

AA-S-271d
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SUPERSEDING
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FEDERAL SPECIFICATION

SHELVING, STORAGE AND DISPLAY, STEEL,
INTERCHANGEABLE, NUT AND BOLT TYPE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers requirements for storage and display shelving, fabricated from steel, with vertically adjustable shelves secured by means of nuts and bolts.

1.2 Classification.

1.2.1 Kinds, types, classes, and sizes. Shelving shall be of the following kinds, classes, types, and sizes as specified (see 6.2):

Kind 1 - Plain.

Class 1 - Light loads.

Class 1A - Light loads (front edge reinforced).

Class 2 - Heavy loads.

Class 3 - Extra heavy loads.

Kind 2 - Sloped.

Kind 3 - Cornice.

Kind 4 - Tire and wheel.

Type I - With back and two ends.

Type II - With back and one end (one end open).

Type III - With two ends (open back).

Type IV - With one end (open back and one end).

Type V - Open or skeleton shelving.

Sizes (nominal dimensions):

Heights (posts) - 39, 51, 63, 75, 87, 99, 111, 123, 135, and 147
inches.

Heights (ledges and counters) - 39 inches.

Widths (shelves) - 24, 30, 36, 42, and 48 inches (see 3.3.3 and 6.8).

Depth (shelves) - 12, 15, 18, 24, and 36 inches (see 3.3.3 and 6.8).

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

FF-N-836 - Nut, plain: (Hexagon, Square, Cap and Welding) Nut, Slotted, and Castellated, Hexagon.

FF-S-92 - Screws, Machine: Slotted, Cross-Recessed or Hexagon Head.

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QQ-C-320 - Chromium Plating (Electrodeposited).
QQ-N-290 - Nickel Plated (Electrodeposited).
QQ-S-781 - Steel, Strapping, Flat.
UU-P-268 - Paper, Kraft, Untreated, Wrapping.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Box, Fiberboard.
PPP-B-1055 - Barrier Material, Waterproofed, Flexible.
PPP-C-650 - Crates, Wood, Open and Covered.
PPP-S-760 - Strapping, Nonmetallic, (and Connectors).
PPP-T-60 - Tape; Pressure-Sensitive Adhesive, Waterproof, for Packaging.
PPP-T-97 - Tape; Pressure-Sensitive Adhesive, Filament Reinforced.

Federal Standards:

Fed. Std. No. 123 - Markings for Domestic Shipment (Civilian Agencies).
Fed. Std. No. 187 - Identification of Pressed Bends, Forms, Seams, and Joints, (Sheet Metal).
Fed. Std. No. 595 - Colors.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.)

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-C-604 - Crates, wood, Lumber and Plywood Sheathed, Nailed and Bolted.
MIL-P-116 - Preservation, Methods Of.
MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys.

Military Standards:

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

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal 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, NY 10016.)

National Motor Freight Traffic Association, Inc.:

National Motor Freight Classification Rules.

(Application for copies should be addressed to the National Classification Board, 1616 P Street, NW, Washington, DC 20036.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.)

3. REQUIREMENTS

3.1 Preproduction sample. When specified (see 6.2), before production is commenced, a sample of the storage and display shelving conforming to this specification shall be made available to the contracting officer or his

representative for approval in accordance with 4.2. The approval of the preproduction sample authorizes commencement of production, but does not relieve the supplier of responsibility for compliance with all applicable provisions of this specification. The preproduction sample shall be manufactured in the same facilities to be used for the manufacture of the production items.

3.2 Materials. Materials shall conform to the applicable specifications and requirements specified hereinafter.

3.2.1 Steel. Unless otherwise specified herein, steel sheet, strip, angles, and rods used in the fabrication of items covered by this specification shall be either hot-rolled or cold-rolled, commercial quality, and free from loose scale, rough and sharp edges, and defects or imperfections which may impair the appearance or strength of the end item.

3.2.1.1 Thickness of component parts. Component parts of shelving listed in table I shall be fabricated from steel of the thickness indicated.

3.2.2 Bolts and nuts. Bolts and nuts used for assembly shall be 1/4-20 UNC, class 2A or 2B fit, as applicable. Bolts shall be type I, style 1s, 7s, or 9s, cadmium- or zinc-plated steel of FF-S-92. Nuts shall be type I, style 1, 2, or 3; or type II, style 1, 3, 8, or 10, cadmium- or zinc-plated steel of FF-N-836.

3.3 Construction. Unless otherwise specified (see 6.2), shelving units shall be furnished knocked-down. Shelving construction shall conform to the requirements shown on figures 3, 4, 5, and 6 and hereinafter specified. Sheet metal fabrication terms specified herein shall be as defined in Fed. Std. No. 187. Details not specifically defined shall be in accordance with the supplier's regular commercial practice.

3.3.1 Door handles. Door handles shall be commercially available items, fabricated of die cast aluminum alloy, die cast bronze, brass, zinc alloy, or malleable iron.

TABLE I. Thickness of component parts

Shelving components	Thickness [1]		Shelving components	Thickness [1]	
	Gage (min.)	Decimal equivalent (inches)		Gage (min.)	Decimal equivalent (inches)
Backs	22	0.0299	Posts (see 3.3.2)		.125
Bases	18	.0478	Counter fronts	18	.0478
Bin dividers:			Counter tops	12	.1046
18 inches high or less	20	.0359	Doors	20	.0359
Over 18 inches and including 36 inches high	18	.0478	Door box channel brace	24	.0239
Over 36 inches high	16	.0598	Ends	22	.0299
For sloped shelves	20	.0359	Label holders	26	.0179
Bin fronts	18	.0478	Milling-cutter	16	.0598
Boxes	20	.0359	Shelves:		
Box dividers	22	.0299	Plain (classes 1, 1A, 2, and 3)	18	.0478
Box guides	22	.0299	Cornice	18	.0478
Braces:			Cornice telescoped over		
Angle-sway	13	.0897	integral class 1 (see	16	.0598

Cross-strap-sway	.125 (min.)	3.3.3.3) Sloped Tire and wheel	18 18	.0478 .0478
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[1] Commercial tolerances applicable.

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3.3.2 Posts. Posts shall be rerolled rail steel or formed steel (see 3.2.1), having a side and front flange, and shall conform to the requirements shown in figure 4. Posts shall be provided at the front and rear corners of all units. The use of common posts for adjoining units shall not be permitted. When rerolled rail steel angles are furnished, the posts shall be 3/22 inch thick minimum (commercial tolerances allowable). When formed steel angles are furnished, the posts shall have a thickness not less than indicated in table I.

3.3.3 Shelves. Shelves, in the kind, class, size, and quantity per section specified (see 6.2), shall conform to requirements hereinafter specified. Shelf nominal width and depth dimensions, as specified in 1.2.1, shall be the overall width and depth dimensions of a free standing unit of shelving.

3.3.3.1 Plain Shelves. Plain shelves shall be as shown on figures 3 and 5, as applicable, and unless otherwise specified (see 6.2), shall be furnished with bin divider holes as shown on figure 5. Plain shelves, 18 inches or more in depth, shall have holes provided in the 1/2 inch side horizontal flanges for attachment of two center reinforcing angles running parallel to the front and rear flange of the shelf, as shown on figure 3. The front and rear of the shelves shall be flanged as shown on figure 5, except the inside vertical flanges may be folded down flat on the inside. All plain shelves shall have holes provided at the four corners for attachment of angle-sway braces. The front and rear 1-3/16 inch vertical flanges shall have holes provided for attachment of bin fronts, backs, and label holders. The 1-3/16 inch vertical side flanges of all shelves, 18 inches or more in depth, shall have holes provided at the center for bolting to the side panels (see 3.3.4). Reinforcement of classes 1A, 2, and 3 shelves shall be as shown on figure 3.

3.3.3.1.1 Ledge shelves. When ledge shelves are specified (see 6.2), they shall be class 1 shelves with the addition of class 3 shelf reinforcing angles for each side flange, but without bin divider holes in the top surface.

3.3.3.2 Sloped shelves. Sloped shelves shall have the front, rear, and sides flanged upward. The front and rear flanges shall be folded V form, 1-1/8 inches nominal depth, with the metal returned upon itself and out upon the surface of the shelf not less than 1/4 inch. The sides shall be 1-1/8 inches nominal depth, folded flange formation, with edges turned down flat not less than 1/4 inch. These shelves shall be formed to provide a slope toward the front. When installed, the back shall be raised not less than 2 nor more than 6 inches.

3.3.3.3 Cornice shelves. Cornice shelves, when used for counter tops, shall be of the thickness specified in table I, unless telescoped over a plain shelf, in which case they shall not be less than 0.0598 inch thick. The front and rear edges of double-faced cornice shelves shall be formed to provide an overhang of not less than 7/8 inch and with a down face of not more than 2 inches. The side flanges shall be formed downward to line with the bottom line of the front and rear flanges. The front edge of single-faced cornice shelves shall be formed to provide an overhang of not less than 1 inch and with a down face of not more than 2 inches. The side and rear flanges shall be formed downward to line with the bottom line of the front flange.

3.3.3.4 Tire and wheel shelves. Each tire shelf shall consist of a pair of sloping shelves with side supports to form a complete shelf. Each sloping member of tire and wheel shelves shall have the bent edges rounded so as not to damage stored objects. Plain shelves inserted at an angle will not be acceptable.

3.3.4 Ends. Ends shall have holes provided on centers to match holes in

posts. All ends 18 inches or more in depth shall have a row of holes positioned vertically at the center for bolting through the side flanges of shelves. Sides shall continue to the floor to close the base at this point. Heights over 7 feet 3 inches may be made by overlapping two pieces.

3.3.5 Backs. Backs shall have holes provided on centers to match holes in posts and shall also have a row of holes positioned vertically at the center or bolting through the back flange of shelves. Back shall continue to the floor to close the base at this point. Heights over 7 feet 3 inches may be made by overlapping two pieces.

3.3.6 Counter fronts. When required (see 6.2), counter fronts shall have holes provided on centers to match holes in posts, but shall not have holes on the vertical centerline. Counter fronts shall continue to the floor and then shall be flanged at right angles for a distance not less than 5/8 inch for stiffening.

3.3.7 Bases. When required (see 6.2), bases shall be formed into a channel shape and shall be of a height to form a tight fit under the bottom shelf when its top surface is approximately 3 inches from the floor. Each base end shall have holes provided for bolting on the inside of the 1 inch leg of the post.

3.3.8 Bin dividers for plain shelves. When required (see 6.2), bin dividers for plain shelves shall be furnished in the quantity per shelf specified and center distance between shelves specified. Dividers shall be flanged at right angles not less than 5/8 inch wide at both top and bottom, and these flanges shall have holes provided for bolting to the shelves. For heights 10 inches and less, the front and rear edges may be finished to a flat fold. For heights 12 inches and greater, the front shall be formed into a bead of not less than 5/16 inch diameter. The rear edge shall be formed the same, or flanged at right angles not less than 1/2 inch. Heights above 36 inches shall have a bead at the front not less than 1/2 inch in diameter.

3.3.9 Bin dividers for sloped shelves. When required (see 6.2), bin dividers for sloped shelves shall be furnished in the specified quantity per sloped shelf. The dividers shall be flanged at the bottom to permit the dividers to stand in a vertical position without bolting to the shelf. However, the flanges shall be provided with mounting holes for bolting.

3.3.10 Bin fronts. When required (see 6.2), bin fronts in the specified quantity and height (see 6.5), shall have the top edge formed into a bead not less than 1/2 inch diameter. The bottom shall be flanged to incase the front flange of the shelves. When used in the first opening immediately above a ledge shelf, the bin front shall rest upon the ledge shelf and the bottom shall be formed the same as the top. Bin fronts shall have a provision to take labels.

3.3.11 Boxes. When required (see 6.2), and unless other sizes are specified, shelf boxes shall be furnished in the specified quantity, and in specified sizes, selected from the following:

- (a) Quantity per 36 inch shelf width - 3, 4, 6, or 8 boxes.
- (b) Shelf depth - 12 or 18 inches.
- (c) Vertical center distance between - 4, 6, or 8 inch shelves.

The boxes shall be provided with rear stops to prevent accidental removal of boxes. All top edges of the boxes shall be folded over flat or beaded, except rear flanges of boxes may be "Z" shaped. Sides shall be formed and perforated or embossed to provide 1 inch adjustment of dividers. The type of perforation or embossing used shall hold dividers in vertical position without tilting. The front shall be equipped with a drawer pull and label holder. Not less than two removable box dividers with label holders shall be provided for each box. The edge of the dividers shall be folded over flat, beaded, or folded over to become part of the label holder.

3.3.12 Box guides (flush bars). When required (see 6.2.), one pair of box guides shall be furnished for each opening in which boxes are specified. Box guides may be specified for other purpose such as to keep material from front leg of posts.

3.3.13 Doors. When doors are required (see 6.2), doors shall be of the swing or hinged type and shall have all four sides, flanged at right angles not less than 3/4 inch, with the edges folded over and returned in upon the inside surface of the door to a folded V form. Alternatively, doors shall have all four sides flanged at right angles to form a web not less than 3/4 inch and flanged sides shall be flanged again inward at right angles a distance of not less than 3/8 inch, to a panel formed channel shape. On left-handed doors, the

flange next to the right-hand door only shall be flanged outward at right angles to the web and parallel with the door face, a distance of not less than 3/8 inch to a "Z" brace shape. Corners shall be welded together. A hat channel brace shall be centered and spot welded to the inside of the doors and shall be approximately the full height of the doors. Braces with a web not less than 4 inches wide and a flange 7/16 inch high shall be used for door widths up to and including 15 inches. Braces with a web not less than 6 inches wide and a flange 7/16 inch high shall be used for door widths greater than 15 inches. All edges shall be flanged outward not less than 5/8 inch. A three-point locking device shall be furnished on each door or pair of doors. Doors to cover openings greater than 2 feet in width shall be furnished in pairs. When units over 7 feet 3 inches high are to be covered by doors, two or more doors of standard size shall be furnished for use in tiers. When double doors are furnished with locks (see 3.3.17), the right-hand door shall contain the

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lock and handle. Handles and locks are not required on the lefthand double doors. Unless otherwise specified (see 6.2), all single doors on the right side of the unit. Handles shall be of the material specified in 3.3.1.

3.3.14 Label holders. When required (see 6.2), label holders in the specified quantity shall be of the material specified in 3.2.1 and of the thickness specified in table I. Holders shall be a continuous type or of the adjustable type, as specified (see 6.2), and shall be shaped in accordance with the supplier's standard practice.

3.3.15 Milling-cutter inserts. When required (see 6.2), milling-cutter inserts shall consist of a back panel and a pair of box-type doors (double-wall) and shall be made for openings 3 feet wide, with shelves spaced vertically on 36-inch centers and 18 inches deep. The back panel and both faces of the doors shall be punched on 1-inch centers for the adjustment of pegs. Pegs shall be not less than 1/4 inch diameter by 3 inches long and designed to readily adjust in holes of the panels, and lock in place when inserted. Check hooks shall be of the adjustable type. Pegs and check hooks shall be furnished only when called for and in the quantities specified (see 6.2).

3.3.16 Sway braces. Sway braces shall be angle type or cross-strap type as required (see 3.3.16.1 and 3.3.16.2). Angle-sway braces shall be as shown in figure 6 for bolting to the down flange of shelves and the inside surface of post legs. Cross-strap-sway braces shall be 1 inch wide by the thickness specified in table I for attachment to the posts on vertical centers of not less than 28 inches.

3.3.16.1 Angle-sway braces. Unless otherwise specified (see 3.5 and 6.2), angle-sway braces shall be furnished for the open sides of type III, IV, and V shelving. Two angle-sway braces shall be furnished for each shelf at the exposed ends of a rack. Alternatively, cross-strap-sway braces may be substituted at the open ends of units within a rack. In addition, angle-sway braces shall be furnished for the front faces of double-faced units and the front and rear faces of single faced units. Two angle-sway braces per shelf face shall be furnished in accordance with the following:

- (a) All shelves in units having less than five shelves.
- (b) The top two shelves, the bottom two shelves and one intermediate shelf of units having more than five shelves.

3.3.16.2 Cross-strap-sway braces. When specified (see 3.5 and 6.2), cross-strap-sway braces shall be furnished for open backs and ends of type III, IV, and V shelving in lieu of angle-sway bracing specified above. When cross-strap-sway braces are specified for backs of single-faced racks, the same quantity shall serve for double-faced racks with open backs. There shall not be less than one pair of cross-strap-sway braces furnished for each open-end unit and not less than one pair for each open-back. Cross-strap-sway braces may be omitted from backs of open-back units when shown on a floor plan assembled to closed-back units. For units over 99 inches high, there shall not be less than two pairs of braces on the open ends and backs requiring braces. Each pair of braces may be joined at the center by a rivet, cotter pin, or nut and bolt in a manner to allow hand pivoting of the brace legs for packing and alignment with post holes.

3.3.17 Locks. When specified (see 6.2), flat-key locks shall be furnished on all doors. As an alternate, paracentric-type key locks may be furnished as an integral part of the handle. Unless otherwise specified (see 6.2), all locks in one order shall be keyed alike and not less than two keys for each lock shall be furnished.

3.3.18 Finish.

3.3.18.1 Paint finish. Metal surfaces not having an electrodeposited or anodized coating to resist corrosion, shall be cleaned, treated and painted in accordance with the manufacturer's regular practice. Unless otherwise specified (see 6.2), the final finish shall be approximate color No. 26134, gray of Fed. Std. 595 (see 6.10). The finished coating shall be smooth and free of streaks, drops, sags, pinholes, checks, cracks, peeling, blisters, foreign material, and area of no film.

3.3.18.2 Door handles. Door handles shall be chrome plated in accordance with class 1, type I of QQ-C-320, or at the supplier's option, the coated surface shall conform to the following:

- (a) Die cast aluminum - anodized per type I or II, MIL-A-8625.
- (b) Die cast bronze and brass - nickel plate per class 1, type VII, QQ-N-290.
- (c) Die cast zinc alloy - nickel plate per class 1, type X, QQ-N-290.

3.4 Erection instructions. Unless otherwise specified (see 6.2), printed erection instructions giving complete detailed instructions for the erection of shelving specified in the contract shall be furnished by the supplier in the quantity specified in 6.2.

3.5 Assembly. Shelving shall be manufactured so that each shelf, when assembled, can be secured to the posts at not less than eight points, using nuts and bolts, as shown on figures 1 and 2. Angle-sway braces, cross-strap-sway braces, bases, counter fronts, backs, sides, ends, and reinforcement angles shall also be secured by nuts and bolts. Flush bars, label holders, bin fronts and bin dividers may be secured by nuts and bolts or clips or studs, provided hole location, shape, size, etc., conform to all requirements specified herein.

3.6 Workmanship. The component parts of the assembly shall be free of cracks, tears, burrs and sharp edges. Assembly of the shelving shall be accomplished without the need to modify or replace any component part. When assembled, the shelving shall present a neat appearance with all component parts firmly attached and without visible evidence of misalignment or out of square conditions.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Preproduction sample inspection. When required, the preproduction sample shall be examined for defects in tables II, III, and dimensions specified.

4.3 Sampling for inspection. Sampling for inspection shall be performed in accordance with the provisions set forth in MIL-STD-105, except where otherwise specified herein.

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

4.3.2 End item inspection. The lot shall be the number of units of shelving of the same kind, type, class, and size offered for inspection at one time. The sample unit shall be one complete unit of unassembled shelving.

4.3.2.1 Visual examination before assembly. The unassembled units shall be examined for defects in table II. The inspection level shall be II and the acceptable quality level (AQL) shall be 2.5 for major defects and 10.0 for total defects, expressed in term of defects per hundred units.

4.3.2.2 Dimensional examination, unassembled. Examination shall be made of the unassembled end item for defects in dimensions. Any dimension not within specified requirements shall be classified as a defect. The inspection level shall be S-2 and the AQL shall be 4.0, expressed in terms of defects per hundred units.

4.3.2.3 Visual examination during assembly. Sample units from each inspection lot specified in 4.3.2 shall be assembled and examined for defects in table III. The inspection level shall be S-2 and the AQL shall be 4.0, expressed in terms of defects per hundred units.

4.3.3 Examination of preparation of delivery. An examination shall be made to determine that packaging, packing, and marking as required by section 5 are complied with. Defects shall be as specified in table IV. The sample unit shall be one shipping container fully prepared for delivery except that it need not be sealed. Defects of closure shall be examined on shipping containers fully prepared for delivery. The lot shall be the number of containers offered for inspection at one time. The inspection level shall be S-2 and the AQL shall be 2.5, expressed in terms of defects per hundred units.

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TABLE II. Visual examination, before assembly.

Examine	Defect	Classification	
		Major	Minor
Finish	Rust or indication of rust under paint -----	x	
	Not type or color specified -----		x
	Poor adhesion, i.e., peeling, blistered or flaky --	x	
	Tacky or soft runs or sags -----		x
	Area of no film -----		x
	Not smooth or uniform -----		x
	Touchup not neat -----		x
	Discoloration, stain or dirt -----		x
	Color separation -----		x
	Foreign matter imbedded in paint -----		x
	Color shade varies between components -----		x
	Construction and workmanship	Not specified kind, type, or class -----	x
Any component part not as specified -----			x
Any component broken, fractured, or cracked -----		x	
Sharp edges, slivers, or burrs -----		x	
Any component malformed, buckled, warped, bent out of shape or damaged -----		x	
Bolt hole missing or in wrong location -----		x	
Panel visibly out of square -----		x	
Any flange omitted -----			x
Any flange not formed as specified -----			x
Bin or box dividers not secured vertically i.e., tilt -----			x
Corners of doors not welded -----	x		

TABLE III. Visual examination during assembly.

Examine	Defect
Assembly or erection	Shelving cannot be readily set up without the use of special tools or appliances.
	Erection instructions missing or not as specified.
	Does not assemble as specified.
	Thread wrong size or stripped.
	Assembly nuts or bolts missing. Misaligned or out of square.
Locks and keys (when specified)	Not flat key or paracentric type (as specified).
	All locks in order not keyed alike (unless otherwise specified).
	Less than two keys furnished with each lock. Lock does not function.
Height, depth, and width of shelving	The examination for height, width, and depth of shelving, to determine compliance with the applicable standard sizes specified in the contract, or order shall be performed in conjunction with the assembly, or erection of shelving to assure that the standard sizes are furnished.
Kind 2, slopes	Sloped more than six or less than two inches.

shelves |
(when |
applicable) |

TABLE IV. Examination of preparation for delivery

Examine	Defect
Markings (exterior & interior containers)	Missing, incomplete, illegible, of improper size, location, sequence, or method of application.
Materials	Component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling, bulging, or distortion of container.
Erection instruc- tions	Missing.
Contents	Contents per container is more or less than required.
Weight	Weight per shipping container exceeds requirements.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C, as specified (see 6.2).

5.1.1 Level A. Shelving and parts of shelving of like description, except shelf boxes and connecting hardware, shall be nested or grouped together and securely strapped with flat strapping conforming to type I, class A or B, grade 2 of QQ-S-781, or type II of PPP-S-760. Alternatively, small components such as flush bars and angle braces weighing less than ten pounds may be secured with minimum 1-inch width tape conforming to type IV or PPP-T-97 or annealed wire. All sections of the shelving, except bin fronts, boxes, flush bars, braces, corner posts, and label holders shall be interleaved with minimum 50-pound basis weight kraft paper conforming to grade B of UU-P-268 to prevent damage to the finished surfaces. Cushioning or corner protectors shall be used on the edges under the strapping. The bundled shelving shall then be individually wrapped in waterproof barrier material conforming to type C-1 or C-2 of PPP-B-1055 secured with tape conforming to class 1 of PPP-T-60, or type IV of PPP-T-97. Alternative to the individual wrapping of components of like description, shelving components comprising one complete unit shall be nested in the most compact manner with the posts positioned on each of the side corners of the bundle and the components interleaved and the bundle strapped, wrapped, and taped as specified herein.

5.1.1.1 Shelf boxes. Not more than 12 shelf boxes shall be packaged in a snug-fitting fiberboard box conforming to style optional, V3c or V3s of PPP-B-6M. The fiberboard box shall be closed and waterproofed by means of tape in accordance with the appendix of the box specification.

5.1.1.2 Hardware. Connecting hardware required for assembly of one complete shelving unit shall be packaged together as specified in 5.1.1.1 or in accordance with method IC-2 of MIL-P-116.

5.1.1.3 Erection instructions. The erection instructions shall be placed in a paper envelope and packaged with the connecting hardware.

5.1.1.4 Keys. Keys, when furnished, shall be attached to a door handle and secured with tape specified herein.

5.1.2 Level C. Shelving shall be packaged to afford adequate protection against damage during shipment from the supply source to the first receiving activity. The supplier may use his standard practice, when it meets this requirement.

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

5.2.1 Level A. Shelving, packaged as specified in 5.1, shall be packed as specified in 5.2.1.1 or 5.2.1.2.

5.2.1.1 Loads weighing less than 1,000 pounds. Shelving components comprising one complete unit, or multiples of one complete unit, weighing less than 1,000 pounds, shall be blocked, braced, and cushioned within a snug-fitting shipping

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container conforming to type I, II, or IV, style A of PPP-C-650; overseas type, type 3 load of PPP-B-601; or class 2, type 3 load of PPP-B-621. Each shipping container exceeding 250 pounds gross weight shall be provided with skids in accordance with the applicable container specification. Closure and strapping shall be in accordance with the appendix of the applicable container specification.

5.2.1.2 Loads weighing 1,000 pounds and over. Components of shelving comprising one complete unit or multiples of one complete unit, weighing 1,000 pounds or over shall be blocked, braced, and cushioned within a snug-fitting shipping container conforming to type V, style A of PPP-C-650, or type I, class 1 or 2, style A of MIL-C-104. Closure and strapping shall be in accordance with the applicable container specification or appendix thereto.

5.2.2 Level B. Shelving, packaged as specified in 5.1, shall be packed as specified in 5.2.1, except for loads weighing less than 1,000 pounds, shipping containers shall conform to type I or II, style B, or type IV, style A of PPP-C-650; domestic type, style A or B of PPP-B-601; or class 1, style 2, type 3 load of PPP-B-621. For loads weighing 1,000 pounds and over, shipping containers conforming to PPP-C-650 shall be style B, and shipping containers conforming to MIL-C-104 shall not require waterproof crate liner.

5.2.3 Level C. Shelving, packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. Containers and packing shall comply with Uniform Freight Classification Rules or National Motor Freight Classification Rules.

5.3 Marking.

5.3.1 Civil agencies. In addition to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

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

6. NOTES

6.1 Intended use. Shelving is to be used in stock rooms, tool rooms, warehouses, offices, ships, etc., for the display, issue, and storage of commodities in Government installations.

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

- (a) Title, number, and date of this specification.
- (b) Kind, type, class, and size of shelving required (see 1.2.1).
- (c) When preproduction sample is required (see 3.1).
- (d) When assembled shelving is to be furnished (see 3.3).
- (e) Quantity of shelves required per section (see 3.3.3 1).
- (f) When bin divider holes are not required in plain shelves (see 3.3.3.1).
- (g) When ledge shelves are required (see 3.3.3.1.1).
- (h) When counter fronts are required (see 3.3.6).
- (i) When bases are required (see 3.3.7).
- (j) When bin dividers for plain shelves are required, specify quantity per shelf and center distance between shelves (see 3.3.8).
- (k) When bin dividers for sloped shelves are required, specify quantity per shelf (see 3.3.9).

- (l) When bin fronts are required, specify quantity and height (see 3.3.10).
- (m) When boxes are required, specify quantity per shelf, shelf size, and center distance between shelves (see 3.3.11).
- (n) When box guides (flush bars) are required (see 3.3.12).
- (o) When doors are required (see 3.3.13).
- (p) When single door suspension is other than specified (see 3.3.13).
- (q) When label holders are required, specify quantity, and whether of the continuous type or adjustable type (see 3.3.14).

- (r) When milling-cutter inserts are required, when peg and check hooks are required and the quantity (see 3.3.15).
- (s) When angle-away braces are not required (see 3.3.16.1).
- (t) When cross-strap-sway braces are required (see 3.3.16.2).
- (u) When locks are required for doors and when locks shall be keyed alike (see 3.3.17).
- (v) Color of finish, when other than specified (see 3.3.18.1).
- (w) When erection instructions are not required or quantity when required (see 3.4).
- (x) Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
- (y) Marking required (see 5.3).

6.3 Definitions.

6.3.1 Unit and section. The terms "unit" and "section" are synonymous and shall apply to a single series of shelves arranged one above the other and having a single post at each of its four corners, thus making each unit self-supporting and an individual unit by itself.

6.3.2 Racks. The term "rack" shall apply to any specified number of units secured together to form a single continuous run. Single-faced racks are those which can be worked from only one side or face. Double-faced racks are those which are accessible from both faces and are built up on single depth, with or without a closed back between them.

6.4 Cross-strap-sway braces are intended for use only when the shelving installation is erected against a wall or between free standing units where they will not interfere with accessibility of stored parts (see 3.3.16.1 and 3.3.16.2).

6.5 Bin fronts. Bin fronts are generally available in heights of 1-1/2, 2, 3, 4, and 6 inches.

6.6 Load capacity. Since there are no recognized load capacity standards for the various classes of shelving, table V is furnished as a guide only in selecting a class of shelving. The type of load and the degree of impact loading anticipated should be considered apart from the values given, which are based on a uniformly distributed static load.

6.7 Deletion. The style B, clip type shelving and 6, 9, and 21 inch depth shelving in AA-S-271c has been deleted in this revision. For clip type shelving, see AA-S-1048. The style A, classification has also been deleted from this revision since only nut and bolt shelving is now covered in this revision.

TABLE V. Load capacity, plain shelves.

Shelf size, inches		Pounds per shelf			
Width	Depth	Class 1	Class 1a	Class 2	Class 3
24	12	700	1000	1200	2000
24	15	700	1000	1150	2100
24	18	700	900	1000	2200
24	24	700	900	1000	1700
24	30	700	800	900	1600
24	36	700	800	900	1500
30	12	600	900	1200	1800

30	15	600	900	1200	1750
30	18	600	800	1100	1700
30	24	600	800	1050	1650
30	30	600	750	1000	1600
30	36	550	650	950	1600
<hr/>					
36	12	400	800	1000	1500
36	15	400	750	1100	1650

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TABLE V. Load capacity, plain shelves.

Shelf size, inches		Pounds per shelf			
Width	Depth	Class 1	Class 1a	Class 2	Class 3
36	18	450	750	1000	1800
36	24	450	700	1000	1700
36	30	450	700	860	1500
36	36	450	500	700	1300
42	12	300	350	700	850
42	15	300	350	600	900
42	18	350	400	525	1300
42	24	300	350	700	1200
42	30	300	350	700	1100
42	36	300	350	650	1050
48	12	300	320	400	560
48	15	300	320	400	750
48	18	300	320	400	650
48	24	300	400	520	1000
48	30	300	400	400	1150
48	36	250	390	420	1000

6.8 Nonstandard shelving. Thirty inch-width shelving and fifteen inch-depth shelving is nonstandard for DOD use.

6.9 It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no sample will be necessary prior to award to determine compliance with this specification. If for any particular purpose samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the sample should be definitely stated, the specification to apply in all other respects.

6.10 Color samples. Sample panels of the standard color are obtainable without charge from the Business Service Center, Federal Supply Service, General Services Administration, Washington, D.C., 20406, or from the Business Service Center of the nearest GSA Regional Office.

MILITARY CUSTODIANS:

Army-GL
Navy-YD
Air Force-69

Preparing activity:

Army-GL

Civilian agencies interest:

AGR
NBS
GSA
HEW
JUS
FPI
VA

Review activities:

Army-GL
Navy-YD
Air Force-69

User activities:

Army-ME, CE
Navy-MC, SA

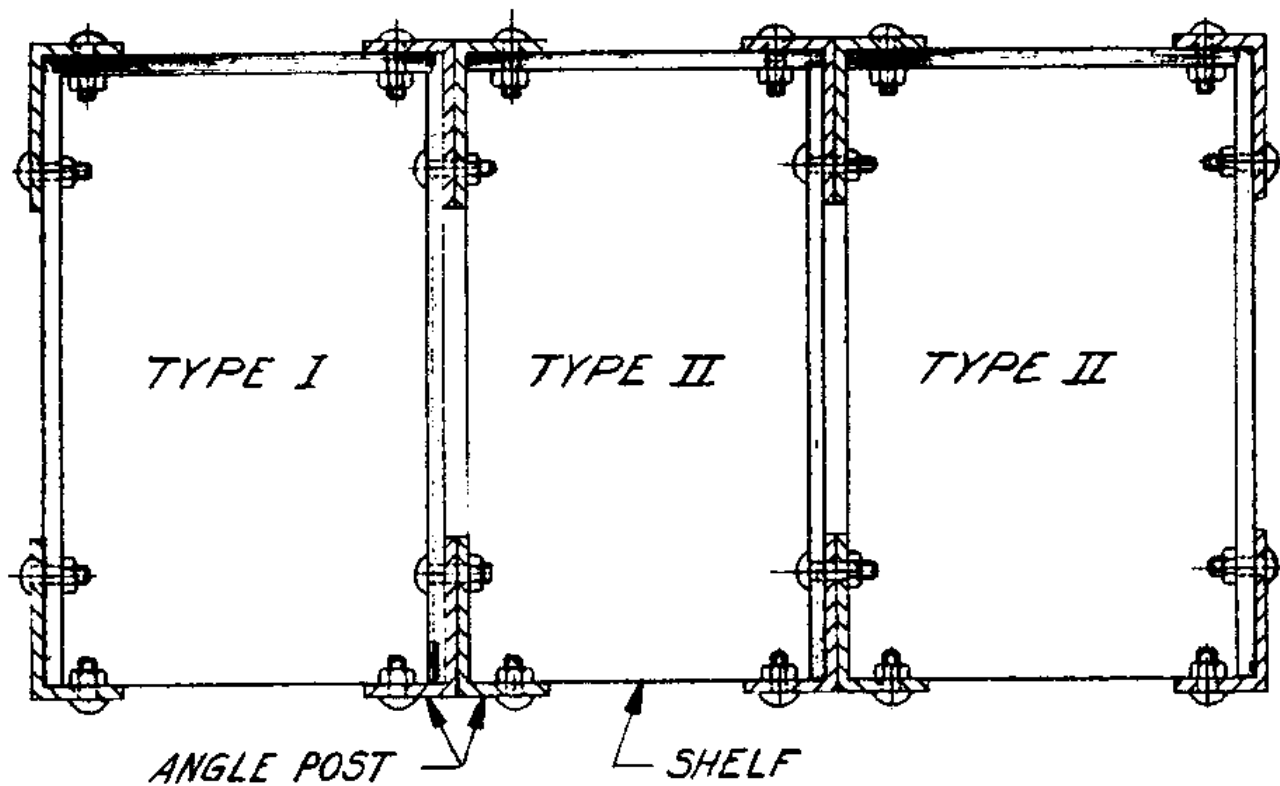
Review and user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be

based on the information in the current Federal Supply Classification Listing of DOD Standardization Documents.

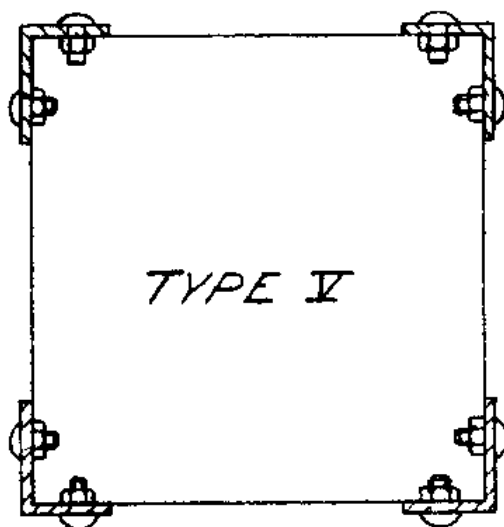
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and intermediate partitions.]

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*SINGLE FACE; STAND ALONE OR AGAINST WALL;
ENDS, BACKS & COMMON SIDES*



*OPEN OR SKELETON
TYPE SHELVING*

Figure 2. Single installation.

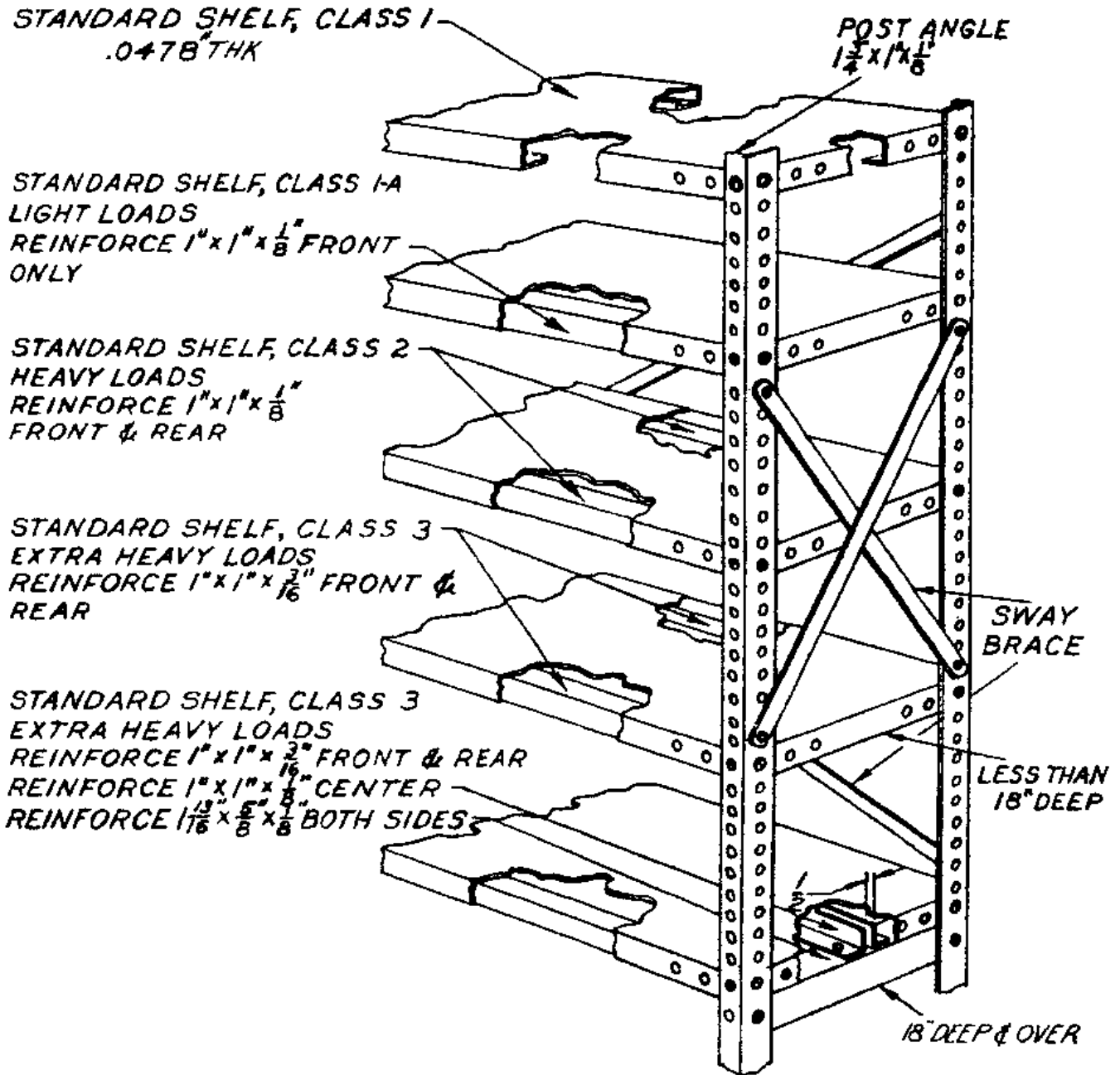


Figure 3. Shelving construction details.

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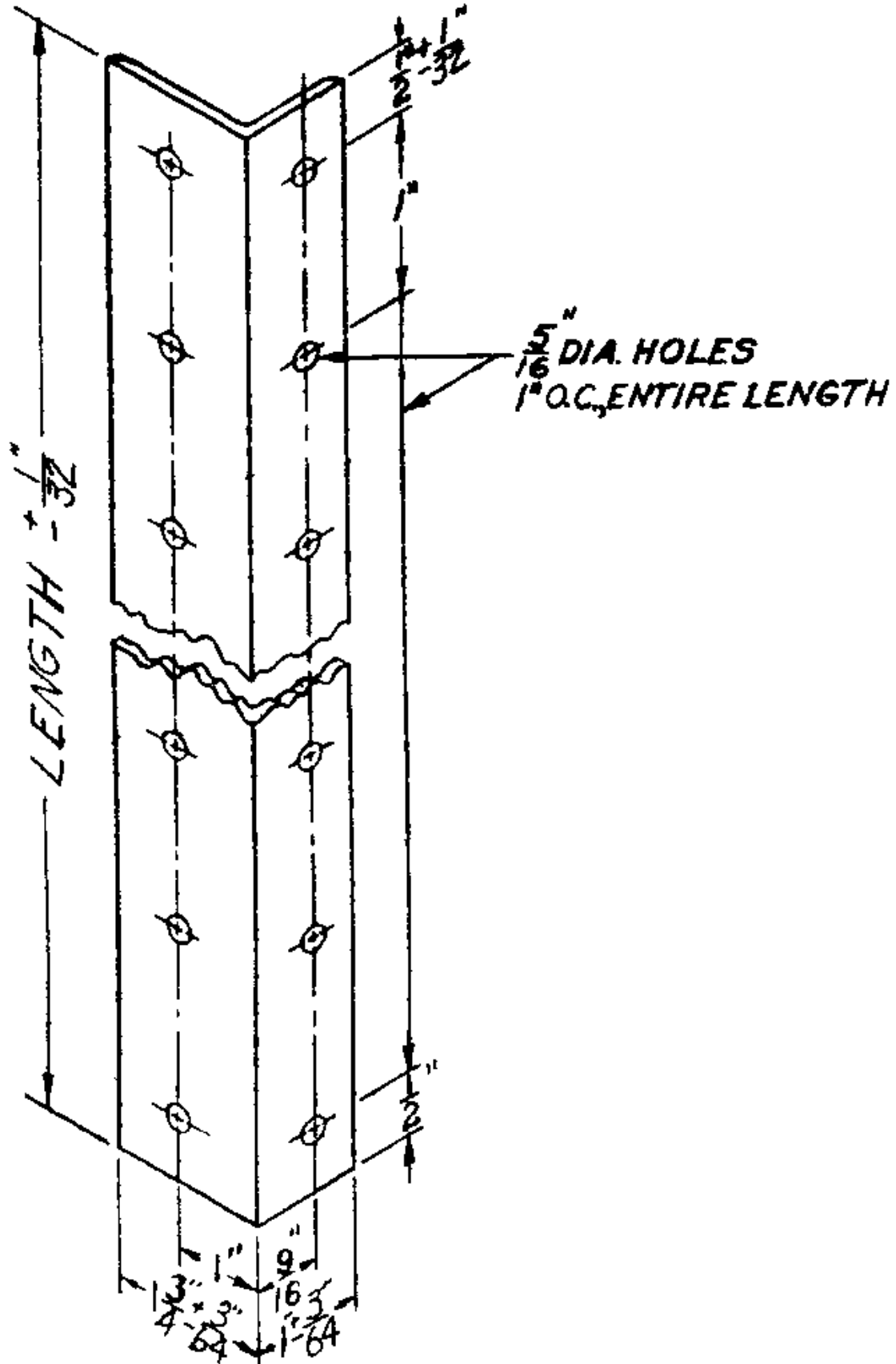
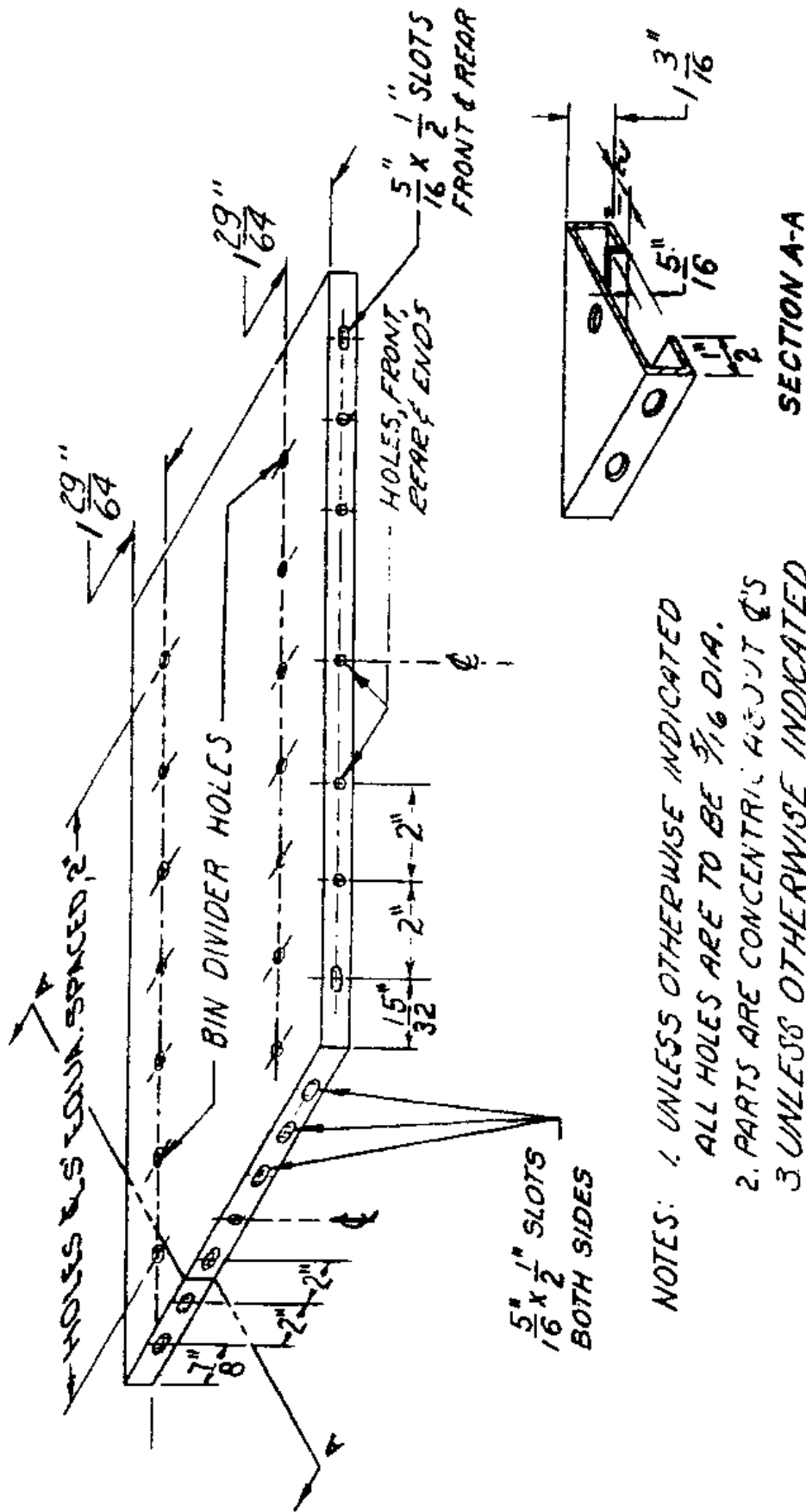


Figure 4. Post.



- NOTES:
1. UNLESS OTHERWISE INDICATED ALL HOLES ARE TO BE 9/16 DIA.
 2. PARTS ARE CONCENTRIC ABOUT C/S
 3. UNLESS OTHERWISE INDICATED FABRICATING TOLERANCES:
 FLANGES ± 1/64"
 ALL OTHER DIMENSIONS ± 1/32"

Figure 5. Shelf, plain.

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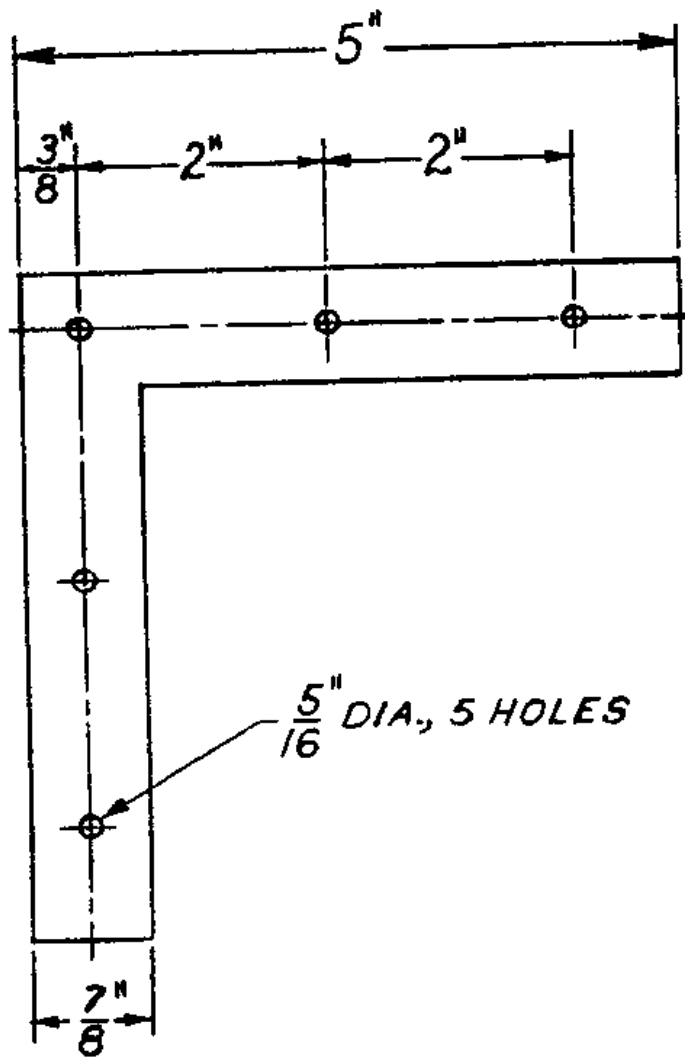


Figure 6. Angle Sway Brace.

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 15 cents each.

AA-S-271D
Amendment-1
November 6, 1968

FEDERAL SPECIFICATION

SHELVING, STORAGE AND DISPLAY, STEEL, INTERCHANGEABLE, NUT AND BOLT TYPE

This amendment which forms a part of Federal Specification AA-S-271D, dated April 14, 1967, was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

PAGE 4

Paragraph 3.3.2, fourth line, delete "3/22" and substitute "3/32".

FSC 7125