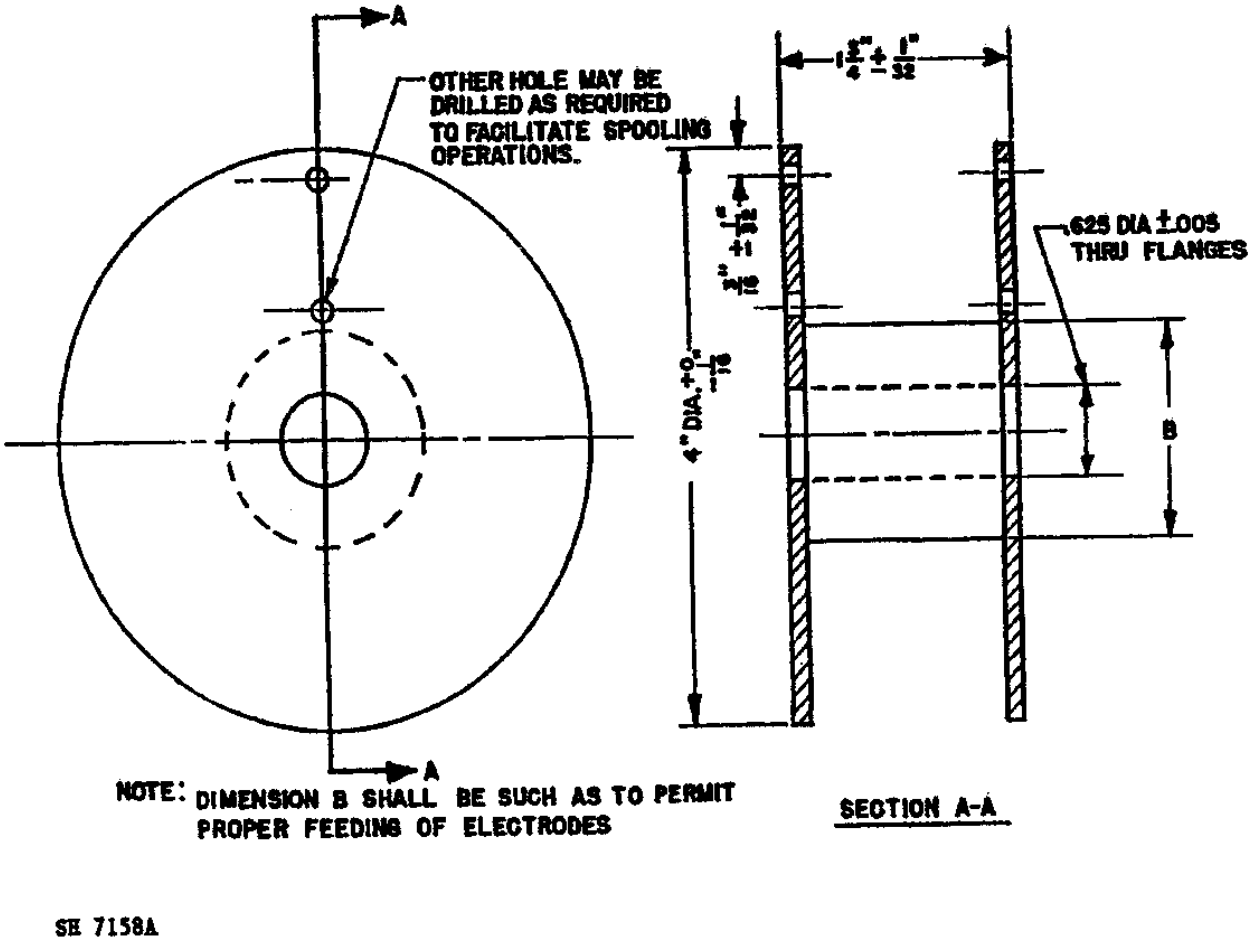
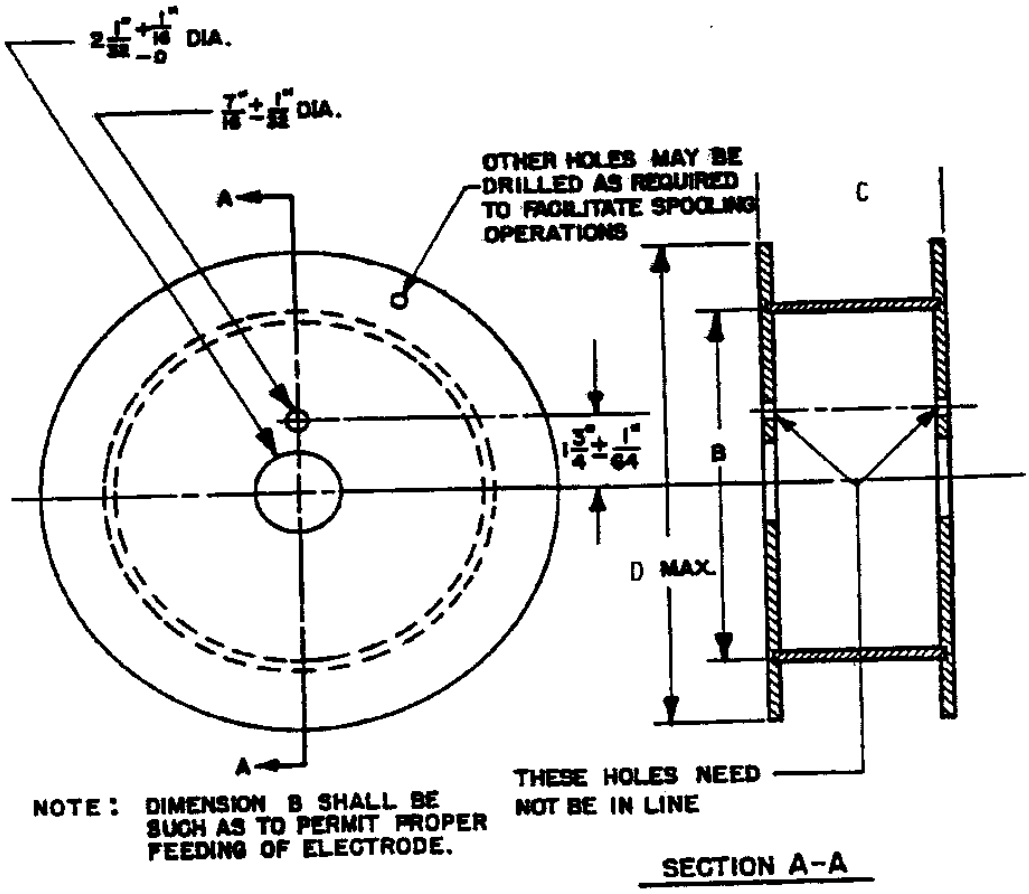



FIGURE 2. Dimensions for class 3a spools.

MIL-W-10430D

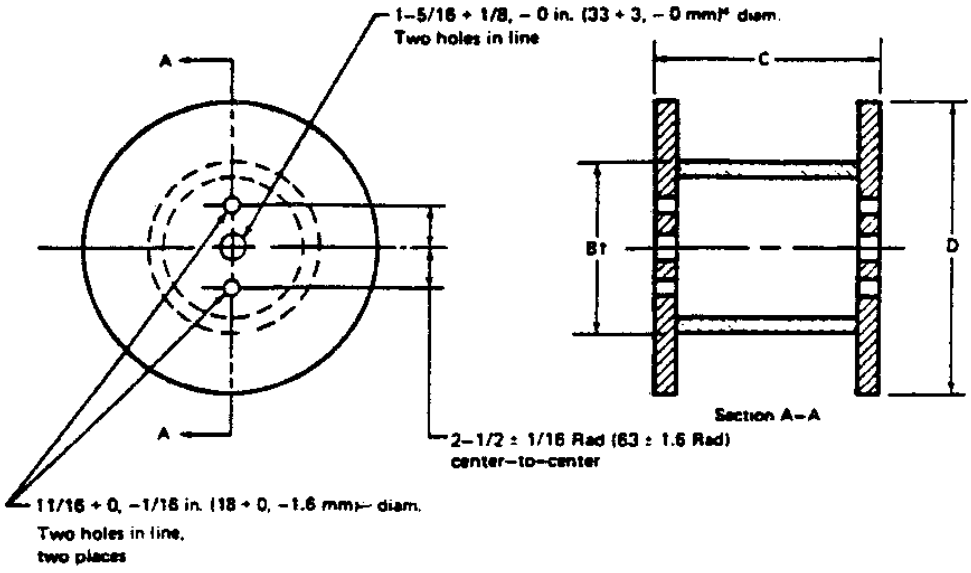



SH 7157A

| Form | Dimensions (inches) | |
|---|---|---|
| | C | D (maximum) |
| 3b-1 | 2-5/32 ± 1/32 | 8 |
| 3b-2 | 4 ± 1/16 | 12 |
| 3b-3 | 4 ± 1/16 | 14 |

FIGURE 3. Dimensions for class 3b spools.

MIL-W-10430D



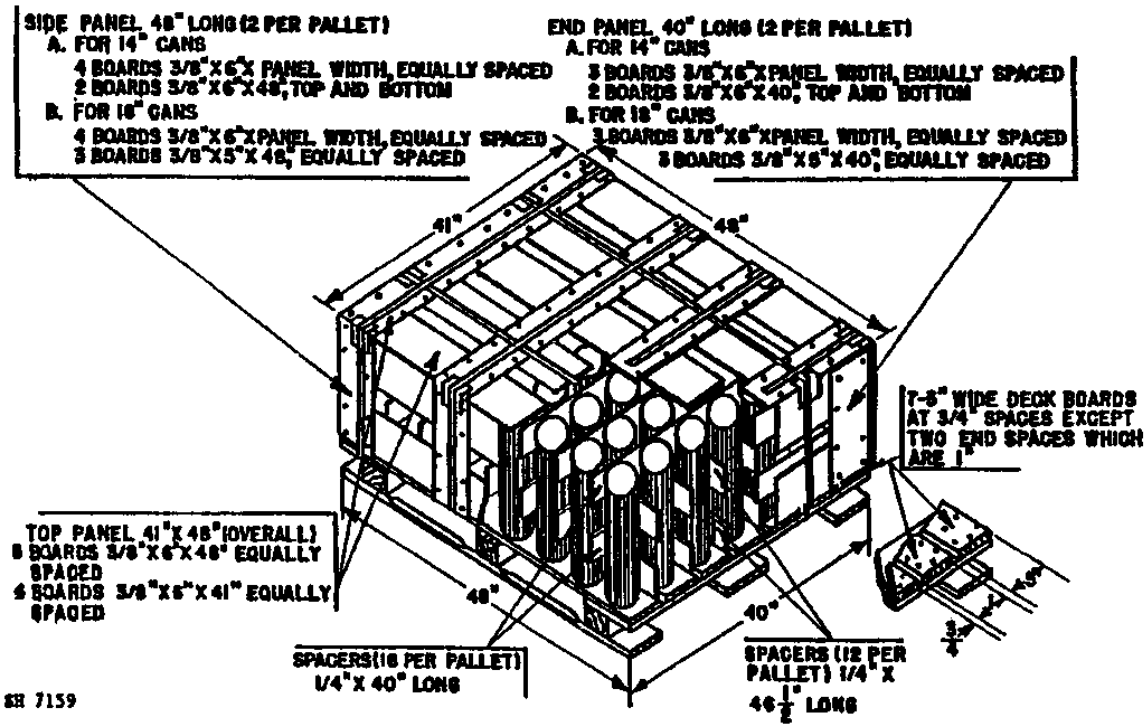

All dimensions are in inches (millimeters).

† Dimension B, outside diameter of barrel, shall be such as to permit proper feeding of the filler metals.

| Form | Spool Size (in) | Dimensions (inches) | |
|---|---|---|---|
| | | D (in) | C, (maximum) (in) |
| 3b-4 | 22 | 22 ± 1/2 | 12 |
| 3b-5 | 30 | 30 ± 1/2 | 13-1/2 |

FIGURE 3. Dimensions for Class 3b spools. - Continued

MIL-W-10430D

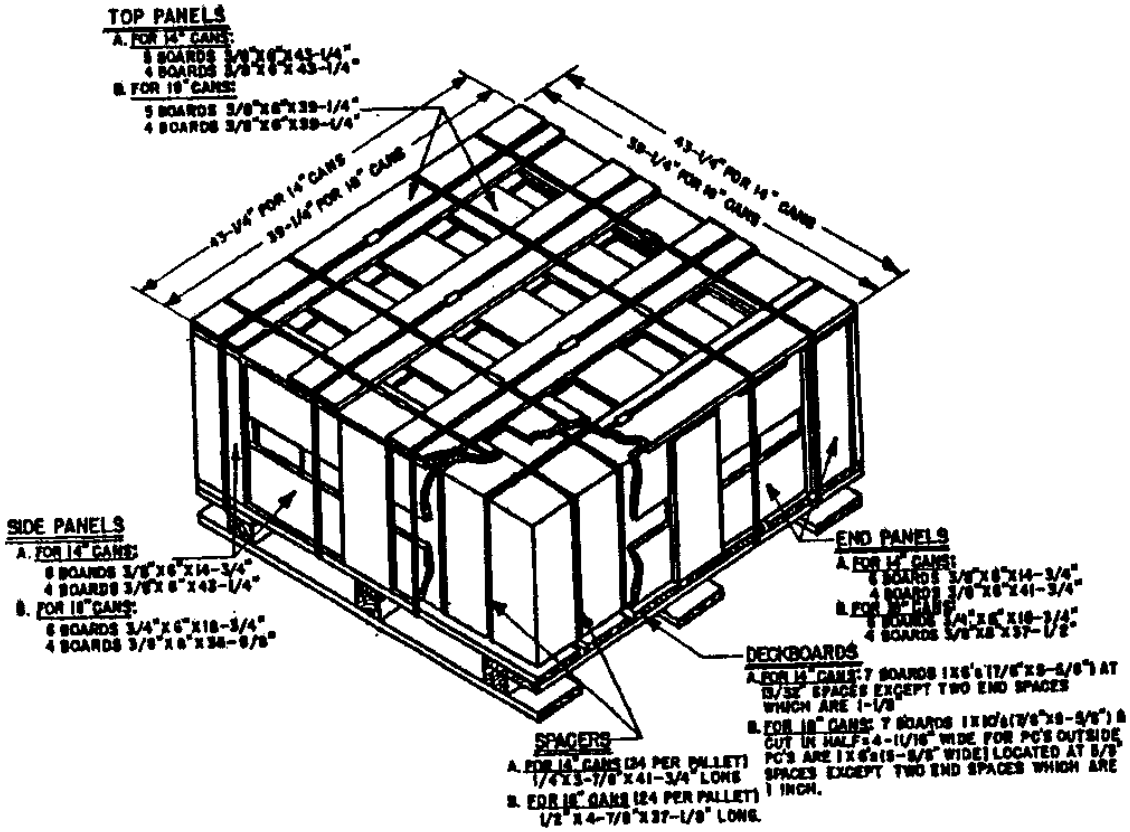



NOTES:

1. See 3.7.1.4.
2. Width of spacers, end panels and side panels shall be such that panels and spacers extend at least 1/4 inch above cans.
3. Outer panels shall be nailed and clinched before assembly.
4. Pallet shall be in accordance with class A or B of MIL-P-15011 except for width and spacing of deck boards, which shall be as shown above.
5. Strapping shall be in accordance with ASTM D 3953, type 1, class A, width 1-1/2inches, thickness 0.035 inch.

FIGURE 4. Palletized unit (cylindrical containers).

MIL-W-10430D

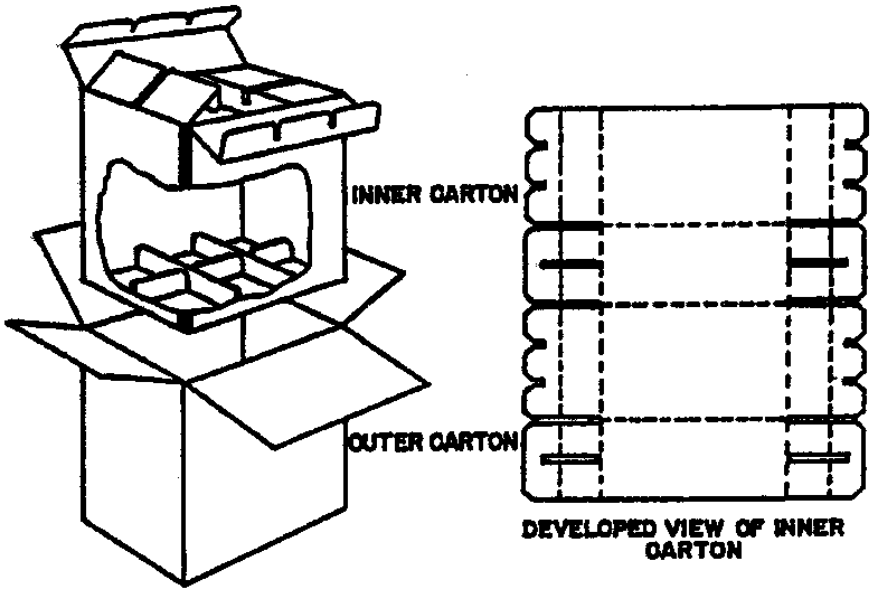



NOTES:

1. See 3.7.1.4.
2. Width of spacers, end and side shall be such that they extend at least 1/4 inch above cans.
3. Outer panels will be nailed and clinched before assembly.
4. Spacer (vertical wood separators) shall be in accordance with MIL-STD-147, except for 18-inch cans spacers shall be 1/2-inch thick.
5. Size, type of nails and nailing pattern shall be in accordance with MIL-P-15011.
6. Pallet shall conform to MIL-P-15011 of oak wood species except for length of runners.
7. Strapping shall be in accordance with ASTM D 3953, type 1, class D, width 1-1/4 inches, thickness 0.035 inch.

FIGURE 5. Pallet load rectangular containers.

MIL-W-10430D



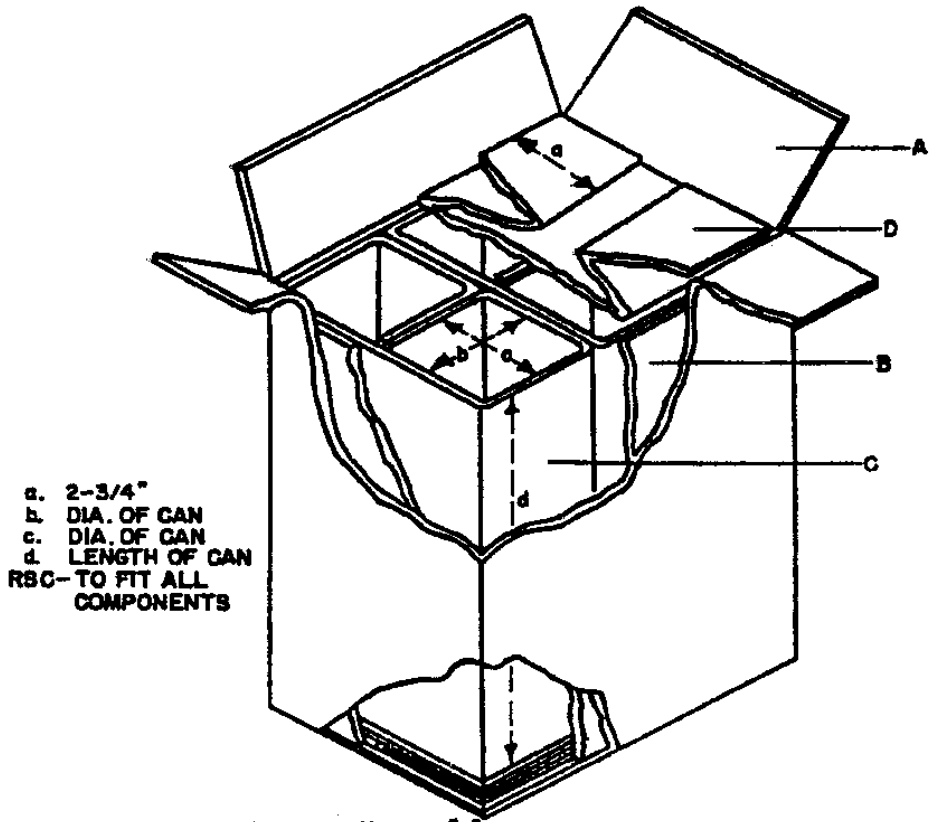

SH 7161

NOTES:

1. Level A, B, or C packing material for the inner carton shall be in accordance with class domestic, type CF, variety SW, B flute, grade 275 of PPP-B-636 (see 3.3.4 and 3.6.1.2). The manufacturer's joint of the inner carton shall be sealed by means of gummed cloth tape minimum 2-inches wide. Inner carton closure shall conform to method or II of the appendix to PPP-B-636.
2. Level A and B packing material for the outer carton shall conform to class weather-resistant, grades V2s, V3s, V4s, or V3c for loads greater than 75 pounds or grades W5s or W5c for loads less than 75 pounds. The outer carton closure shall conform to method V of the appendix to PPP-B-636. See 3.7.2.1 for level A overpacking requirements.
3. Level C packing materials for the outer carton shall be in accordance with class domestic, type CF, variety DW, AB-flute, grade 275 of PPP-B-636 (see 3.3.4 and 3.6.1.2). The outer carton closure shall conform to method I of the appendix to PPP-B-636.

FIGURE 6. Inner and outer shipping carton.

MIL-W-10430D




a. 2-3/4"
b. DIA. OF CAN
c. DIA. OF CAN
d. LENGTH OF CAN
RSC-TO FIT ALL COMPONENTS

A-REGULAR SLOTTED CARTON-200# TEST, "A" FLUTE-CORRUGATED, BOARD, STITCHED-HORIZONTAL CORRUGATIONS.
B-LARGE LINER -200# TEST, DOUBLE-WALLED CORRUGATED BOARD-NOT TAPED-HORIZONTAL CORRUGATIONS.
C-INDIVIDUAL LINERS -200# TEST, DOUBLE-WALLED CORRUGATED BOARD-NOT TAPE HORIZONTAL CORRUGATIONS.
D-SPRING PADS -200# TEST, "A" FLUTE-CORRUGATED BOARD.

SH 7162

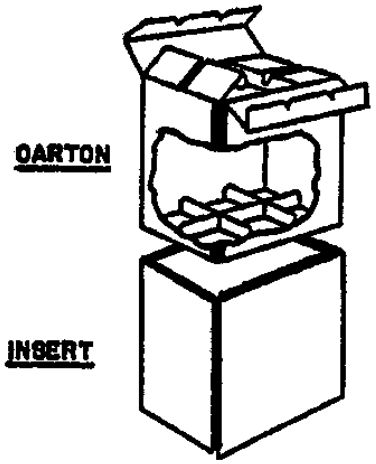
NOTES:
1. For level A and B packing, the outer carton shall be in accordance with class weather-resistant grades W5s, W5c, V3s, V4s or V3c of PPP-B-636. Carton closure shall conform to method V of the appendix to PPP-B-636 (see 3.3.4).
2. For level C preservation, the outer carton shall be in accordance with class domestic, type CF, variety SW, A-flute, grade 200 of PPP-B-636 (see 3.3.4 and 3.6.1.2). Carton closure shall conform to method I of PPP-B-636.

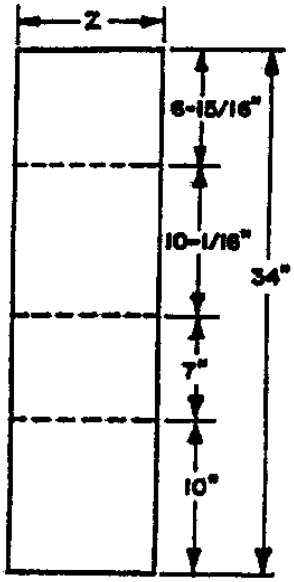
FIGURE 7. Shipping carton with liners.

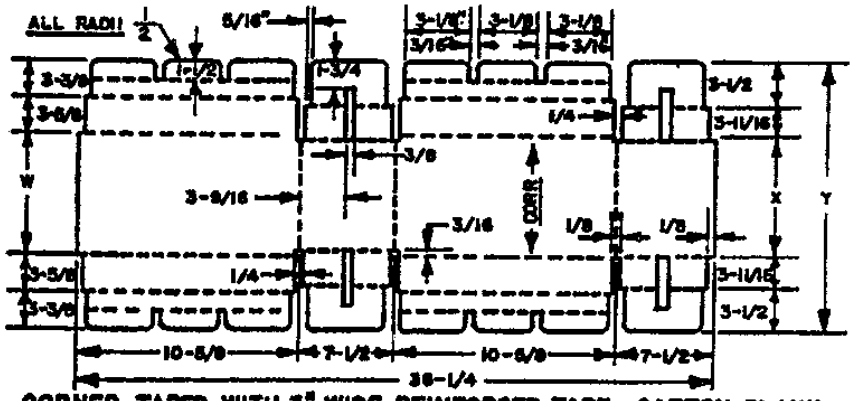
MIL-W-10430D

NOTES:
Materials and closure:
1. For level A and B packing - same as figure 6, note 2.
2. For level C packing - same as figure 6, note 3.

Other requirements:
1. See 3.7.2.1 for level A overpacking requirements.
2. Material for insert - class domestic, type CF, variety DW, A-B flute, grade 300 of PPP-B-636 (see 3.3.4 and 3.6.1.2).



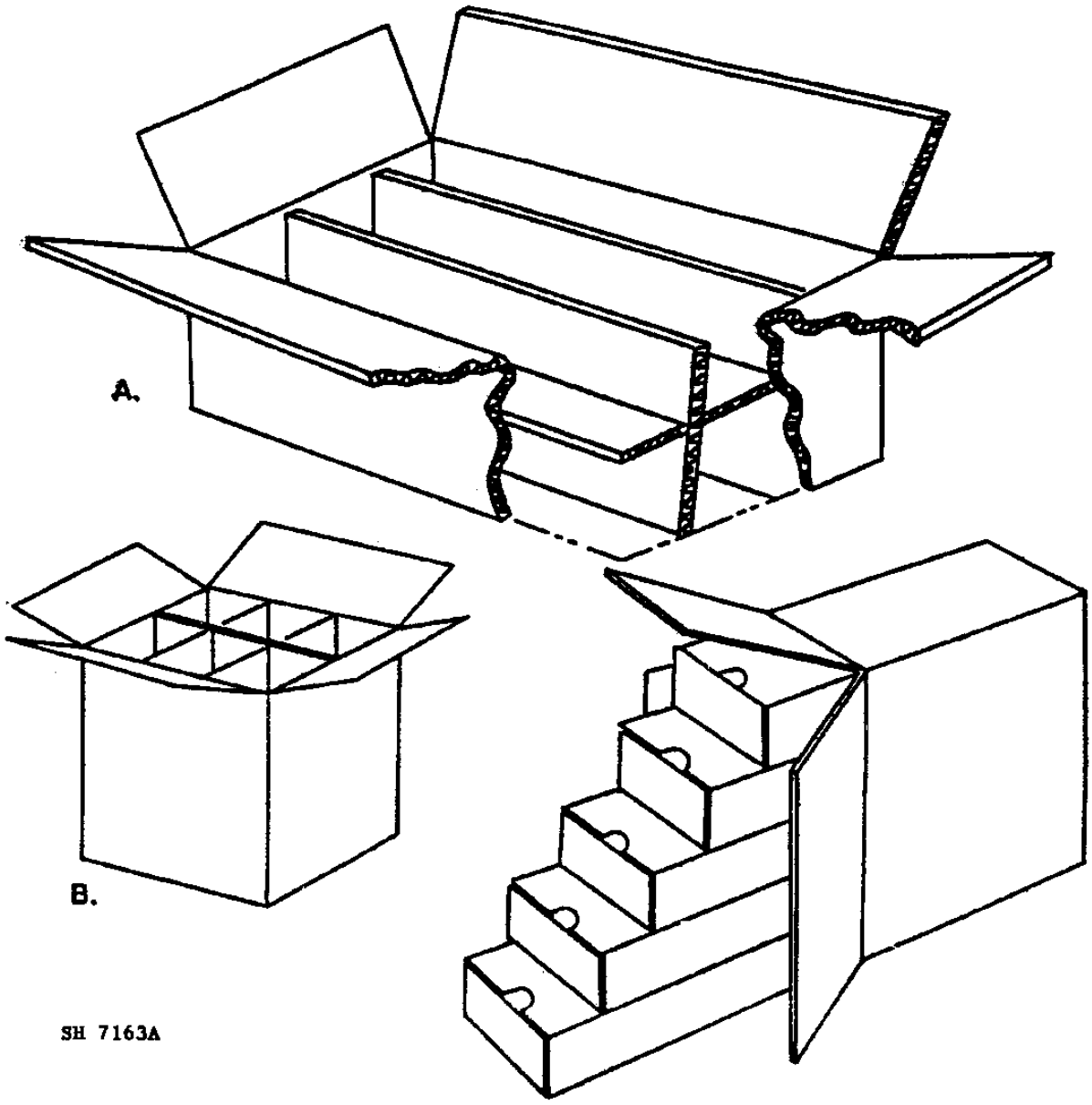

CORNER TAPED WITH 3" WIDE REINFORCED TAPE - CARTON BLANK

| USAGE | CARTON | | | | INSERT | |
|---|---|---|---|---|---|---|
| 3" I.D. CANS | W | X | Y | INSIDE DIMENSIONS | Z | INSIDE DIMENSIONS |
| 36#'s-9" CANS | 10 | 9-5/8 | 24 | 7-3/8X10-7/16X9-3/8 | 9-3/8 | 6-5/8X9-13/16X9-3/8 |
| 60#'s-14" CANS | 15 | 14-5/8 | 29 | 7-3/8X10-7/16X14-3/8 | 14-3/8 | 6-5/8X9-13/16X14-3/8 |
| 72#'s-18" CANS | 19 | 18-5/8 | 32 | 7-3/8X10-7/16X18-3/8 | 18-3/8 | 6-5/8X9-13/16X18-3/8 |

SH 5335C

FIGURE 8. Shipping carton with insert.

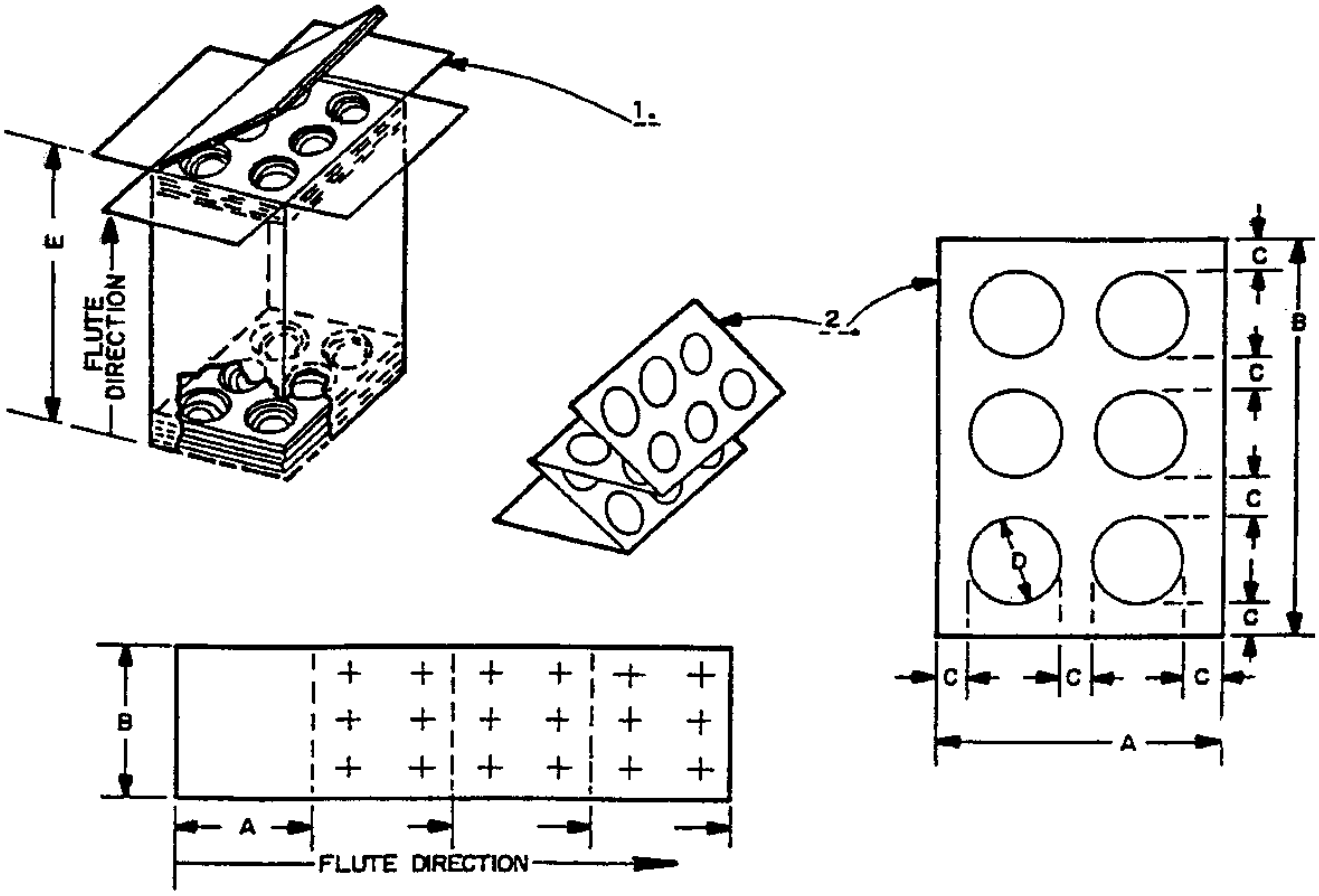
MIL-W-10430D




NOTES:
1. Boxes shall be type CF (corrugated fiberboard) (see 3.3.4 and 3.6.1.2).
2. Top or end loading permitted at the option of the contractor.
3. For level A overpacking, see 3.7.2.1 and 3.3.4.
4. View C., end loading without inner packing form (see 3.7.3.1.3).

FIGURE 9. Shipping carton - top or end loadings.

MIL-W-10430D




NOTES:

1. Outer carton in accordance with PPP-B-636 as follows:
   (a) For level A and B packing - type CF, class weather resistant (see 3.3.4), variety SW, grade W5c, W6c or V3c, style RSC.
   (b) For level C and commercial packing - type CF, class domestic, variety SW, grade 275 (minimum) (see 3.3.4 and 3.6.1.2).
2. Inserts - Two required in accordance with PPP-F-320, class domestic, variety DW, grade 350, a/c flute (see 3.3.4 and 3.6.1.2).
3. Dimensions: A- Inside width of container.
   B- Inside length of container.
   C- Minimum 3/4 inch between outer edge of cutouts and edges of the hinged insert.
   D- Die-cut three pads, six holes per pad, snug fit to outside diameter of the welding rod can.
   E- Inside depth of container to provide snug fit for the welding rod cans.
4. Level A shipments required overpacking (see 3.7.2.1).

FIGURE 10. Shipping carton for top opening welding rod cans.

MIL-W-10430D

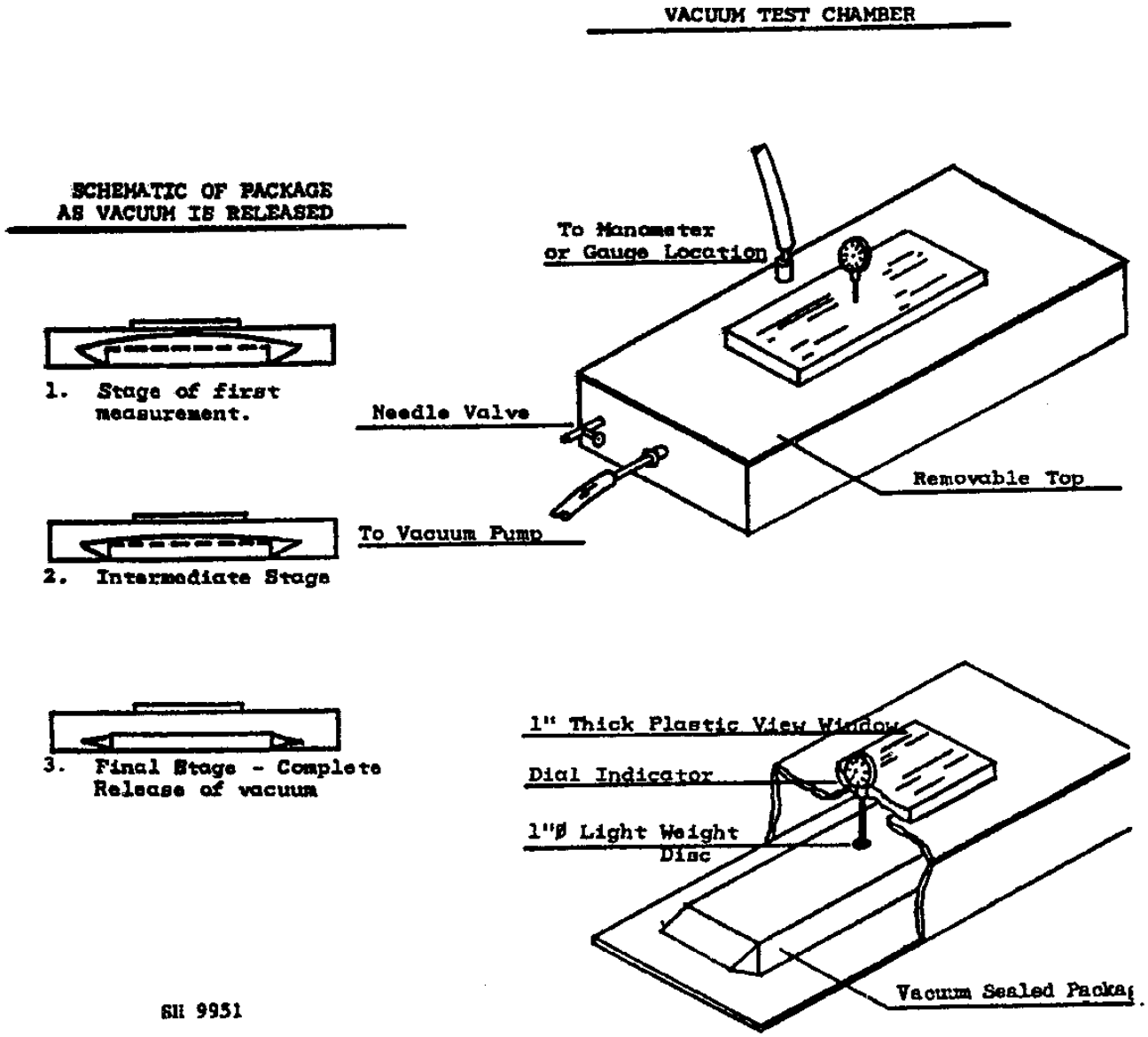



FIGURE 11. Vacuum test chamber and package schematic.

NOTES:

Method of determining amount of vacuum contained in a vacuum package:

1. Apparatus:

   (a) Test chamber. Chamber shall be constructed of a material and in such a manner to be capable of withstanding 27 inches of mercury. The top shall be removable with a view window installed; this is due to the necessity of viewing the product during test. The chamber shall be of sufficient size to accommodate the largest product to be measured plus 2 inches of head room.
   (b) Vacuum pump. The pump shall be capable of pulling 27 inches of mercury.
   (c) Manometer. Scale shall measure from 0 to 30 inches of mercury. A calibrated gauge may be substituted.
   (d) Needle valve. Valve shall be connected directly to test chamber and shall be of sufficient size to bleed off the vacuum in the chamber while the vacuum pump continues to operate.
   (e) Dial indicator. Indicator shall be mounted in the view window with an extension capable of reaching the product in the test chamber. On the end of the extension, a lightweight, 1-inch diameter rigid (fiber-board, aluminum) disc shall be secured to distribute the point of the extension over a larger area. The indicator shall have range of 2.000 inches with 0.001 inch graduations.

2. Step by step Procedure:

   (a) Remove the vacuum sealed package from the unit container.
   (b) Place the vacuum sealed package on the bottom of the chamber with the smooth side and the largest surface area positioned so that it will come in contact with the dial indicator. The approximate center of the package shall be located directly under the dial indicator. Place the top on the chamber.
   (c) If a manometer is being used, standardize to atmospheric pressure. Set the dial indicator to read "O" on every tenth of an inch. This is for the purpose of easier and more accurate readings. Close the needle valve and start the vacuum pump.
   (d) As the vacuum is being pulled in the test chamber, observe the package. When the vacuum inside the package is less than that in the chamber (indicated by a swelling out of proportion of the package), the package is conditioned for analysis and the first reading should now be recorded.

FIGURE 11. Vacuum test chamber and package schematic - Continued.

(e) While the pump is operating, set up a slow rate of decrease in vacuum by adjusting the needle valve. As the vacuum decreases, record the dial indicator reading as each 1/2-inch of mercury is passed. Initially, the readings will be greater than 0.100 inch for each 1/2-inch of mercury. When the vacuum in the chamber falls below that contained in the package, the readings will fall within 0.001 inch of each other. At this time, turn the pump off since the data for the unknown value has been obtained. Use caution and do not allow the vacuum to fall too fast during the test or the dial indicator will move too fast and accurate readings cannot be obtained.

3. Determining amount of vacuum:

(a) Reference example.
(b) Subtract the lowest dial indicator reading from each of the other readings obtaining a resulting differential at each 1/2-inch of mercury.
(c) On a graph plot the differential on the abscissa axis versus each 1/2-inch of mercury on the ordinate axis. The graph shall range from 16 to 26 inches of mercury in 1/2-inch intervals and 0 to 1.1 inches differential in tenths of an inch.
(d) From the graph the unknown value of a contained vacuum can be determined if it falls within the specified range. Observe the point on the graph where the plots start a slight rise across the graph to the right. From this point drop down 1/2-inch on the inches of mercury scale and read the unknown value to plus or minus 1/2-inch of mercury.

4. Example (see figure 12):

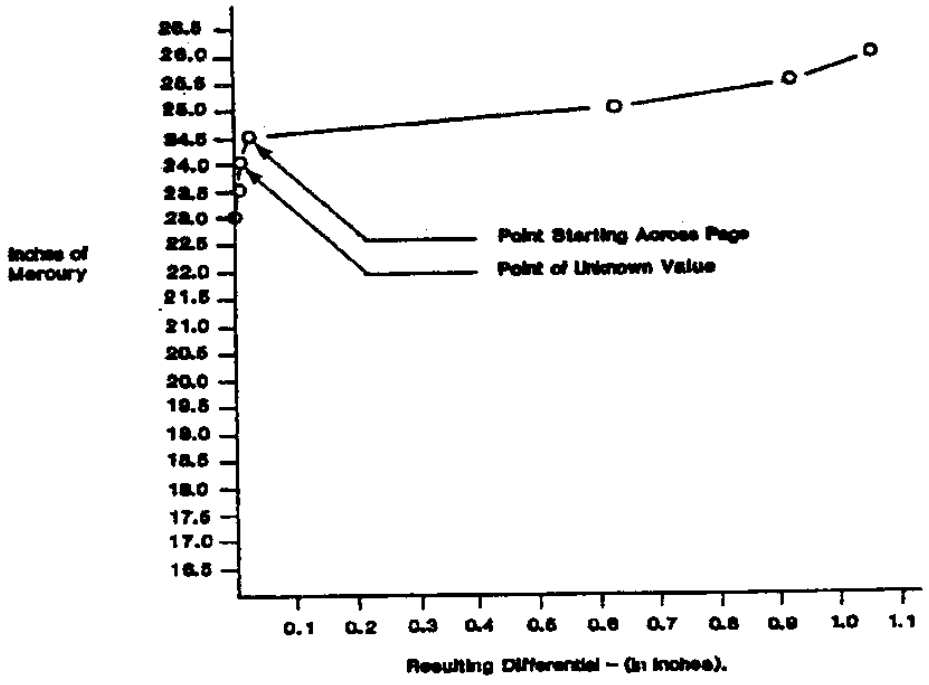
Data:

| Inches of mercury | Dial indicator readings | Resulting differential |
|---|---|---|
| 26.0 | 1.486 (B) | 1.063 |
| 25.5 | 1.352 (B) | 0.929 |
| 25.0 | 1.060 (B) | .637 |
| 24.5 | 0.476 (B) | .053 |
| 24.0 | .436 (B) | .013 |
| 23.5 | .429 (B) | .006 |
| 23.0 | .423 (A) | .000 |

B - A = Resulting differential.

FIGURE 11. Vacuum test chamber and package schematic - Continued.

MIL-W-10430D




SH 9932

FIGURE 12. Graph for determining amount of vacuum.

# APPENDIX

## ENGINEERING DRAWINGS TECHNICAL CONTENT REQUIREMENTS

10. SCOPE

10.1 Scope. This appendix covers information that shall be included on the drawings when specified in the contract or order. This appendix is mandatory only when data item description DI-DRPR-80651 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

30. DRAWING CONTENTS

30.1 Drawings. Information on the drawings shall include but not be limited to the following:

(a) Applicable specification (including revision) and contract number.
(b) References as applicable.
(c) Description and summary of each pack test.
(d) Test sequence.
(e) Interpretation of test results including failures and corrective action taken.
(f) Signature acknowledgement and date by tester, inspector and Government representatives.