

MIL-S-40144E

23 June 1975

SUPERSEDING

MIL-S-40144D

31 December 1974

MILITARY SPECIFICATION

SHELVING, STORAGE, STATIONARY AND MOBILE, FOOD SERVICE

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

1. SCOPE

1.1 Scope. This specification covers self-supporting, metal, food storage shelving, with adjustable shelves.

1.2 Classification. Shelving shall be of the following types, styles, and sizes exclusive of casters, as specified (see 6.2 and 6.3).

Type I	- Stationary
Style 1	- Wire Construction
Size 2	- 18 to 20 inches deep by 48 inches wide by 58-66 inches high
Type II	- Mobile
Style 1	- Wire construction
Size 2	- 18 to 20 inches deep by 48 inches wide by 58-66 inches high
Size 4	- 24 inches deep by 48 inches wide by 58-66 inches high
Size 6	- 18 inches deep by 30 inches wide by 74 inches high
Size 7	- 18 inches deep by 36 inches wide by 74 inches high
Size 8	- 18 inches deep by 48 inches wide by 74 inches high
Size 9	- 24 inches deep by 30 inches wide by 74 inches high
Size 10	- 24 inches deep by 36 inches wide by 74 inches high
Size 11	- 24 inches deep by 42 inches wide by 74 inches high
Size 12	- 24 inches deep by 48 inches wide by 74 inches high

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- Style 2 - Slotted sheet metal or louvered shelves
- Size 2 - 18 to 20 inches deep by 48 inches wide
by 58-66 inches high
- Size 3 - 24 inches deep by 36 inches wide
by 58-66 inches high
- Size 4 - 24 inches deep by 48 inches wide
by 58-66 inches high

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

- FF-C-77 - Casters, Institutional Duty
- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-C-650 - Crates, Wood, Open and Covered

MILITARY

- MIL-L-10547 - Liners, Case, and Sheet, Overwrap Vaporproof or Waterproof, Flexible

STANDARDS

MILITARY

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

(Copies of specifications, standards, drawings and publications required by suppliers 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

National Sanitation Foundation (NSF) Standard

No. 2 - Food Service Equipment

Listing of Food Service Equipment

(Application for copies should be addressed to the National Sanitation Foundation, NSF Building, School of Public Health, University of Michigan, Ann Arbor, MI 48105.)

National Motor Freight Traffic Association, Inc., Agent

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

American Society for Testing and Materials (ASTM)

A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip

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

(Technical society and technical association 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 Standard product. The shelving shall, as a minimum, be the manufacturer's standard commercial product with any added features needed to comply with the requirements specified herein. Modifications to add features shall not

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incorporate different parts unless such parts are used on other current commercial models. Standard or modified commercial products furnished in accordance with this specification shall be identifiable by regular manufacturer's or commercial service organizations servicing the brand involved. Service organizations shall be capable of providing complete parts and repair services on models furnished to the Government consistent with their normal commercial practices.

- * **3.2 Codes and standards.** The shelving shall comply with the applicable requirements of NSF Standard No. 2. Prior to commencing production, the supplier shall submit to the contracting officer or his authorized representative, satisfactory evidence that the shelving he proposes to furnish hereunder meets the applicable requirements of NSF Standard No. 2. Satisfactory evidence of meeting the requirements of NSF shall be:

- (1) A listing in the current edition of the NSF "Listing of Food Service Equipment" or display of the NSF seal on the finished shelving, or

- (2) A certification for the shelving issued by NSF under their special one-time contract evaluation/certification service, or

- (3) A certified test report from a recognized independent testing laboratory acceptable to the medical department of the service for which the shelving is being procured, indicating that the shelving has been tested and conforms to NSF.

- * **3.3 Material and components.** Materials and components shall be as specified herein. Materials not definitely specified shall be of the quality normally used by the manufacturer in his standard commercial shelving provided the completed item complies with all provisions of this specification.

- * **3.3.1 Stainless steel plate, sheet, and strip.** Corrosion-resisting steel plate, sheet, and strip shall conform to type 302 or 304 as specified in ASTM A167.

- * **3.3.2 Casters.** Casters shall conform to the requirements of type II (swivel) class B, 5-inch, style c, mounting A or P of FF-C-77. Two casters shall have brakes.

- * **3.4 Design.** The shelving shall be self supporting and shall not require fastening to the floor, wall, ceiling, or adjacent units. The shelving shall be open type construction and shall be capable of being assembled and disassembled with the use of hand tools. Shelves shall be capable of being adjusted vertically the entire height of the frame on not more than 2-inch increments. Sway braces are allowable if provided on the manufacturer's standard product.

3.4.1 Dimensions. Shelving dimensions shall be as specified in table I. The height shall be exclusive of casters or dolly.

TABLE I. Overall dimensions (inches)

Size	Depth	Width \pm 1-1/4	Height <u>1/</u>
2	18 to 20	48	58-66
3	24 \pm 1-1/4 inch	36	58-66
4	24 \pm 1-1/4 inch	48	58-66
6	18 \pm 1/2 inch	30	72-76 1/2
7	18 \pm 1/2 inch	36	72-76 1/2
8	18 \pm 1/2 inch	48	72-76 1/2
9	24 \pm 1/2 inch	30	72-76 1/2
10	24 \pm 1/2 inch	36	72-76 1/2
11	24 \pm 1/2 inch	42	72-76 1/2
12	24 \pm 1/2 inch	48	72-76 1/2

1/ Maximum height for 72-76 1/2 inch shelving equipped with casters or dolly shall be 80 inches.

- * 3.5 Construction. Sizes 2 through 4 shelving shall be supplied with four adjustable shelves. Sizes 6 through 12 shelving shall be supplied with five adjustable shelves. Each shelf in a unit of shelving shall be capable of supporting a concentrated load of 200 pounds, on a 12 inch by 12 inch square area located at the geometric center of the shelf, without permanent distortion or deformation when tested as specified in 4.3.3. The shelving shall withstand a uniformly distributed load of 45 pounds per square foot of total shelf area, and a horizontally applied force of 150 pounds at a height of 4 feet at one end with no resulting permanent distortion, loss of rigidity, or other evidence of failure, when tested as described in 4.3.1. Type I shelving shall have shelves and uprights fabricated of carbon steel. Type II shelving shall have shelves and uprights fabricated of stainless steel specified in 3.3.1.

3.5.1 Type I shelving. Type I shelving shall be stationary with leveling devices provided at each bottom corner.

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- * 3.5.2 Type II shelving. Type II shelving shall have either casters or a dolly. Casters shall be as specified in 3.3.2 and shall be attached to each of the four bottom corners of the base frame or dolly, as applicable. One caster on each end shall be provided with a brake. When tested as specified in 4.3.2 each caster shall roll and swivel freely without binding. When furnished, the dolly shall be stainless steel.
- * 3.5.3 Style 1 shelving. Style 1 shelving shall have shelves fabricated of wire. Uprights shall be wire, tubular, or angular construction. The size 3 and 4 shelving shall be constructed in one 24-inch-deep piece or shall have two 12-inch-deep shelves clipped together with an intermediate support.
- * 3.5.4 Style 2 shelving. Style 2 shelving shall have tubular uprights and slotted or louvered sheet metal shelves.
- * 3.6 Finish. Miscellaneous hardware used to attach casters to type II shelving and exposed metal parts of casters, where not fabricated from corrosion-resistant metal, shall be plated in accordance with manufacturer's standard practice, provided it meets NSF requirements. There shall be no evidence of flaking, blistering, or foreign matter imbedded in finish. Type I shelving shall have a nickel-chromium plating, zinc plating, clear epoxy coating, baked-on over nickel-chromium or zinc plating, or a baked-on plastic finish over zinc-plating. Type II shelving shall have a No. 3 finish or better.
- * 3.7 Erection instructions. Erection instructions shall be furnished and shall be printed on bond paper.
- * 3.8 Marking for identification. Shelving shall be permanently and legibly marked with the manufacturer's name or trade name.
- * 3.9 Workmanship. Welds shall be adherent and complete. Scale, flux, pits, slag, or splatter shall be removed. The shelving shall not be dirty or streaky. Rough or sharp edges, burrs, and slivers shall be removed. Threaded fasteners shall be drawn tight with lock washers and nuts provided where necessary.

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 in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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- * 4.1.1 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of certification (see 3.2).
- * 4.2 Inspection. Except as otherwise specified herein, sampling for inspection shall be performed in accordance with MIL-STD-105.
- * 4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.
- * 4.2.2 End item inspection. The lot shall consist of all shelving of the same description offered for inspection at one time. The sample unit shall be one completely fabricated and assembled shelving unit.
- * 4.2.2.1 Visual examination. Examination of the shelving shall be in accordance with the classification of defects in table II. The inspection level shall be level II with an AQL of 2.5 for major defects and 6.5 for total defects, expressed in terms of defects per hundred units.

TABLE II. Classification of defects

Examine	Defect	Classification	
		Major	Minor
Finish	Evidence of flaking, blistering, peeling, foreign matter imbedded in finish	X	
Design, construction (general)	Shelving not of an open type construction	X	
	Threaded fasteners missing or not tight		X
	Any rough edges, burrs or slivers	X	
	Any shelf missing	X	
	Welds not adherent; incomplete	X	
	Scale, flux, pits, slag, or splatter not removed		X
Style 1	Not fabricated of wire	X	
	Uprights not type specified	X	
Style 2	Not tubular and sheet metal construction	X	
	Shelves not slotted or louvered	X	

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TABLE II. Classification of defects (cont'd)

Examine	Defect	Classification	
		Major	Minor
Type I	Not self-supporting type	X	
	Leveling devices missing	X	
	Leveling devices not adjustable	X	
	Not plated or coated as specified	X	
Type II	Not self-supporting type	X	
	Dolly missing (when required)	X	
	Dolly not specified material	X	
	Not a No. 3 or better finish	X	
Casters	Missing; not removable or not swivel type	X	
	Two casters not provided with brakes	X	
	Not type specified	X	
Erection instructions	Missing; incomplete; illegible; incorrect	X	
Marking for identification	Missing; incomplete, illegible; incorrect		X

- * 4.2.2.2 Dimensional examination. Examination shall be made of the assembled shelving to determine compliance with the dimensional requirements of this specification. Any dimensions not within specified requirements shall constitute a defect. The inspection level shall be S-2 with an AQL of 4.0 defects, expressed in terms of defects per hundred units.
- * 4.2.2.3 Testing of the end product. The initial production unit shall be tested as specified in 4.3.1 through 4.3.3 as applicable. Failure shall be cause for rejection of the unit. The shelving shall be tested as specified in 4.3.1 through 4.3.3, as applicable. The inspection level shall be S-2 with an AQL of 4.0 defects, expressed in terms of defects per hundred units.
- * 4.2.3 Examination of preparation for delivery. An examination shall be made to determine that preservation and packaging, packing and marking as required by section 5 are complied with. Defects shall be listed in table III. The sample unit shall be one shipping container fully prepared for delivery, except that it need not be closed. The lot shall be the number of containers offered for inspection at one time. The inspection level shall be S-2 with an AQL of 4.0 defects, expressed in terms of defects per hundred units.

TABLE III. Examination of preparation for delivery

<u>Examine</u>	<u>Defect</u>
Markings (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Component missing, damaged, or not as specified
Content	Number per container is more or less than required Hardware, erection instructions, and casters (type II shelving) missing, not packaged as specified
Preservation (caster bearings for type II)	Lubrication improperly applied or missing

- * 4.2.3.1 Examination of shipping containers. When shipping containers are required to be in accordance with PPP-C-650, examination for defects in closure and strapping shall be in accordance with PPP-C-650.
- * 4.3 Tests.
- * 4.3.1 Load test. The shelving shall be placed on a concrete floor. Caster wheels of type II shelving shall be locked. The total shelf area shall be uniformly loaded with 45 pounds per square foot. A force of 150 pounds shall be applied horizontally to an end 4 feet above the floor. Failure of the shelving to meet the requirements of 3.5 shall constitute failure of this test.
- * 4.3.2 Caster test. The type II shelving, loaded with 1200 pounds, shall be rolled up and over an obstacle 10 times. The obstacle shall have vertical faces a minimum of 1/4 inch high, shall be at least 12 inches wide, and shall be long enough to allow both leading casters to strike the obstacle at the same time. The casters shall be examined. Failure of the caster to meet the requirements of 3.5.2 shall constitute failure of this test.
- * 4.3.3 Concentrated load test. The shelving shall be placed on a level floor. Type II shelving shall have casters locked. A concentrated load of 200 pounds shall be placed on a 12 inch by 12 inch area located at the geometric center of the width and length dimension of each shelf, in turn, for a minimum of 2 minutes. The load shall then be removed and each shelf and the corner posts shall be examined. Failure of the shelving to meet the requirements of 3.5 shall constitute failure of this test.

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5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Disassembly. Each unit of shelving shall be completely disassembled and packaged knocked down flat.

5.1.1.2 Preservation. The caster bearings of each caster for type II shelving shall be lubricated to capacity with the manufacturer's recommended lubricant containing a rust inhibitor.

5.1.1.3 Component packaging and arrangement. Hardware required to reassemble one complete unit of shelving shall be placed in a plastic bag or cotton cloth drawstring bag. The erection instructions shall be placed in a kraft paper envelope. The framing members of each shelving unit shall be nested together. The four shelves of each shelving unit, together with base or chassis shall be nested together. For type I shelving, the bagged hardware and the erection instructions shall be secured to one of the nested frame members. For type II shelving, the bagged hardware, together with erection instructions and casters, shall be placed in a snug fitting fiberboard box conforming to style RSC, type CF, variety SW or type SF, class domestic of PPP-B-636. Fiberboard inserts shall be used as required to immobilize the contents. Box closure shall be in accordance with the appendix of PPP-B-636.

5.1.1.4 Unit packaging. One complete unit of shelving, preserved and packaged as specified in 5.1.1.2 and 5.1.1.3 respectively, shall be packed in the most compact manner in a snug fitting fiberboard box conforming to style FOL, end-opening, type CF, variety SW or type SF, class domestic, grade 275 of PPP-B-636. Inserts made of corrugated fiberboard as specified for the box shall be used as required to immobilize the contents. Closure shall be in accordance with method II of the appendix of the box specification.

5.1.2 Level C. Shelving shall be preserved and packaged to afford adequate protection against corrosion, deterioration, and damage during shipment from the supply source to the first receiving activity. The package and the quantity per package shall be the same as that normally used by the supplier for retail distribution.

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

5.2.1 Level A. Three units of shelving, preserved and packaged as specified in 5.1, shall be packed in a crate conforming to type II of PPP-C-650, except that the bottom crossmember shall be nominal 1- by 6-inch lumber with one edge of the top and bottom crossmembers in alignment. Each crate shall be provided with nominal 2- by 4-inch skids laid flat, positioned parallel to the ends, and extending the full exterior width of the crate. Skids shall be placed one under each end crossmember, flush with the inside edge, and under each intermediate crossmember, flush with its unaligned edge, when width of top and bottom crossmember differ. Skids shall be secured by nailing through the bottom crossmember and skids, and the nails clinched not less than 1/8 inch. Nails fastening the skids shall be arranged in two rows in a staggered pattern, with spacing between nails in each row to be not more than 6 inches. Each row of nails shall be approximately 1/2 inch in from the edge of the skid. The nailing pattern shall begin and end approximately 1-1/2 inches in from the ends of each skid. Strapping shall be positioned alongside the skids. Each shipping container shall be provided with a type I or II, grade C (for subsistence items) case liner conforming to MIL-L-10547. Each shipping container shall be closed and strapped in accordance with the appendix of the container specification.

5.2.2 Level B. Three units of shelving, preserved and packaged as specified in 5.1, shall be packed as specified in 5.2.1, except that case liners shall not be required.

5.2.3 Level C. Shelving, preserved and packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the supplier for his retail distribution. Containers shall comply with U.S. Postal Service, Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.3 Marking. 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 covered by this specification are for general storage of packaged and canned goods. Type II shelving is used in refrigerated areas of restricted dimensions.

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6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type, style, and size of shelving required (see 1.2).
- (c) Selection of applicable levels of preservation, packaging and packing (see 5.1 and 5.2).

6.2.1 Contract data requirements. Any data items to be delivered under any contract for the items covered by this specification should be specifically called for in the contract in accordance with the applicable regulations of the procuring activity.

* 6.3 Supersession data. Grades have been deleted since all type I items are fabricated of carbon steel and all type II items are fabricated of stainless steel. Classification 2.1 has been revised to reflect known or potential items of supply by type, style, and size.

6.4 The margins of this specification are marked with an asterisk (*) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and suppliers are cautioned to evaluate the requirements of this document based on the entire content as written irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - GL
 Navy - YD
 Air Force - 84

Preparing activity:

Army - GL
 Project No. 7125-0095

Review activity:

Army - MD

User activities:

Army - CE
 Navy - MC, CG

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER		2. DOCUMENT TITLE	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION <i>(Mark one)</i>	
b. ADDRESS <i>(Street, City, State, ZIP Code)</i>		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER <i>(Specify):</i> _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER <i>(Last, First, MI)</i> - Optional		b. WORK TELEPHONE NUMBER <i>(Include Area Code)</i> - Optional	
c. MAILING ADDRESS <i>(Street, City, State, ZIP Code)</i> - Optional		8. DATE OF SUBMISSION <i>(YYMMDD)</i>	

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)