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## MILITARY SPECIFICATION

### COPPER AND COPPER-BASE ALLOY MILL PRODUCTS; PACKAGING OF

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy and the Air Force.

#### 1. SCOPE

1.1 This specification details the requirements for materials, methods, containers, and procedures for the preparation for shipment of copper and copper-base alloy mill products. Mill products wherein copper is the basic metal are within the scope of this specification. Level C covers the minimum requirements which will apply unless Level A or B packing is specified (see 6.2).

1.2 Classification. - Shipping containers, for Levels A and B packing (see 3.3 and 3.5), having common characteristics are as follows:

- Category 1. . . . . Boxes, nailed wood, wire-bound wood, and wood-cleated plywood and wood-cleated, veneer, paper over-laid (See 3.3.1.1).
- Category 2. . . . . Wooden barrels, kegs, fiber and metal drums (see 3.3.1.2).
- Category 3. . . . . Pallets and pallet boxes (see 3.3.1.3).
- Category 4. . . . . Skidded lifts (see 3.3.1.4).
- Category 5. . . . . Hand bundles (see 3.3.1.5).
- Category 6. . . . . Secured lifts (without skids) (master bundles) (see 3.3.1.6).
- Category 7. . . . . Reels and spools (see 3.3.1.7).
- Category 8. . . . . Fiberboard boxes (see 3.3.1.8).
- Category 9. . . . . Special containers (see 3.3.1.9).

#### 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitations for bids, form a part of this specification to the extent specified herein:

#### SPECIFICATIONS

##### FEDERAL

- NN-K-231 - Kegs; Wood, Slack.
- NN-P-515 - Plywood, Container Grade.
- UU-P-31 - Paper; General Specification and Methods of Testing.
- UU-P-271 - Paper, Kraft, Wrapping, Waterproofed.
- UU-P-553 - Paper, Wrapping, Tissue.
- PPP-B-41 - Barrels; Wood, Slack.
- PPP-B-576 - Box, Wood, Cleated, Veneer, Paper Overlaid.
- 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 - Box, Fiberboard.
- PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple Wall.
- PPP-D-705 - Drum; Metal Shipping, Steel (Over and Under 55 Gallon).
- PPP-D-723 - Drums, Fiber.
- PPP-D-729 - Drums: Metal, 55-Gallon (for Shipment of Noncorrosive Materials).
- PPP-T-97 - Tape; Pressure-Sensitive Adhesive, Filament Reinforced.

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- MIL-W-6110 - Wood: Determination of Moisture Content of.
- MIL-B-13239 - Barrier Material, Waterproofed, Flexible, All Temperature.
- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-147 - Palletized Unit Loads (40" x 48" 4-Way Partial and 4-Way Pallets).

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

2.2 Other publications. - The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

**OFFICIAL CLASSIFICATION COMMITTEE**  
Uniform Freight Classification Rules

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, N. Y.)

**3. REQUIREMENTS**

3.1 Options. - Unless otherwise specified, where options are indicated in the packaging and packing requirements selection shall be at the option of the contractor.

3.2 Packaging and packing materials. - Materials not covered by applicable specifications or not specifically described herein shall be of the best commercial quality and suitable for the purpose intended.

3.2.1 Packaging. - The use of packaging materials shall be as specified in 3.5

3.2.1.1 Level A. -

3.2.1.1.1 Waterproof barrier material. - The material shall consist of 100 percent sulphate paper suitably coated or laminated to meet the following requirements in accordance with Specification UU-P-31. If an asphalt laminate (base weight 30 pounds minimum) is used, the paper shall have a minimum basis weight of 30 pounds per 500 sheets 24 by 36 inches (30-30-30-Minimum).

Tensile strength per inch width (weaker direction) - - - - - 15 pounds.  
Water resistance (dry indicator method) - - - - - 10 hours.

3.2.1.1.1.1 Alternatively, waterproof barrier materials conforming to Specifications UU-P-271 and MIL-B-13239 may be used at the contractor's option. All wrapping material in contact with bare metal surfaces shall be within the pH range of 5.0 - 10.0.

3.2.1.1.2 Interleaving paper. - Interleaving paper shall be antitarnishing, noncorrosive uncreped paper of 10 pounds minimum basis weight and shall conform to type II of Specification UU-P-553.

3.2.1.1.3 Unit containers. - Fiberboard boxes used for packaging wire on spools, wire and tube in coils or similar products shall conform to Specification PPP-B-636. Where specific container designs are not described by the applicable specification, the manufacturer's commercial practice shall apply.

3.2.1.2 Level C. - Unless level A or B packing is specified (see 6.2), the following shall apply:

3.2.1.2.1 Packaging materials, shall be sufficient to afford adequate protection against physical damage during shipment from the supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

3.2.2 Packing. -3.2.2.1 Levels A and B. -

3.2.2.1.1 Wood. - Requirements for wood for boxes, pallets, reels and similar items with regard to species, quality and dimensions shall be in accordance with Specification PPP-B-621 except as modified in 3.2.2.1.1.1 and tables I, II, and III.

3.2.2.1.1.1 Seasoning. - The wood shall be seasoned to a moisture content not more than 18 percent nor less than 12 percent. At the time of inspection of containers the moisture content of the wood shall not be less than 8 percent. Wood for pallets shall be seasoned to a moisture content not more than 22 percent for deck boards, 26 percent for stringers.

3.2.2.1.2 Plywood. - Plywood for boxes shall be in accordance with type I or II, class 2 of Specification NN-P-515 for level A packing, and type III, class 1 of Specification NN-P-515 for level B packing.

3.3 Container construction, packing, and securing methods. -3.3.1 Levels A and B. -3.3.1.1 Category 1 boxes. -

3.3.1.1.1 Nailed wood boxes (all groups of wood). - The construction and style of nailed wood boxes shall be in accordance with figures 1 through 6 and tables I, II, III and IV. Side, top, and bottom sections 9-1/2 inches or less in width shall be made of one piece, whenever possible. Spliced boards, whenever necessary, on nailed wood boxes are permissible. The boards shall be butted and the splicing board shall extend on each side of the joint at least three times the width of the board being spliced. The splicing board shall equal the width and thickness of the boards being spliced. Nails shall be clinched.

Table I - Nailed wood boxes for straight lengths of bar, rod, shafting, shapes, flat wire and tubular products (all dimensions are minimum).

Weight of content	Box styles (see figs. 1 through 6)	Sides thickness	Top and bottom thickness	Ends		End cleats <sup>4/</sup>		Battens <sup>4/</sup>	
				Styles 1 and 1A <sup>1/</sup>	Styles 2, 4, 7 and 8 <sup>3/</sup>	Styles 2, 4, 7 and 8		Styles 1A, 7 and 8	
				1 or 2 ply Thickness <sup>2/</sup>	1 ply thickness	Width	Thickness	Width	Thickness
Pounds		Inches	Inch	Inches	Inches	Inches	Inches	Inches	Inch
Up to 280	1, 2 and 4	5/8	1/2	1-1/16	5/8	2-1/2	5/8	---	---
281 to 560	1, 2 and 4	5/8	5/8	1-1/16	5/8	2-1/2	5/8	---	---
561 to 1120	1 to 8	3/4	5/8	1-1/2	1-1/16	2-3/4	3/4	2-3/4	3/4
1121 to 2240	1 to 8	1-1/16	3/4	1-1/2	1-1/16	2-3/4	1-1/16	2-3/4	3/4

<sup>1</sup> Ends of boxes having a weight content exceeding 2000 pounds or ends of boxes exceeding 12 inches in depth shall be 2 ply laminates of equal thickness with the grain reversed.

<sup>2</sup> Combined thickness of 2 ply end; grain of separate plies reversed.

<sup>3</sup> Styles 2, 4, 7 and 8 boxes shall not be required if the depth of the box is 10 inches or less.

<sup>4</sup> Nails used for end cleats shall pass through the ends and be clinched to not less than 1/8 inch. Nailing and clinching of battens shall be in such a manner as to prevent damage by protruding heads or points to the contents of the box.

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Table II - Nailed wood boxes for flat straight lengths of plate, sheet and strip (all dimensions are minimum).

Weight of content	Box for products up to 4 feet inclusive in length <sup>4/</sup>									
	Box styles (see figs. 1 through 6)	Sides thickness	Top and bottom thickness	Ends		End cleats <sup>4/</sup>		Battens <sup>4/</sup>		
				Styles 1 and 1A <sup>1/</sup>	Styles 2, 4, 7 and 8 <sup>3/</sup>	Styles 2, 4, 7 and 8		Styles 1A, 7 and 8		
				1 or 2 ply Thickness <sup>2/</sup>	1 ply thickness	Width	Thickness	Width	Thickness	
Pounds	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	
Up to 280	1, 2 and 4	5/8	1/2	1-1/16	-----	-----	-----	-----	-----	-----
281 to 560	1, 2 and 4	5/8	5/8	1-1/16	5/8	2-1/2	5/8	-----	-----	-----
561 to 1120	1 to 8	1-1/16	5/8	1-1/2	1-1/16	2-3/4	3/4	2-3/4	3/4	3/4
1121 to 2240	1 to 8	1-1/16	5/8	1-1/2	1-1/16	2-3/4	1-1/16	2-3/4	2-3/4	1-1/16
2241 to 6000	1 to 8	1-1/2	1-1/16	2	1-1/16	2-3/4	1-1/16	2-3/4	2-3/4	1-1/16
Boxes for products over 4 feet in length										
Up to 280	1 or 1A	5/8	1/2	1-1/16	-----	-----	-----	2-1/2	5/8	5/8
281 to 560	1 or 1A	1-1/16	5/8	1-1/16	-----	-----	-----	2-1/2	5/8	5/8
561 to 1120	1 or 1A	1-1/16	5/8	1-1/2	-----	-----	-----	2-3/4	3/4	3/4
1121 to 2240	1 to 8	1-1/2	3/4	1-1/2	1-1/16	2-3/4	1-1/16	2-3/4	2-3/4	1-1/16
2241 to 6000	1 to 8	1-1/2	1-1/16	2	1-1/16	2-3/4	1-1/16	2-3/4	2-3/4	1-1/16

- <sup>1/</sup> Ends of boxes having a weight content exceeding 2000 pounds or ends of boxes exceeding 12 inches in depth shall be 2 ply laminates of equal thickness with the grain reversed.
- <sup>2/</sup> Combined thickness of 2 ply end; grain of separate plies reversed.
- <sup>3/</sup> Styles 2, 4, 7 and 8 boxes shall not be required if the depth of the box is 10 inches or less.
- <sup>4/</sup> Nails used for end cleats shall pass through the ends and be clinched to not less than 1/8 inch. Nailing and clinching of battens shall be in such a manner as to prevent damage by protruding heads or points to the contents of the box.

3.3.1.1.1.1 Skid (runners). - Except as specified herein, boxes having a gross weight exceeding 600 pounds shall be modified by the addition of nominal 2 by 4 inch skids positioned flatwise across the width of the box and located approximately 4 inches from the ends of the box. In attaching skids, nailing shall be through the bottom boards and into the skids. When longitudinal as well as girthwise straps are required, the skids shall be notched to permit passage of the straps between the skids and the bottom of the box. Skids are not required for the following:

- Boxes shipped on pallets.
- Boxes in a skidded master shipping unit.
- Boxes 7 feet or over in length.

3.3.1.1.1.2 Thickness of lumber. - The thickness of lumber for nailed wood boxes shall be in accordance with tables I, II, and III.

3.3.1.1.1.3 Nails. - The nails for nailed wood boxes shall be in accordance with table IV.

3.3.1.1.1.4 Strapping. - Nailed wood boxes shall be strapped with flat steel strap or equivalent round in accordance with table V. Equivalent round is round wire having a breaking strength equivalent to that of the flat strap. Strap placement shall be in accordance with figures 1 through 6, as applicable.

3.3.1.1.2 Wirebound boxes. - Wirebound boxes shall conform to Specification PPP-B-585, class 3 use for Level A packing and class 1 or 2 use for Level B packing. Unless otherwise specified (see 6.2), the gross weight of wirebound boxes shall not exceed the requirements of the box specification.

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Table III - Nailed wood boxes for wire (round or flat) on spools or in coils, tubes in coils, circles and disks, sheet and strip in rolls, forgings and similar items (all dimensions are minimum).

Weight of content	Box styles (see figs. 1 through 6)	Sides Thickness	Top and bottom thickness	Ends		End cleats <sup>4/</sup>		Battens <sup>4/</sup>	
				Styles 1 and 1A <sup>1/</sup>	Styles 2, 4, 7 and 8 <sup>3/</sup>	Styles 2, 4, 7 and 8		Styles 1A, 7 and 8	
				1 or 2 ply thickness <sup>2/</sup>	1 ply thickness	Width	Thick-ness	Width	Thick-ness
Pounds		Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Up to 280	1, 2 and 4	5/8	1/2	1-1/16	5/8	2-1/2	5/8	-----	---
281 to 560	1, 2 and 4	5/8	5/8	1-1/16	5/8	2-1/2	5/8	-----	---
561 to 1120	1 to 8	3/4	5/8	1-1/16	3/4	2-3/4	3/4	2-3/4	3/4
1121 to 2240	1 to 8	3/4	5/8	1-1/16	3/4	2-3/4	3/4	2-3/4	3/4
2241 to 6000	2 to 8	1-1/2	1-1/16	-----	1-1/16	2-3/4	1-1/16	2-3/4	3/4

- <sup>1/</sup> Ends of boxes having a weight content exceeding 2000 pounds or ends of boxes exceeding 12 inches in depth shall be 2 ply laminates of equal thickness with the grain reversed.
- <sup>2/</sup> Combined thickness of 2 ply end; grain of separate plies reversed.
- <sup>3/</sup> Styles 2, 4, 7 and 8 boxes shall not be required if the depth of the box is 10 inches or less.
- <sup>4/</sup> Nails used for end cleats shall pass through the ends and be clinched to not less than 1/8 inch. Nailing and clinching of battens shall be in such a manner as to prevent damage by protruding heads or points to the contents of the box.

Table IV - Nails.

For nailing side to end		For nailing top and bottom to sides and ends					
		Thickness of side	Nail (min.)	Inside depth of side or end	Thickness of top and bottom (Inches)		
Nail (min.)							
Inches		Inches					
5/8	6d	Up to 3/4 inclusive	2d	3d	3d	4d	
1-1/16	12d	Over 3/4 to 1-1/2 inclusive	3d	3d	4d	5d	
1-1/2	16d	Over 1-1/2 to 3 inclusive	4d	4d	5d	7d	
		Over 3	5d	6d	7d	10d	

3.3.1.1.3 Wood cleated-plywood boxes. - Wood cleated plywood boxes shall conform to Specification PPP-B-601, overseas type for Level A packing and domestic type for Level B packing. Unless otherwise specified (see 6.2), the gross weight shall not exceed the weight limitations of the box specification.

3.3.1.1.4 Wood, cleated, veneer paper-overlaid boxes. - Wood, cleated veneer paper-overlaid boxes shall conform to Specification PPP-B-576 class 2 for Level A packing and class 1 for Level B packing. Unless otherwise specified (see 6.2), the gross weight shall not exceed the weight limitations of the box specification.

3.3.1.1.5 Closure and strapping. - Closure and strapping requirements for wood cleated-plywood and wood, cleated, veneer paper-overlaid boxes shall be in accordance with the appendix to the applicable box specification.

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Table V - Size of strap.

Weight of box contents	Size strap (minimum)
Pounds	Inch
Up to 280	1/2 by 0.020
281 to 560	5/8 by .020
561 to 1120	3/4 by .023
1121 to 2240	3/4 by .023
2241 to 6000	3/4 by .035

**3.3.1.2 Category 2, wooden barrels, kegs, and drums. -**

**3.3.1.2.1 Barrels. -** Barrels shall conform to Specification PPP-B-41, type II for Level A packing and type I for Level B packing.

**3.3.1.2.2 Kegs. -** Kegs shall conform to Specification NN-K-231.

**3.3.1.2.3 Fiber drums. -** Fiber drums shall conform to Specification PPP-D-723 as follows: Type II, grade A for Level A packing and type I, grade A (class optional) for Level B packing.

**3.3.1.2.4 Metal drums. -** Metal drums shall conform to Specification PPP-D-705 or PPP-D-729 at the option of the contractor.

**3.3.1.3 Category 3, pallets and pallet boxes. -** Unless otherwise specified (see 6.2), the gross weight shall not exceed 6,000 pounds.

**3.3.1.3.1 Pallets. -** Pallets for Level A or B shipments shall be expendable-type and constructed as follows:

**Lumber:** All groups of wood (see 3.2.2.1.1). Surfaced deck boards of fairly uniform width and spacing.

**Thickness:**

Deckboards - Groups I and II woods - 1 inch minimum.  
- Groups III and IV woods - 3/4 inch minimum.

Stringers - All wood groups - 1-1/2 by 3-1/2 inches.

**Moisture content** - Deck boards - 22 percent maximum.  
- Stringers - 26 percent maximum.

**Design:** Types - Single face, wing type, two-way entry (see figure 7).  
- Single face, flush stringer, two-way entry (see figure 8).  
- Single face, post construction, four-way entry (see figure 9).

Stringers - Three stringers on pallet widths 30 inches and over.

**3.3.1.3.2 Pallet boxes. -** Boxes with pallet or skid type base of commercial design with wirebound or nailed wood construction may be used (see figures 10 and 11).

**3.3.1.4 Category 4, skidded lifts. -** Skidded lift is a means of packing heavy products by securing skids, (runners) to the product itself either crosswise or lengthwise with flat steel straps or equivalent round wire. Unless otherwise specified (see 6.2), the gross weight of 6,000 pounds is permissible for skidded lifts.

**3.3.1.4.1 Skids (runners). -** Skids shall be of sound lumber of not less than 3 inches nominal width by 4 inches nominal height. Skid ends shall be beveled. The length of the skids shall be the full dimension of the unit along the direction in which they are used. At least 2 skids shall be used.

**3.3.1.4.2 Strapping. -** Straps or wires shall be stapled to the skid ends. Straps shall be a minimum of 3/4 by 0.025 inch or equivalent round wire. Straps shall not be in direct contact with the product.

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3.3.1.4.3 Protectors. - Metal protectors or cushioning packs or sheets of corrugated fiberboard shall be used between the straps and the product.

3.3.1.5 Category 5, hand bundles. - Hand bundles of straight or flat length products shall be tied with rope, wire or flat steel straps. At least two ties shall be used. Spacing between ties shall not exceed 6 feet. The ties shall be approximately 12 inches from each end except where short lengths of the products will not permit. The weight of hand bundles shall not exceed 200 pounds.

3.3.1.5.1 Hand bundles of coiled wire, and similar products shall have at least three ties.

3.3.1.6 Category 6, secured lifts (without skids)(master bundles). - Secured lifts shall be strapped in accordance with table VI.

Table VI - Size of girthwise straps for secured lifts (minimum).

Length of lift	Minimum number of straps <sup>1/</sup>	Weight of secured lift (pounds)			
		200 to 560	561 to 1120	1121 to 2240	2241 to 6000
		Size of straps <sup>3/</sup>			
Feet		Inch	Inch	Inch	Inches
Up to 10	3	5/8 by 0.020	3/4 by 0.023	3/4 by 0.028	1-1/4 by 0.035
11 to 21	4	5/8 by .020	3/4 by .023	3/4 by .028	3/4 by .035
21 to 30	5	1/2 by .020	3/4 by .020	3/4 by .028	3/4 by .035
31 to 40	6	1/2 by .020	3/4 by .020	3/4 by .028	3/4 by .035
Over 40	2/	1/2 by .020	5/8 by .020	3/4 by .023	3/4 by .035

<sup>1/</sup> Ends ties shall be secured approximately 12 inches from each end; additional ties shall be evenly spaced between the end ties.

<sup>2/</sup> For lengths over 40 feet, the maximum distance between straps shall not exceed 7 feet.

<sup>3/</sup> Equivalent galvanized round or high tensile wire may be substituted.

3.3.1.6.1 Protectors. - Metal protectors, fibrous pads, or corrugated fiberboard shall be used under ties of sheet, plate, and coiled products where it is essential for protection of finish, shape, or the wrapping material under the strapping.

3.3.1.7 Category 7, reels and spools. - Reels and spools shall be commercial design and construction.

3.3.1.8 Category 8, fiberboard boxes. - Fiberboard boxes shall conform to Specification PPP-B-636 or PPP-B-640 at the option of the contractor. Class 2 fiberboard boxes shall be for Level A packing and unless otherwise specified (see 6.2), class 1 fiberboard boxes shall be for Level B packing.

3.3.1.8.1 Closure, sealing and reinforcing. - Fiberboard box closure, sealing and reinforcing shall be in accordance with the appendix to the applicable box specification.

3.3.1.9 Category 9, Special containers. - Containers other than those listed in this specification of special design or construction may be used subject to the approval of the bureau or activity concerned.

3.3.2 Level C. - Unless Level A or B packing is specified (see 6.2), the following container construction and securing methods shall apply.

3.3.2.1 Container construction and securing methods shall be sufficient to afford adequate protection against physical or mechanical damage during shipment from the supply source to the first receiving activity for immediate use. Container construction and securing methods shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations and may be the supplier's commercial practice when such meet the requirements of this level.

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3.4 Box style details (see figures 1 through 6). -3.4.1 Styles 1 and 1A (no cleats). -

3.4.1.1 In the ends the grain of the wood shall run in the direction of the greatest dimensions.

3.4.1.2 Styles 1 and 1A boxes shall be limited to a height of 10 inches.

3.4.2 Styles 2 and 7 (four plain cleats each end). -

3.4.2.1 The ends of the cleats which run across the grain of the ends shall be 1/8-inch from the inside surface of the top and bottom.

3.4.2.2 The sides, top and bottom shall be flush with the outside surface of the cleats.

3.4.3 Styles 4 and 8 (two plain cleats each end). -

3.4.3.1 The ends of the cleats which run across the grain of the ends shall be 1/8-inch from the outside surface of the top and bottom.

3.4.3.2 The sides shall be flush with the outside surface of the cleats.

3.5 Commodity packing details. -3.5.1 Levels A and B. -3.5.1.1 Straight lengths of bar, rod, shapes, flat wire and tubular products. -

3.5.1.1.1 Level A. - The products shall be separated by size, composition and temper, and packed as specified in 3.5.1.1.1.1 or 3.5.1.1.1.2, as applicable.

3.5.1.1.1.1 Rod, bar and shapes under 3/8 inch diameter or thickness and flat wire and tubular products shall be packed in nailed wooden boxes conforming to 3.3.1.1.1. Lengths up to 60 inches, inclusive, may also be packed in wire bound boxes, wood-cleated plywood boxes, or pallet boxes conforming to 3.3.1.1.2, 3.3.1.1.3 and 3.3.1.3.2, respectively. Small boxes, whenever practicable, shall be palletized or tied onto a skidded master lift.

3.5.1.1.1.2 Rod, bar and shapes, 3/8-inch and over in diameter or thickness, shall be packed in category 1, 4, or 6 containers conforming to 3.3.1.1, 3.3.1.4 and 3.3.1.6, respectively. The gross weight of the container shall not exceed 6,000 pounds.

3.5.1.1.2 Level B. - Packing shall be in accordance with Level A as specified in 3.5.1.1.1 or in category 4, 5, or 6 containers conforming to 3.3.1.4, 3.3.1.5 and 3.3.1.6, respectively.

3.5.1.2 Rod, welding (bare rod or bare wire form) (straight lengths, in coils, or on spools). -

3.5.1.2.1 Levels A and B. - The product shall be separated by size, composition and temper and packed as specified in 3.5.1.2.1.1, 3.5.1.2.1.2 or 3.5.1.2.1.3.

3.5.1.2.1.1 Straight lengths (nominal 36 inch). - Straight lengths shall be packed in unit quantities of 100, 200 or 500 pounds net weight in category 1 (see 3.3.1.1) containers strapped in accordance with 3.3.1.1.1.4 and shall require no other protection. The containers may be palletized or tied onto a skidded master lift. Straight lengths in unit quantities of 50 pounds net weight shall be packed in either a bundle (see 3.5.1.2.1.1.1), carton (see 3.5.1.2.1.1.2) or cylindrical tube (see 3.5.1.2.1.1.3) and shall require no other protection, except shipments of less than 600 pounds to one destination shall be packed in one category 1 (see 3.3.1.1) container. Shipments of 600 pounds or more shall be packed in category 3 (see 3.3.1.3) containers, maximum 6,000 pounds gross.

3.5.1.2.1.1.1 Bundle. - Units of 50 pounds net weight shall be wrapped (see figure 12) in paper conforming to Specification UU-P-271, class G-3 and secured with 3 girthwise ties, 3/8-inch steel strap or wire equivalent, or tape conforming to Specification PPP-T-97 and shall require no other protection.

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3.5.1.2.1.1.2 Carton. - Units of 50 pounds net weight shall be packed (see figure 13) and closed in category 8 containers (see 3.3.1.8).

3.5.1.2.1.1.3 Cylindrical tube. - Units of 50 pounds net weight shall be packed (see figure 14) in spiral-wound cylinders made of chipboard or kraft of good commercial quality with a minimum wall thickness of 3/16 inch. The end closures shall be wood plugs of minimum 1 inch thickness and shall be nailed or stapled.

3.5.1.2.1.2 Coils. - Coils of welding rod in the form of round wire shall be wrapped as shown in figure 15 with a single wrap of creped waterproof paper or overwrapped with one layer of waterproof paper conforming to 3.2.1.1.1 and packed in category 1, 2, or 3 containers (see 3.3.1.1, 3.3.1.2, and 3.3.1.3). As an alternate, unwrapped coils may be packed in category 1, 2, or 3 (see 3.3.1.1, 3.3.1.2, and 3.3.1.3) containers with a waterproof paper (see 3.2.1.1.1) inner liner. Coils exceeding 12 inches in diameter shall be wrapped as shown in figure 15 with a double layer of creped waterproof paper conforming to 3.2.1.1.1 and tied securely with not less than 3 ties evenly spaced around the coil and shall not require other external container.

3.5.1.2.1.2.1 When specified (see 6.2), bare welding rod in wire form shall be furnished in fiber drums conforming to Specification PPP-D-723 as follows:

- (a) Grade A, type II or III for overseas shipments.
- (b) Grade A, type I for domestic shipment and storage.

NOTE. - Except where 7/16-inch plywood heading is specified, 3/8-inch thickness of the bottom headings is permissible.

Drums shall be provided with cores fabricated from convolutely wound Kraft liner board of minimum 0.012-inch thickness. 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 top of drum. Drums shall be closed by means of a lever locking band. Net weight of drum contents will be 400-500 pounds. When specified (see 6.2), coiled wire shall be furnished in lighter or heavier net weights. Overpacking of drums for shipment shall not be required. When specified (see 6.2), drums shall be palletized in accordance with Standard MIL-STD-147.

3.5.1.2.1.3 Spools. - Welding rod in 25 pound unit quantities shall be layer wound on spools (see figure 16) so as to avoid producing kinks, waves, or sharp bends and so that it is free to unwind without restriction caused by overlapping and wedging. The final layer of rod shall be covered with a strip of waterproof paper (see 3.2.1.1.1). Spools shall be packed in fiberboard boxes constructed and closed in accordance with class 1 domestic service grade of Specification PPP-B-636. These fiberboard boxes, containing the rod on spools, shall be overpacked in category 1, 3, or 9 (see 3.3.1.1, 3.3.1.3, and 3.3.1.9) containers, maximum 3,000 pounds gross weight.

### 3.5.1.3 Shafting. -

3.5.1.3.1 Levels A and B. - Shafting shall be separated by size, composition, and temper and packed in nailed wood boxes conforming to 3.3.1.1.1. Shafting 3 inches and under in diameter may be packed more than one to a box. Shafting over 3 inches in diameter shall be individually packed. When specified (see 6.2), shafting 1-1/2 inches to, but not including 3 inches, shall be supported within the boxes on wood saddles. The saddles shall be located at each end of the box and every 3 feet of box length. The saddle shall be of nominal 2 inch thickness lumber and the full inside width of the box. The shafting shall be secured within the box by corresponding saddle members placed over the bearing saddles or by members attached to the inside face of the top of the box.

### 3.5.1.4 Flat straight lengths, plate, sheet, strip, circles and disks. -

3.5.1.4.1 Levels A and B. - The products shall be separated by size, composition and temper and packed in category 1, 3, or 4 (see 3.3.1.1, 3.3.1.3 and 3.3.1.4) containers. The product when packed on pallets, in open pallet boxes or on skidded lifts, shall be shrouded with waterproof material conforming to 3.2.1.1.1. Products with polished surfaces shall be interleaved with paper conforming to 3.2.1.1.2 and packed in category 1 containers (see 3.3.1.1) and lined with waterproof material conforming to 3.2.1.1.1.

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3.5.1.5 Sheet and strip in coils

3.5.1.5.1 Levels A and B. - The product shall be separated by size, composition and temper, and packed in either category 1 or 2 (see 3.3.1.1 and 3.3.1.3) containers. The products, when packed on pallets or in open pallet boxes shall be shrouded in waterproof material conforming to 3.2.1.1.1. Products with polished surfaces shall be interleaved with paper conforming to 3.2.1.1.2 and packed in category 1 containers (see 3.3.1.1) and lined with waterproof material conforming to 3.2.1.1.1.

3.5.1.6 Cable, wire, (round or flat) - The products shall be separated by size, composition and temper.

3.5.1.6.1 Levels A and B. -

3.5.1.6.1.1 Reels or spools. - Cable and wire (round or flat) when packed on large reels or spools shall be protected by a layer of waterproof material conforming to 3.2.1.1.1 and extending completely around the reel. The paper shall be tacked, taped or strapped to the flanges of the reel. Reels shall be completely enclosed with wooden lagging with boards touching each other as shown on figure 17. Lagging boards shall be the same thickness as the flange but not thicker than 2-inch commercial lumber and shall be nailed to the outside of the flanges and secured with steel straps of minimum dimensions 5/8 by 0.020 inch, or equivalent round wire drawn tight around the periphery of the lagging. The straps shall be stapled or nailed at intervals of approximately 15 inches. For reels or spools of intermediate sizes (flange diameters in the approximate range 10 to 30 inches) where external lagging is not practicable, the product may be wrapped instead with plywood or solid fiberboard wrappers directly over the product and snugly fitting between the reel flanges and secured by either steel straps of minimum dimensions 1/2 by 0.020 inch or equivalent round wire. The product on small spools (flange diameter less than approximately 10 inches) may be wrapped in accordance with the manufacturer's standard practice and shall be packed in either category 1 or 3 (see 3.3.1.1 and 3.3.1.3) containers. Whenever practicable, small boxes of individual reels or spools may be palletized or secured onto a skidded master shipping unit.

3.5.1.6.1.2 Coils (round wire) - Coils of round wire shall be wrapped as shown on figure 15 with a single wrap of creped waterproof material or overwrapped with one layer of waterproof material conforming to 3.2.1.1.1 and packed in category 1, 2, or 3 containers conforming to 3.3.1.1, 3.3.1.2, and 3.3.1.3 respectively. As an alternate, unwrapped coils may be packed in category 1 or 2 containers with a waterproof material (see 3.2.1.1.1) liner. Whenever practicable, small packages of individual coils may be palletized or secured onto a skidded master shipping unit. Coils of round wire, exceeding 12 inches in diameter, wrapped as shown on figure 15 with a double layer of creped material conforming to 3.2.1.1.1 and tied securely with not less than three ties evenly spaced around the coil shall require no other external container.

3.5.1.6.1.3 Flat wire in coils, bobbins or on bucks. - Flat wire in coils (rolls) or on bucks shall be tied with not less than three ties evenly spaced around the unit and packed in category 1, 2, or 3 containers conforming to 3.3.1.1, 3.3.1.2 and 3.3.1.3, respectively. To prevent damage to adjacent coils, separators shall be provided between the coils. Whenever practicable, small boxes shall be palletized or secured onto a skidded master shipping unit.

3.5.1.7 Tubular products in coils -

3.5.1.7.1 Levels A and B. - Tubular products in coils shall be separated by size, composition and temper and packaged in containers specified in 3.2.1.1.3 or in accordance with commercial practice and packed in category 1, 2, or 3 containers conforming to 3.3.1.1, 3.3.1.2 and 3.3.1.3, respectively.

3.5.1.8 Forgings, forging blanks or slugs, small arms components, (disks, cups, cases, and jackets), bushings, short tube blanks, rotating band blanks, and similar items. -

3.5.1.8.1 Levels A and B. - The product shall be separated by size, composition, and temper and packed in category 1 or 2 containers or pallet boxes conforming to 3.3.1.1, 3.3.1.2 and 3.3.1.3, respectively. The contents of pallet boxes shall be shrouded with waterproof material conforming to 3.2.1.1.1. Whenever practicable, small boxes shall be palletized or secured onto a skidded master shipping unit.

3.6 Marking. - In addition to any special marking required (see 6.2), marking for shipment shall be in accordance with Standard MIL-STD-129.

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3.7 Workmanship. - All operations and processes involved in accomplishing the requirements specified herein, shall be in accordance with the highest grade practices associated with this type of work. Workmanship shall be first class in every respect.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. 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.

##### 4.2 Sampling for quality conformance inspection. -

4.2.1 Inspection lot. - All units of the same product packed in the same manner and presented for delivery at one time shall be considered an inspection lot.

4.2.2 Sampling for visual and dimensional examination. - Random sample of filled containers or unit loads shall be selected from each lot in accordance with table VII to verify compliance with all requirements of this specification which do not involve tests.

Table VII - Sampling for visual and dimensional examination.

Lot size (number of containers)	Sample number of containers	Acceptance number of defects	Rejection number of defects
1 to 8	All	---	---
9 to 25	5	0	1
26 to 65	7	0	1
66 to 110	10	1	2
111 to 180	15	2	3
181 and over	25	3	4

4.2.3 Sampling for moisture content in wood. - The total number of pieces of wood in all pallets, skids, and boxes shall be considered the lot size. The number of pieces on which moisture measurement shall be made is shown in table VIII. These pieces shall be selected at random and one moisture meter measurement made on each piece (see 4.4.2).

Table VIII - Sampling for moisture content in wood.

Lot Size (number of pieces)	Sample size (number of pieces tested)	Acceptance (number of pieces outside moisture limits)
Up to 40	5	0
41 to 65	7	0
66 to 110	10	1
111 to 300	15	1
301 to 800	25	2
801 to 1300	35	3
1301 to 3200	50	4
3201 to 8000	75	6

4.3 Visual and dimensional examination. - Each sample filled container or unit load selected from table VII shall be visually examined and measured to verify conformance to the workmanship and other requirements of this specification. Examination shall be as specified in table IX. Any container or unit load in the sample containing one or more defects shall not be offered for delivery, and if the number of defects in any sample exceeds the acceptance number for that sample, this shall be cause for rejection of the lot represented by the sample.

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Table IX - Classification of defects in accordance with Standard MIL-STD-105.

Categories	Defects
Critical: 1	None defined.
Major:	
101	Level of packaging not as specified.
102	Packaging not sufficient to afford adequate protection against physical damage.
103	Evidence of unauthorized material used.
104	Products not separated by size, composition and temper as specified.
105	Net weight of unit package in container exceeds specified limit.
106	Coils not wrapped in waterproof paper.
107	Shafting (when specified) not supported on saddles, saddles not spaced as required.
108	Flat straight lengths, plate, sheet, strip, circles and disks with polished surfaces not interleaved with paper as required.
109	Products in rolls, reels, spools or coils not shrouded or wrapped in waterproof material as specified.
110	Forgings, forging blanks or slugs, small arms components, bushings, short tube blanks, rotating band blanks and similar items not shrouded in waterproof material.
111	Level of packing not as specified.
112	Weight of contents relative to the container style exceeds the allowable limit.
113	Packing does not insure acceptance by common carrier or protection against physical damage.
114	Shipping containers nonconforming to uniform freight classification.
115	Wood for boxes, pallets, reels and similar items not in accordance with specifications as modified.
116	Veneer, paper overlaid panel board nonconforming to type I or type II as specified.
117	Category of container not as specified.
118	Box containers nonconforming to sides thickness, top and bottom thicknesses, ends, end cleats and battens styles as specified.
119	Closure banding or strapping not as specified.
120	Steel strap size less than the specified minimum in relation to the weight of the box contents.
121	Wooden barrels, kegs and drums nonconforming.
122	Pallet surface boards not of uniform width and spacing, thickness less than minimum required, stringer size and number of stringers less than required.
123	Gross weight of shipping containers exceeds limit specified.
124	Skids not provided when required.
125	Skids not in accordance with applicable box specifications.
126	Spools not within specified dimensions, flanges not parallel, not constructed with adequate strength and rigidity to prevent damage in normal handling.
127	Bundles, cartons and cylinders not as specified, weight exceeds the specified limit.
Minor:	
201	Marking; shipment information not provided on interior packages.
202	Nomenclature, Federal Stock number or manufacturer's part number, contract or order number, contractor's name and destination not legible, missing or improperly marked on containers.

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#### 4.4 Test procedures. -

4.4.1 Tensile strength and water resistance. - The fabricated material (see 3.2.1.1.1) shall be tested as specified in Specification UU-P-31.

4.4.2 Moisture content. - For determining the moisture content of wood either of the following methods shall be used:

4.4.2.1 Oven-drying method. - A small sample, preferably not smaller than 3 inches square, not less than 20 grams (approximately 3/4 ounce), shall be cut from the material to be tested. Weigh immediately on a scale that is accurate to one-half of one percent. This is the original weight. Dry in an oven maintained at a temperature of 212° to 221°F. (100° to 105°C.) until constant weight is attained. Reweigh the sample. This is the oven-dry weight. Compute moisture content by the following formula:

$$\frac{\text{Original weight} - \text{oven-dry weight}}{\text{Oven-dry weight}} \times 100 = \text{moisture content in percent.}$$

4.4.2.2 Electrical moisture meter method. - Electrical moisture meter method shall be conducted in accordance with Specification MIL-W-6110.

#### 4.4.3 Possible test failures. -

- (a) Tensile strength and water resistance. - Waterproof barrier material not as specified and tensile strength per inch width less than specified.
- (b) Water absorption. - Evidence of water absorption when tested for the specified period by the dry indicator method of Specification UU-P-31.
- (c) Moisture content. - Not within the specified limit when wood sample is tested by either the oven-drying method or electrical moisture meter method.

4.4.3.1 Failure to meet any of the test requirements shall be cause for rejection of the entire lot.

#### 5. PREPARATION FOR DELIVERY

5.1 Not applicable.

#### 6. NOTES

6.1 Intended use. - It is intended that this specification be used for reference in Section 5 of copper and copper-base alloy mill product commodity specifications and for direct reference in procurement documents. The packaging, packing and marking requirements specified herein are intended to insure proper and safe storage and transportation of copper and copper-base alloy mill products for direct shipment to Government activities or shipment processed at a Military activity or agency.

6.2 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Level of packaging and level of packing if other than Level C (see 4.2.1.2 and 3.3.2).
- (c) Maximum gross weight of container (see 3.3.1.1.2, 3.3.1.1.3, 3.3.1.1.4, 3.3.1.3 and 3.3.1.4).
- (d) Fiberboard box, if other than class 1 (see 3.3.1.9).
- (e) When palletized drums are required (see 3.5.1.2.1.2.1).
- (f) When bare welding rod in wire form is required in fiber drums (see 3.5.1.2.1.2.1).
- (g) When cores fitted with slinger ring attachment are required (see 3.5.1.2.1.2.1).
- (h) When coiled wire is required in lighter or heavier net weight (see 3.5.1.2.1.2.1).
- (i) When saddles are required for shafting (see 3.5.1.3.1).
- (j) Special marking required (see 3.6).

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Notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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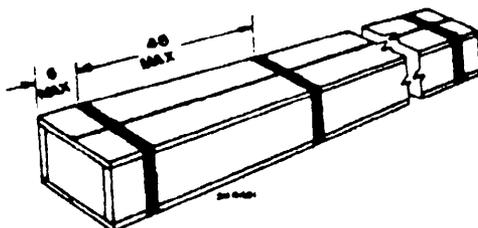


Figure 1 - Style 1 box.

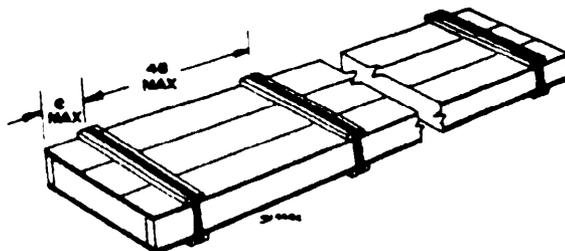


Figure 2 - Style 1A box (batten reinforced top and bottom).

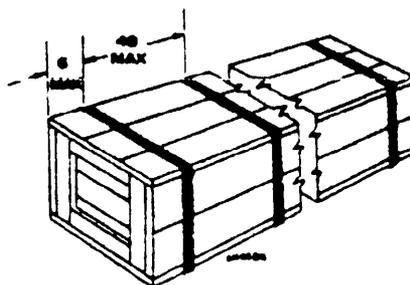


Figure 3 - Style 2 Box.

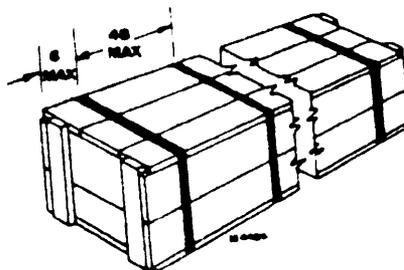


Figure 4 - Style 4 box.

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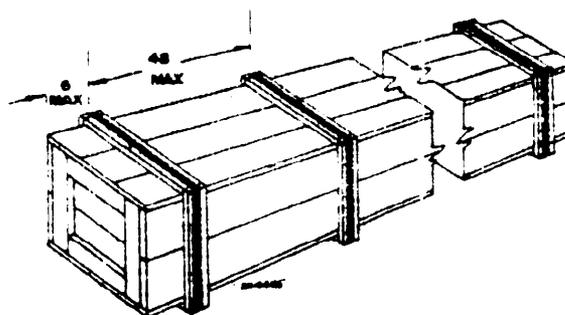


Figure 5 - Style 7 box (batten reinforced).

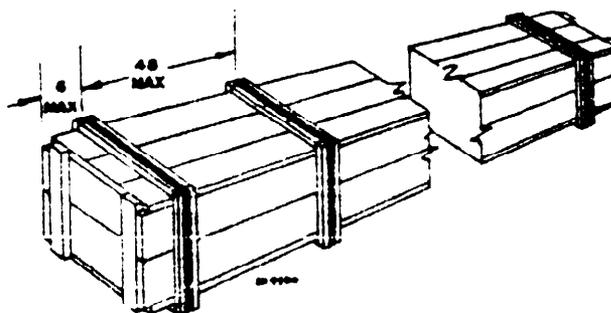


Figure 6 - Style 8 box (batten reinforced).

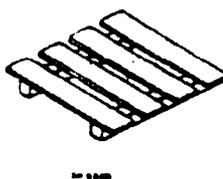


Figure 7 - Single face wing type.

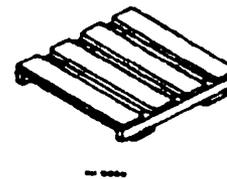


Figure 8 - Single face (with bottom cleats).

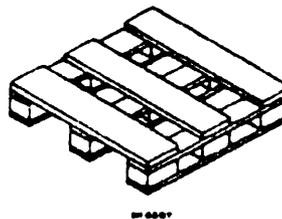


Figure 9 - Four-way entry.

TYPICAL PALLET CONSTRUCTION

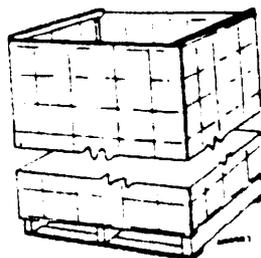


Figure 10 - Pallet box (wirebound construction).

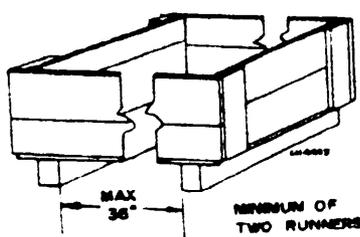
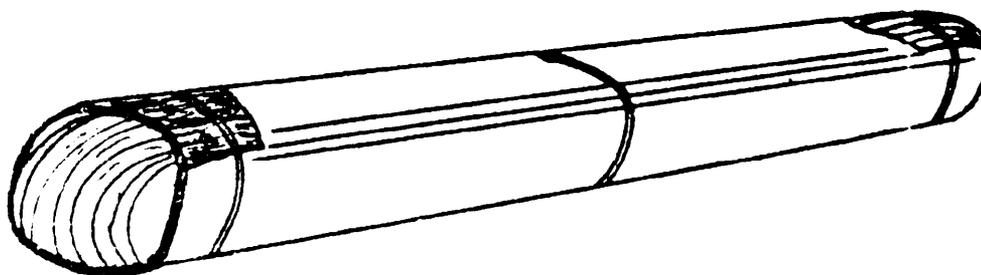


Figure 11 - Pallet box (nailed wood construction).



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Figure 12 - 50 pound bundle

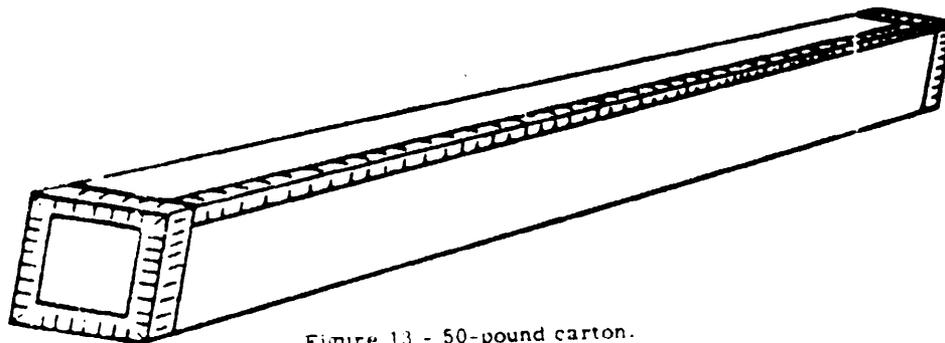


Figure 13 - 50-pound carton.

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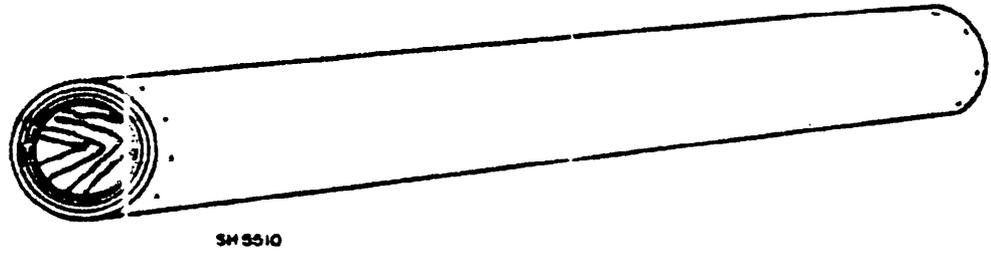


Figure 14 - 50-pound cylinder.

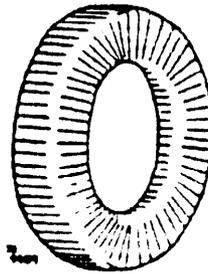
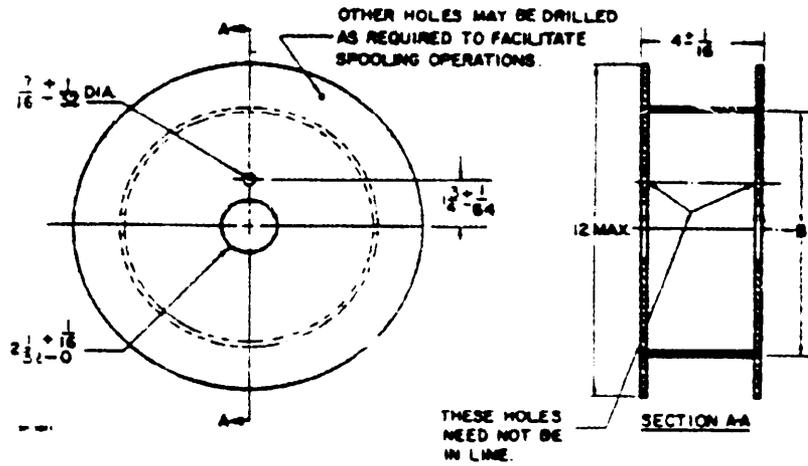


Figure 15 - Typical wrapped coiled round wire.



NOTES:

- (1) Dimension B shall be such as to permit proper feeding of electrode.
- (2) Flanges must not be out of parallel more than 3/16-inch.
- (3) Flange and barrel material shall be constructed of such thickness as to provide adequate strength and rigidity to prevent damage or distortion in normal handling or use.

Figure 16 - Standard-spool dimensions.

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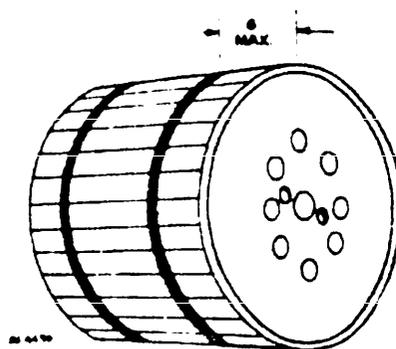


Figure 17 - Typical lagged reel for wire and cable.

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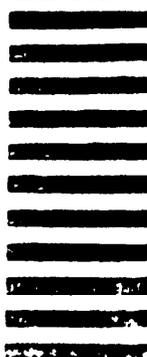
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