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SUPERSEDING
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FEDERAL SPECIFICATION

CHAIRS, FOLDING, (STEEL)

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 folding chairs for use as temporary seating in dual purpose areas (see 6.1).

1.2 Classification. Chairs shall be of the following types and classes as specified (see 6.2).

Type I - Tubular steel frame.
Type II - Double-bead channel or channel steel frame.

Class:

1 - Steel seat and steel back.
2 - Padded seat and padded back.
3 - Plywood seat and steel back.
4 - Padded seat and padded back, with arms.

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.

Federal Specifications:

TT-C-490	-	Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings.
TT-L-57	-	Lacquer, Rubbing. Clear, (for Wood Furniture).
TT-S-720	-	Stain: Wood, Non-Grain Raising, Solvent-Dye Type.
CCC-A-680	-	Artificial Leather (Cloth Coated), Vinyl Resin, Expanded Layer, (Upholstery).
CCC-C-700	-	Cloth, Coated, Vinyl Coated (Artificial Leather).

Federal Standards:

Fed. Std. No. 595 - Colors.

(Single copies of this specification and other Federal Specifications and Standards required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Philadelphia, Washington, D.C., Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, and Auburn, WA.

(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-W-12332 - Welding, Resistant, Spot and Projection, for Fabricating Assemblies of Low Carbon Steel.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions can be obtained from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.)

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.

American Iron and Steel Institute (AISI) Publication:

Steel Products Manual - Sheet Steel; Carbon, High Strength Low Alloy, and Alloy; Coils and Cut Lengths.

(Application for copies should be addressed to the American Iron and Steel Institute, 1000 16th Street, N.W., Washington, D.C. 20036.)

American National Standards Institute (ANSI) Standards:

ANSI/HPMA HP 1983 - Hardwood and Decorative Plywood.

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

American Society for Testing and Materials (ASTM) Standards:

ASTM D 3453 - Flexible Cellular Materials - Urethane for Furniture and Automotive Cushioning, Bedding and Similar Applications.
ASTM D 3574 - Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams.

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

The Business and Institutional Furniture Manufacturer's Association (BIFMA) Standard:

BIFMA F-1-1978 - First Generation Voluntary Upholstered Furniture Flammability Standard for Business and Institutional Markets.

(Application for copies should be addressed to The Business and Institutional Furniture Manufacturer's Association, 2335 Burton S. E., Grand Rapids, MI 49506.)

State of California Standard:

Technical Information Bulletin 117 - Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials used in Upholstered Furniture.

(Application for copies should be addressed to the State of California, Department of Consumer Affairs, Bureau of Home Furnishings, North Highlands, CA 95660.)

3. REQUIREMENTS

3.1 Materials. All materials used shall be as specified herein and shall meet the quality standards established in the respective material paragraphs. Any material required which is not named or which is named but for which a standard of quality is not specified shall be of the quality used for standard

commercial items of the kind covered by this specification. Materials shall not have been previously used in their present state. They shall be free of defects which affect the appearance or the serviceability of the finished product.

3.1.1 Steel. The steel sheets used in the fabrication of the chairs shall be commercial quality, cold rolled. Steel sheets used for all exposed parts shall have a stretcher level standard of flatness. "Commercial quality" and "stretcher level standard of flatness" shall be as defined in the Steel Products Manual. The steel tubing shall be AISI 1010-1020 round section, either seamless or continuously seam welded. The thickness of steel to be used for individual parts shall be as given in the applicable paragraphs of this specification and are the minimum thicknesses permitted except the decimal equivalents shown for gages are subject to the tolerances given in the Steel Products Manual. The steel shall be smooth, free of rust, scale, pits, scratches, laps, crimps and buckles. The sheet steel used for parts to be formed shall withstand the bend test specified in 4.5.1.

3.1.2 Plywood. All plywood shall have a moisture content between 6 and 9 percent at time of fabrication and shall be constructed in accordance with ANSI/HPMA HP 1983, and as specified herein. Bondage shall be not less than Type II. Cross banding shall be not less than sound grade (2). Veneer of exposed parts when chairs are in normal use position shall be not less than B grade (B), either plain, sliced, or flat cut and matched for color and grain to present a uniform appearance. Not less than sound grade (2) veneer shall be used on the underside of the seat. Veneer shall be in full length pieces and shall be edge glued. The inner plies of veneer core plywood shall be not less than sound grade (2), free from open defects, to provide a solid smooth surface. The species of the plywood (including corestock and crossbands) shall be either birch or hard (sugar) maple.

3.1.3 Polyurethane foam. The polyurethane foam shall not contain any filler material and shall be molded or slab complying with all requirements of ASTM D 3453 for the grades designated in table I below. The density shall be as shown in table I below when tested in accordance with ASTM D 3574. The polyurethane foam shall comply with the flammability requirements of BIFMA F-1-1978 and the State of California Technical Information Bulletin 117.

TABLE I. Requirements of polyurethane foam.

	Arm rests and back cushions	Seat cushion
Grade	34	44
Dynamic Performance Grade	BD	AD
Static Performance Grade	BS	AS
Density (lbs./cu. ft.)	2.0 - 2.5	2.7 - 3.5

3.1.4 Artificial leather. The artificial leather shall be either class 2 or better, treatments a, b and c conforming to CCC-C-700 or shall be class 2, treatments (a) 1, (b) and (c) conforming to CCC-A-680. The finish or grain shall be smooth or simulate top-grain leather. The color shall match the chair frame as closely as possible.

3.1.5 Finishing materials.

3.1.5.1 Enamel. Enamel for metal finish shall be the baking type and shall be the manufacturer's commercial product except the color shall be as specified in 3.1.5.1.1.

3.1.5.1.1 Color of metal finish. Unless otherwise specified (see 6.2), the color of the metal finish shall be gray, color No. 26134 of Fed. Std. No. 595 (see 6.3).

3.1.5.2 Lacquer. Lacquer for wood parts shall be in accordance with type I or II gloss of TT-L-57.

3.1.5.3 Stain. Stain, when used, shall be a walnut color in accordance with TT-S-720.

3.1.6 Hardware.

3.1.6.1 Fastening devices. Bolts, nuts, screws, rivets and similar fastening devices used for necessary mechanical joints shall be made corrosion resistant by means of metal plating unless protected by paint upon completion of the end item.

3.2 Construction.

3.2.1 Design. The structural design of the chairs shall be such that any sustained and impact weight will be uniformly distributed on all supporting parts with no excessive strain on any one or pair of supporting parts under normal usage. When in use, the chair shall not collapse due to a shift in weight of the user. The folding mechanism shall be designed to guard against personal injury and snagging or tearing of clothing. The design

shall be such that one person can easily fold and unfold the chairs. The chairs shall fold compactly to permit stacking directly over one another in a free standing pile. The chairs shall fold smoothly and quietly.

3.2.2 Welding and brazing. (See definitions in 6.4). All welding and brazing shall accomplish rigid joints in proper alignment. Welds shall be sound, without porosity, and shall provide rigid one piece units of sufficient strength to meet the prescribed tests without any parts that will work loose or adversely affect the use of the chairs, and to withstand rough handling in moving. Exposed welds shall be free of spatter, burrs, and sharp edges.

3.2.2.1 Spot welding. Spot welds shall not be closer to the edge of either adjoining member than 1/2 the greatest dimension of the spot weld, nor shall they be centered closer together than twice the greatest dimension. Squeeze time, weld time, and hold time shall be controlled to produce uniform welds that will meet the test specified in 4.5.2. All protruding spot welds on exposed surfaces of chairs shall be sanded or ground smooth.

3.2.3 Assembly. The chairs shall be durable and of sturdy construction in accordance with the best commercial practice. They shall be constructed to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage and service. All chairs shall be capable of passing the end item tests specified under 4.5.

3.2.4 Clamping. When specified (see 6.2), fastening devices shall be furnished which will hold the chairs together in groups of two, three, and four chairs, as specified. The device shall be designed to fit the chairs furnished. The clamping device shall hold the chairs together in a rigid and secure manner and shall not hinder easy folding of the chairs. The clamped chairs shall fold as one unit. No special tools shall be required for attachment if a separate device is furnished. The fastening device shall be free from rough edges or protruding parts that might damage clothing or cause injury.

3.2.5 Shoes. The four chair legs shall be provided with replaceable shoes made of a good quality resilient material. The material used shall have characteristics that will prevent the shoes from becoming loose on the legs due to weather conditions. It shall not mar floors and shall be resistant to sliding. The shoes shall snugly fit the bottom end of the legs. Their color shall harmonize with the specified color finish of the chair. They shall be capable of withstanding the applicable test specified in 4.5.6.

3.2.6 Hinge points. Hinge points required to accomplish folding shall be sturdily constructed and free of appreciable wear or deformation after repeated use of the chair.

3.2.7 Legs. The chairs shall have four legs. The bottom ends of the legs shall be free of burrs and sharp edges so that cutting or shearing of the shoes during usage of the chairs will be held to a minimum. The bottom ends of the type I chair legs shall be provided with metal caps, unless the shoes used have integral reinforcement and will withstand the impact test specified in 4.5.6. The top ends of the rear legs of type I chair shall be pressed closed or shall be covered with caps of metal, molded rubber, molded polyethylene, molded polypropylene or molded polyvinyl chloride plastic. After insertion, the caps shall not be removable manually and shall not fall out during the tests specified in 4.5.5 and 4.5.6.

3.2.8 Dimensions. The dimensions shall be as specified in table II and III and in the individual paragraphs hereunder.

TABLE II. Type I chair dimensions (inches).

	Minimum	Maximum
Overall folded length	34	40
Overall height	29-1/2	34
Height from floor to high point of seat	16-1/2	19
Width of seat	15	17-1/2
Depth of seat	14-1/4	16-1/2
Width between arms (class 4)	17-1/2	

TABLE III. Type II chair dimensions (inches).

	Minimum	Maximum
Overall folded length	34	40
Overall height	30	34
Height from floor to high point of seat	16-1/2	19
Width of seat	13-1/2	17-1/2
Depth of seat	12-1/2	16-1/2
Width between arms (class 4)	17-1/2	

3.2.8.1 Dimensions of arm rests. The arm rests shall be not less than 9 inches in length nor less than 1-3/4 inches in width. The thickness, including upholstered pad and pan when so designed, shall be not less than 3/4 inch.

3.2.9 Classes of chairs.

3.2.9.1 Class 1 chairs. Class 1 chairs shall be of all metal construction and shall have no seat padding nor back padding. Steel shall be as specified in 3.1.1.

3.2.9.1.1 Seat. The seat shall be fabricated from a single piece of sheet steel and shall be formed in a manner to be form-fitting and to provide strength and rigidity and to eliminate sharp edges.

3.2.9.1.2 Backrest. The backrest shall be not less than 6 inches high, and fabricated from a single piece of sheet steel, to a comfortable form-fitting shape. All edges shall be formed to provide maximum strength to the back. There shall be no sharp exposed edges. The lower edge of the back shall be not more than 11 inches above the seat.

3.2.9.2 Class 2 chairs. Class 2 chairs shall conform to all the requirements specified herein for class 1 chairs, except that padding covered with artificial leather is added to the seats and backrests. Padding shall be as specified in 3.1.3 and artificial leather shall be as specified in 3.1.4.

3.2.9.2.1 Padding and covering. The polyurethane foam padding shall be in one piece not less than 1 inch thick for the seat padding and not less than 1/2 inch thick for the back padding. The padding and covering shall be securely fastened to the seat and back of the chairs and shall not loosen under continued use. Unfinished edges of the covering shall be concealed and shall be free from wrinkles and ridges.

3.2.9.3 Class 3 chairs.

3.2.9.3.1 Seat. The seat construction shall conform to either of the following:

(a) The chairs shall have a 5-ply plywood seat with rounded front corners. Material shall be as specified in 3.1.2. All seat edges shall be either rounded or housed in a metal frame, to prevent feathering of top and bottom plies.

(b) A form fitting plywood assembly not less than 13 inches wide by 12 inches deep shall be applied to a full drawn steel pan. The assembly shall be not less than 3-ply and not less than 3/16 inch thick. In lieu of birch or hard (sugar) maple specified for corestock and crossbands in 3.1.2, these plies may be any hardwood or softwood species. Except for the species of corestock and crossbands, the plywood assembly shall meet all of the requirements of 3.1.2. The pan shall be recessed to receive

the plywood assembly. Attachment shall be by means of at least ten properly located rivets with rounded heads that do not protrude more than 3/32 inch above the face of the plywood panel. Unless the plywood panel fits flush with or slightly insets the face of the seat pan, its top edge shall be rounded along its entire perimeter.

3.2.9.3.2 Backrest. The backrest shall be as specified in 3.2.9.1.2.

3.2.9.4 Class 4 chairs. Class 4 chairs shall meet the requirements for class 2 chairs with the addition of arms.

3.2.9.4.1 Arms. Arms shall consist of arm rest support assembly and arm rests. The support assembly shall be not less than 20 gage (0.0359 inch) steel if formed or not less than 11 gage (0.1196 inch) steel if flat. All edges and corners shall be well rounded. The folding mechanism shall be of such design as to guard against personal injury or snagging and tearing of clothing. Arm rests shall be padded with not less than 1/2 inch thick polyurethane foam specified in 3.1.3 and covered with artificial leather specified in 3.1.4 to match seat and back cushions or shall be one-piece formed steel not less than 18 gage (0.0478 inch) finished to match other metal parts. If upholstered arm rests are furnished, they shall be attached to metal pans. Arm rest dimensions shall be as specified in 3.2.8.1.

3.2.9.4.2 Arm assembly. Arms, when in use position, shall have a pitch to match pitch of seat and shall be not more than 26 nor less than 24 inches from the floor at rear. When the chair is folded, arms shall rest alongside and approximately parallel to the legs or main frame. Arms shall fold automatically when the chair is folded. There shall be no metal-to-metal contact at point of stop against any other part of the chairs.

3.3 Pretreatment and finishing.

3.3.1 Metal parts.

3.3.1.1 Pretreatment. All unplated ferrous metal surfaces shall be cleaned for painting in accordance with any of the methods specified in TT-C-490. Surface pretreatment process shall be in accordance with either type I or II of TT-C-490.

3.3.1.2 Enameling. All surfaces prepared in accordance with 3.3.1.1 shall be coated with enamel as specified in 3.1.5.1 and baked in accordance with the enamel supplier's directions.

Average dry enamel film thickness on exterior leg surfaces, exposed exterior back surfaces, and exposed top surface of seats shall be 1.0 mil with no reading less than 0.8 mil. The minimum dry enamel film thickness of other surfaces shall be 0.6 mil. The finish shall level out to provide smooth, uniform, exposed surfaces without runs, wrinkles, grit, areas of thin film and no film, and separation of color. The finish shall withstand the tests specified in 4.5.10.

3.3.2 Wood parts.

3.3.2.1 Preparation for finishing. Prior to finishing, all exposed wood surfaces, when chairs are in normal use position, shall be sanded smooth and all corners and edges eased.

3.3.2.2 Finishing, exposed surfaces. The finish of the exposed wood surfaces shall be clear or walnut as specified (see 6.2).

3.3.2.2.1 Walnut finish. All surfaces prepared as specified in 3.3.2.1 shall be stained with nongrain raising stain conforming to 3.1.5.3 and then shall receive at least one coat of lacquer sealer and two coats of clear lacquer. The lacquer shall be as specified in 3.1.5.2. The finishing procedures shall be controlled to produce smooth, uniform surfaces without blisters, pits, wrinkles, runs, tackiness, or more than a trace of orange peel. The finish shall withstand the tests specified in 4.5.11.1 and 4.5.11.2.

3.3.2.2.2 Clear finish. The clear finish shall meet the requirements of 3.3.2.2.1 except the stain shall be omitted.

3.3.2.3 Finishing, unexposed surfaces. Surfaces unexposed, when chairs are in normal use position, shall receive at least one coat of clear lacquer sealer and one coat of clear lacquer.

3.4 Identification marking. Each chair shall be permanently and inconspicuously marked in a plain and legible manner with the specification number, national stock number, contract number, month and year of manufacture and the manufacturer's name or trademark.

3.5 Workmanship. Finished chairs shall be free from any defects that affect the appearance, function or serviceability of the chairs or the safety of the user.

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 First article sample inspection. Examination and testing of the first article samples (when required) shall be made on completely fabricated items for all provisions of this specification applicable to end product examination and tests.

4.3 Sampling for inspection and acceptance. Sampling for lot inspection and acceptance shall be performed in accordance with MIL-STD-105, except as otherwise specified herein.

4.3.1 Component and material inspection. In accordance with 4.1, the supplier is responsible for insuring that components and materials used are manufactured, tested, and inspected in accordance with the specified requirements of referenced subsidiary specifications and standards or, if none, in accordance with this specification.

4.3.2 Inspection of end items. The lot shall be all chairs of the same type and class. The lot size shall be expressed in units of chairs for the purpose of determining the sample size in accordance with MIL-STD-105. The sample unit for this examination shall be one completely fabricated chair.

4.3.2.1 Visual examination. The chairs shall be examined for the defects listed in table IV. The inspection levels and the acceptable quality levels shall be as specified in 4.4.

TABLE IV. Classification of end item defects.

Examine	Defect	Classification Major	Classification Minor
Organic finish	Poor adhesion, i.e., blistered, checked, peeling; tacky (not dry to touch); color separation, stain, not smooth and uniform, runs, sags, foreign matter in coating, area of thin coating or abrasion.		X
	Wrong color.		X

TABLE IV. Continued

Examine	Defect	Classification Major	Minor
	Scratch through to base material, bare spots, rust or decay under coating.	X	
Workmanship and construction (general)	Any part missing including bolts, nuts, lockwashers, or rivets. Malformed or mislocated parts affecting serviceability. Broken, punctured or cracked parts. Sharp edge or projection that may cause injury.	X	
	Malformed, mislocated, damaged, buckled or warped parts affecting appearance. Any dent on exposed surface affecting appearance.		X
	Wrong material.	X	
Welds	Missing, not required number or not sound (broken, cracked, burnt through, poor adhesion, inc.)	X	
	Not ground smooth, protrude, or pits not filled (exposed welds).		X
	Spot welds not spaced as specified.		X
Upholstery material	Torn, cut or contains hole.	X	
	Coating peeled, blistered or cracked.	X	
	Faded, affecting appearance.		X
	Spotted, stained or dirty.		X
	Material has objectionable odor.		X
Plywood	Number of plies not as specified.	X	
	Veneer delaminated.	X	
	Any characteristic defect affecting serviceability.	X	

TABLE IV. Continued

Examine	Defect	Classification Major	Classification Minor
	Any nonpermissible defect affecting appearance.		X
	Any nonpermissible defect filled with plastic wood, or other filler material.	X	
Folding mechanism	Design that may cause injury, snagging or tearing of clothing.	X	
Leg shoes	Not replaceable.		X
Identification marking	Missing, not permanent or is illegible, incomplete or incorrect.		X

4.3.2.2 Dimensional examination. Inspection will be made of chairs for compliance with the dimensions specified, including thickness of metal and film thickness of enamel. Any dimension not within the tolerance specified will be classified as a defect. The inspection level and the acceptable quality level shall be as specified in 4.4.

4.3.3 Examination of preparation for delivery. An examination shall be made for compliance with packing, packaging and marking provisions of section 5 of this specification. Defects will be scored as specified in table V. The sample unit shall be one shipping container fully prepared for delivery. The lot size shall be the number of containers in the inspection lot. The acceptable quality level shall be as specified in 4.4.

TABLE V. Preparation for delivery defects.

Examine	Defect
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any nonconforming component; component missing, damaged, or otherwise defective.
Workmanship	Inadequate application of components such as incomplete closure of taped waterproofed seal, container flaps, loose strapping, inadequate cushioning, bulging, or distortion of containers.

4.4 Inspection levels and AQL's. The inspection levels and the acceptable quality levels (AQL's) expressed in defects per hundred units shall be as follows:

For examination in	Inspection level	AQL's Major	AQL's Total
Table IV	II	4.0	10.0
4.3.2.2 (1 class)	S-2		4.0
Table V (1 class)	S-1		4.0

4.5 Tests. The following tests shall be performed as described herein on each type and class of chair being produced under contract. Tests shall be performed on the first article samples submitted for inspection and thereafter as deemed necessary by the Government. Failure to meet the requirements specified herein shall be cause for rejection of the type and class of chairs being examined and tested.

4.5.1 Bend test for steel sheets. Samples of steel sheets used in forming chair parts shall withstand a 180 degree bend at room temperature with and across the grain, around a radius not greater than the thickness of the metal being tested, without showing any cracks or fractures on the outside of the bends.

4.5.2 Spot welds. Specimens simulating the spot welding of the steel used on the chairs shall meet the peel test of MIL-W-12332, and button diameter shall be as specified therein.

4.5.3 Fold test. The chair shall be opened and closed at least ten times to insure ease of operation and that no pinching hazard is evident.

4.5.4 Adjusting to uneven surfaces. With the chair in an open or sitting position, a solid wood block 3/8 inch thick and at least 2 inches square shall be placed under any one of the four legs. The chair shall adjust to the unevenness without any undue strain on any part or parts, by solid contact with the floor when a person or weight weighing a minimum of 150 pounds is placed on the seat. Each leg shall be tested separately. After completion of the tests, the block shall be removed, and when the same weight is placed on the seat, the chair shall rest solidly on an even floor.

4.5.5 Vertical impact test. The chair shall be subjected to the impacts of a 40 ± 1 pound sandbag which shall be dropped upon the seat from various heights. The chair shall be placed on a

stationary smooth steel platform. The four legs shall be fitted into sockets on the surface of the platform to restrict movement of the legs to not more than 1/2 inch in any horizontal direction. The sandbag shall be 9 ± 1/2 inch in diameter and shall be guided in its vertical drop so that the motion will be not more than 1/2 inch in any horizontal direction. The center of impact shall be on the horizontal centerline 8-1/4 inches from the rear edge of the seat. Seats with pitch shall be shimmed level at the point of impact. Metal seats shall be completely covered with a 3/4 inch hardwood board, securely attached before the leveling shim is attached. The impacts shall be delivered at a rate of not less than 22 nor more than 28 per minute. Upon completion of 1,000 impacts from a height of 10 inches and 1,000 impacts from a height 12 inches, there shall be no weld failures, visible cracks, or fractures of any metal portion of the chair. Permanent deflection of the seat, measured from the floor to the point of impact, shall not exceed 5/16 inch. The chair shall fold to within the same overall folded size as before the test.

4.5.6 Tilt impact test. The chair shall be placed on the stationary smooth steel platform and the rear legs fitted loosely into sockets attached to the surface of the platform. A 76 ± 1 pound metal weight shall be securely fastened to the seat with the weight's center of gravity on the geometric center of the seat. Prior to attachment of the weight, a solid hardwood board, approximately 3/4 inch thick and of sufficient dimensions to cover the outside of the seat, shall be securely attached to the seat. The chair shall be tilted backward so that the front legs are 4 inches from the floor, and then released, allowing a free drop to the floor at a rate of not less than 22 nor more than 28 drops per minute. Upon completion of 30,000 impacts, there shall be no visible cracks or fractures of any metal portion of the chair. The permanent deflection or set measured from the floor to a point on the geometric center of the seat, shall not exceed 1/4 inch. The shoes shall withstand 30,000 drops or impacts without wearing through to the metal leg.

4.5.7 Vertical static force test to back. The chair, equipped with shoes, shall be placed on a stationary smooth steel platform which in turn shall rest on the bed of a vertical force testing machine. A block of wood, approximately 4 inches long and having the under-surface formed to the shape of the metal back frame, shall be placed between the top of the back frame and the moving head of the testing machine. The top surface of the block shall be flat. The chair shall be subjected to a vertical static force, applied to the top of the back, of not less than 295 nor more than 305 pounds. The speed of application shall not exceed 1 inch per minute. Upon completion of the test, there

shall be no visible cracks or fractures of any metal portion of the chair. With the four legs resting on the floor, the permanent deflection or set, measured vertically from the floor to the point of load application, shall not exceed 1/8 inch.

4.5.8 Vertical static force test to seat. The chair shall be placed with all four legs on a stationary smooth steel platform. A block of wood approximately 3/4 inch thick, 2 inches wide, and of a length equal to the width of the seat shall be placed transversely across the seat with the center point of the block on the geometric center of the seat. The side of the block in contact with the seat shall be so shaped that the top surface of the block is on a horizontal plane. A static force of 500 ± 5 pounds shall be applied vertically to the center of the block. Upon completion of the test, there shall be no visible cracks or fractures of any metal portion of the chair. The permanent deflection or set, measured vertically from the floor to a point on the geometric center of the seat, shall not exceed 3/8 inch.

4.5.9 Swinging impact to back panel test. The chair shall be securely fastened to the floor. The front side of the back panel shall then be subjected to repeated impacts of a 40 ± 1 pound cylindrical canvas sandbag, with imitation leather case 10 ± 1 inch in diameter and approximately 20 inches high, at the rate of not less than 22 nor more than 28 impacts per minutes. The sandbag shall be filled with dry silica sand and shall be pivotally hung below a reciprocating bar, movable in a horizontal plane. The bottom of the bag shall be 32 ± 1/2 inch below the pivoting suspension point and shall impact the back panel to a point of 8 ± 1/2 inch below the top of the chair back. The back panel shall be subjected to 10,000 impacts through 4 inch strokes and 5,000 impacts through 6 inch strokes. Upon completion of the test, there shall not be weld failures, visible cracks, or fractures in the back panel or frame.

4.5.10 Metal finish. A metal chair frame shall be used for the test described in 4.5.10.1 and a 20 gage (0.0359 inch) sample panel shall be used for the balance of the tests. The frame and panel shall be prepared in accordance with 3.3.1.1 and 3.3.1.2.

4.5.10.1 Color change and water resistance test. The metal chair frame shall be partially immersed in distilled water (approximately 72 degrees F.) for a period of not less than 18 hours, then dried and lightly polished. There shall be no visible change in adhesive, change in color, nor dulling of the metal finish.

4.5.10.2 Flexibility. The dried film shall show no evidence of cracking or flaking under seven power magnification after a panel has been bent through 180 degrees over a 1/8 inch diameter rod.

4.5.10.3 Hardness. The dried film shall withstand the firm stroke of a 2H pencil held at a 45 degree angle and pushed across the film surface without evidence of marring when viewed at an oblique angle in a strong light.

4.5.10.4 Adhesion. The dried film shall not be removed from the panel when the latter has been scored with a razor blade through the film to the base metal in such a manner as to produce a grid of 1/8 inch squares and a one inch wide piece of Scotch brand No. 600, or equal, cellulose acetate tape is applied firmly to the grid surface and then quickly pulled from the surface.

4.5.11 Wood finish.

4.5.11.1 Cold water test. Pads of ozite saturated with water (approximately 72 degrees F.) shall be placed on the finished top surface of the wood seat of the sample chair for a period of 48 hours. The pads shall be covered with glass to retard evaporation and shall be resaturated at approximately 8 hour intervals. At the end of 48 hours the pads shall be removed and the finished surface shall be wiped clean and dry with a cloth. There shall be no visible change in appearance of the tested area of the finished surface after a period of 3 hours.

4.5.11.2 Boiling water test. Boiling water (212 degrees F.) shall be trickled over the finished top surface of the seat, inclined at an angle of approximately 5 degrees to the horizontal, for a period of not less than 10 minutes. The water shall be confined by means of strips of putty to a portion of the surface not less than 1-3/4 nor more than 2-1/4 inches in width and shall flow at the rate of approximately 250 cubic centimeters per minute. Upon completion of the test, the finished surface shall be wiped clean and dry with a cloth. There shall be no visible change in appearance of the tested area of the finished surface after a period of 3 hours.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. Packaging, packing and marking shall be as specified in the contract or purchase order.

6. NOTES

6.1 Intended use. The all metal chairs may be used indoors or outdoors. However, it is not recommended that they be continually exposed to the elements. Chairs with plywood seats are generally intended for indoor use. The padded seat and back chairs are intended for conference rooms, court rooms and for general household and hospital use.

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) Type and class of chair required (1.2).
(c) Color of metal parts if other than specified (3.1.5.1.1).
(d) When clamping device is required and number of chairs to be held together (3.2.4).
(e) Finish of exposed wood parts (3.3.2.2).
(f) Packaging, packing and marking required (5.1).

6.3 Color panels. Sample panels of No. 26134 gray of Fed. Std. No. 595 are obtainable from the Regional Business Service Centers, Federal Supply Service, General Services Administration.

6.4 Definitions of welding terms and brazing.

6.4.1 Resistance welding. Resistance welding is a group of welding processes wherein coalescence is produced by the heat obtained from resistance of the work to the flow of the electric current in a circuit of which the work is a part, and by the application of pressure.

6.4.2 Spot welding. Spot welding is a resistance welding process wherein coalescence is produced by the heat obtained from resistance to the flow of electric current through the work parts held together under pressure by electrodes. The size and shape of the individually formed welds are limited primarily by the size and contour of the electrodes.

6.4.3 Fusion welding. Fusion welding consists of any welding process in which the weld is carried out solely by the melting of the metals to be joined, without any mechanical pressure. The joining is usually accomplished through the fusion of metal deposits from an external source.

6.4.4 Brazing. Brazing is the joining of metals with the aid of a filler metal of a different composition having a melting point above 800 degrees Fahrenheit.

6.5 <u>Item identifying reference part number system</u>. The item identifying reference part number system shall be as shown below.

```
AAC291 - 1 C 2 B 2     Example of reference part number:
         | | | | |     AAC291-1C2B2
         | | | | |
         | | | | |_ Color of metal: 1 - Gray
         | | | |                    2 - Other
         | | | |
         | | | |___ Finish of wood: A - Clear
         | | |      (Class 3 only)  B - Walnut
         | | |
         | | |_____ Clamping system: 1 - Not required
         | |                         2 - Required
         | |
         | |_______ Class: A - Class 1 - Steel seat and back
         |                 B - Class 2 - Padded seat and back
         |                 C - Class 3 - Plywood seat and back
         |                 D - Class 4 - Padded seat and back,
         |                               with arms
         |
         |_________ Type: 1 - Type I - Tubular steel frame
                          2 - Type II - Double-bead channel or
                                        channel steel frame
```

Preparing Activity:

GSA-FSS/FCNE