

PURCHASE DESCRIPTION

CHAIRS, WOOD, EXECUTIVE OFFICE, TRADITIONAL

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for the component materials and their assembly into upholstered office chairs of traditional design.

1.2 Classification.

1.2.1 Types, styles and classes. The chairs shall be of the following types, styles and classes, as specified (see 6.2).

Types and Styles

Type I - Straight chair

Style A - Side chair with arms (figures 1 and 2)

Style B - Side chair without arms (figure 3)

Style C - Fiddle-back chair with arms

Type II - Rotary, tilting, fixed seat and back

Style A - with star base

Style B - with jury base

Type III - Rotary, posture, fixed seat, tilting back

Type IV - Rotary, tilting, fixed seat and high back (judges)

Style A - with head roll

Style B - without head roll

Type V - Rotary, Ergonomic chair

Classes

Class 1 - Leather seat and back

Class 2 - Fabric seat, leather back

Class 3 - Vinyl seat and back

Class 4 - Fabric seat, vinyl back

2. APPLICABLE DOCUMENTS

2.1 Specifications and standards. The following specifications and standards, 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:

Commercial item Description:

A-A-1011 – Caster, Swivel (Chair)

Federal Test Method Standards:

No. 191 - Federal Standard for Textile Test Methods

No. 311 - Leather, Method of Sampling and Testing

(Federal Specifications, Commercial Item Descriptions and Federal Test Methods are available, for bidding purposes, from General Services Administration, Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Houston; Denver; Los Angeles; San Francisco; and Seattle, WA.)

U.S. Department of Agriculture Handbook:

Wood Handbook: Wood as an Engineering Material

(The Wood Handbook is available on-line at www.fpl.fs.fed.us/documnts/fplgtr/fplgtr113/fplgtr113.htm. Printed copies are available from U.S. Government Printing Office, Washington DC 20402 or through the U.S. Government On-line Bookstore at www.access.gpo.gov/su_docs/sale.html.)

2.2 Commercial and State Standards and Publications.

American National Standards Institute Publications

- ANSI/HPVA HP-1 - Standard for Hardwood and Decorative Plywood
- ANSI/BIFMA X5.1 - General Purpose Office Chairs Tests
- ANSI/NFPA 260 - Cigarette Ignition Resistance of Components of Upholstered Furniture
- ANSI/ASQ Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Application for copies should be addressed to ANSI, 11 West 42nd Street, NY 10036.)

American Society for Testing and Materials Standards

- D 905 - Standard Method of Test for Strength Properties of Adhesives in Shear by Compression Loading
- D 1211 - Standard Test Method for Temperature-Change Resistance of Clear Nitrocellulose Lacquer Films Applied to Wood
- D 1233 - Twine made from Bast and Leaf Fibers
- D 1682 - Breaking Load and Elongation of Textile Fibers
- D 2097 - Standard Test Method for Flex Testing of Finish on Upholstery Leather
- D 2194 - Standard Test Method for Measurement of Plasticizer Migration From Vinyl Fabrics to Lacquers
- D 2256 - Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method
- D 3597 - Standard Specification for Woven Upholstery Fabrics – Plain, Tufted, or Flocked
- D 3770 - Standard Specification for Flexible Cellular Materials - High Resilience Polyurethane Foam(HR).
- D 3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
- D 3884 - Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959)

Upholstery Furniture Action Council (UFAC) Test Methods

UFAC Flammability Test Methods for Upholstered Furniture Components - 1983

(UFAC test methods are available from UFAC, Box 2436, High Point, NC 27261)

State of California Technical Information Bulletin

Technical Bulletin 117 - Requirements, Test Procedures and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture

(State of California technical bulletins are available on-line at <http://www.bhfti.ca.gov/bulletin.htm>. For further information contact California Bureau Of Home Furnishings And Thermal Insulation, 3485 Orange Grove Ave., North Highlands, CA 95660; (916) 574-2041)

3. REQUIREMENTS

3.1 Materials. The following paragraphs describe minimum requirements for materials used in construction and assembly.

Regulatory requirements. The offerer/contractor is encouraged to use recovered materials in accordance with Public law 94-580, as amended, to the maximum extent practicable.

3.1.1 Wood.

3.1.1.2 Varieties. The wood and veneer used in the construction of the exposed components shall be walnut or cherry. Only one species is permitted on any one chair. The wood used in the construction of the unexposed

components shall be domestic hardwood which meets the following requirements at 12% moisture content. See the USDA Wood Handbook.

Modulus of Rupture - 68,000 kilopascals (kPa) min.

Modulus of Elasticity - 9,500 megapascals (MPa) min.

3.1.1.3 Characteristics. The solid wood used for exposed parts shall be bright, well sanded, and free from brashness, discolorations, worm holes, honeycomb, splits, and shake. The wood for steam bent parts shall be selected from long straight grained uniform stock. The wood used for unexposed parts may contain small defects, such as pin knots, sapwood, or mineral streaks provided the strength of the part is not affected.

3.1.1.4 Plywood. All plywood shall be 5 ply, a minimum of ½ inch (13 mm) thick, and constructed in accordance with the requirements of ANSI/HPVA HP-1 and as specified herein. Minimum type II bond is required. Crossbanding shall be not less than grade 2. Exposed faces of plywood chair backs shall have grade 1 walnut or cherry veneer, either plain sliced or flat cut and matched for color and grain to present a uniform appearance. Grade 2 veneer minimum shall be used on unexposed faces of backs.

3.1.1.5 Seasoning. All wood shall be thoroughly air-seasoned and then uniformly kiln-dried without honeycomb or case hardening to a moisture content of 5 percent. At the time of assembly, moisture content shall not exceed 7 percent. Parts which require steam bending shall be air-seasoned before bending, and uniformly kiln-dried to a moisture content of 5 percent after bending is completed. Kiln-dried parts shall be allowed to temper approximately 2 weeks in a sheltered area to equalize moisture before milling. Steam bent parts shall remain in forms or shackles until drying is completed.

3.1.2 Dowels. Dowels shall be of beech, birch, hickory, or maple and have a maximum 5% moisture content at time of assembly. They shall be spirally or longitudinally grooved. Unless otherwise specified herein, dowels shall have a minimum diameter of 3/8 inch (9 mm) and the length shall be not less than 4 times the diameter.

3.1.3 Adhesive. Block shear strength shall be 19,300 kPa (2,800 lb/in) minimum when tested in accordance with ASTM D 905. See test procedure paragraph 4.4.1.

3.2 Upholstery materials and flammability requirements. All upholstery cover materials, welts, interior fabrics, fillings, and paddings shall meet NFPA-260 Class 1 construction, or UFAC Class 1 flammability requirements. All polyurethane foam shall meet California Technical Bulletin 117, Section A, Part I and Section D, Part II.

3.2.1 Fabric. The fabric shall conform to ASTM D 3597. The color selection is specified in 3.6 (see 6.2).

3.2.2 Leather. Leather shall be top grain, dyed full depth. Leather shall meet the following requirements when tested in accordance with the methods in 4.4.7. The color selection is specified in 3.7 (See 6.2)

Thickness - 2 to 3 oz (57 to 85 g).

Breaking force (grab method) - 100 lb (444 N) minimum

Elongation - 40% maximum stretch.

Stitch tear (double hole) - 15 lb (67 N) minimum

Crocking (colorfastness, resistance to rubbing)

Dry: 8.5 Munsell or better

Wet: 6.5 Munsell or better.

Blocking - Specimens must separate with ease and show no grain damage. pH - 3.3 to 5.0

Fade resistance (colorfastness) - Little or no change in color or finish.

Abrasion resistance - No signs of the finish wearing through (except for gloss change).

Flexibility - Fine cracks, no russet showing.

3.2.3 Vinyl. Vinyl shall have a terry loop knit polyester base cloth. Vinyl shall meet the following requirements when tested in accordance with the methods in 4.4.8. The color selection is specified in 3.8 (see 6.2).

Thickness: 1.2 mm, minimum

Total weight: Minimum 678 g/m²

Breaking strength, Minimum: 266 N Wales, 266 N Courses

Elongation, Maximum: 5% stretch, Wales, 25% stretch Courses

Tear strength, Minimum: 44.4 N Wales, 44.4 N Courses

Crocking (colorfastness, resistance to rubbing): Good

Abrasion resistance: No signs of the finish wearing through (except for gloss changes) after 30,000 double rubs.

3.2.4 Cambric. Black or grey non-woven fabric, 1.9 oz./sq. yd. (minus 0.08) (64 g/m²). Test procedure 4.4.3.

3.2.5 Polyester fiberfill batting. Garnetted (not resinated), min. 2 oz/ft² (610 g/m²) (test procedure 4.4.3), 5.5 to 16 denier, hollow and slickened, branded polyester fiber (branded by fiber producer).

3.2.6 Garnetted batting. Garnetted material, smoothly carded, clean and free of foreign matter, made in unbroken laminated sheets. Felt weight: 18.7 oz/sq.yd. (634 g/m²) minimum (Test procedure 4.4.3) unless otherwise specified.

3.2.7 Wadding/thin fiber batting. White, cotton or synthetic fibers, 3/16 to 9/16 inch (5 to 14.3 mm) thick, smoothly carded, thermally bonded, or resin treated. Weight: 1.8 to 4.5 oz/sq.yd. (61 g/m² to 153 g/m²) (Test procedure 4.4.3)

3.2.8 Twine.

3.2.8.1 Sewing and quilting twine. Minimum breaking strength 65 lbs. (29.5 kg) when tested as specified in 4.4.4.

3.2.8.2 Spring-up seat twine. 6 ply minimum, minimum breaking strength 200 lbs. (91 kg) when tested as specified in 4.4.4.

3.2.8.3 Spring-up back twine. 4 ply minimum, minimum breaking strength 200 lbs. (91 kg) when tested as specified in 4.4.4.

3.2.9 Welts

3.2.9.1 Seam welts. Welts shall be of leather/artificial leather uniformly drawn over a suitable 5/32 inch (4 mm) minimum core.

3.2.9.2 Bumper welts. Leather/artificial leather uniformly drawn over a resilient 10/32 inch (8 mm) minimum core.

3.2.9.3 Double bumper welt. Consists of a double welt sewn hard cord core. It shall be stapled to the chair in between the welts. The staples shall not be visible in between the welts. The double welt shall not be over 9/16 inch (14 mm) wide and shall be sewn with no cut stitches. As an alternative to the bumper on the arms, a sewn min. 10/32 (8 mm) resilient core bumper welt may be neatly and securely attached to the arm underside. The sewn bumper welt shall not have stitching or stapling visible in the normal use position and the arm underside shall be covered with cambric.

3.2.10 Sheet fabric. For use over foundation springs. Polypropylene, woven - 3 oz./sq. yd. (102 g/m²) minimum (Test procedure: 4.4.3).

3.2.11 Webbing. Any of the following materials are acceptable for the application listed. When installing, pull tightly and securely attach to frame.

Strip webbing (seat)	Polypropylene, selvage edge both sides. Width: 3-1/2 inches (89 mm) minimum. Breaking strength, warp direction: 300 pounds (136 kg) minimum. (Test procedure: 4.4.5)
Strip webbing (back)	Polypropylene, selvage edge both sides. Width: 3-1/2 inches (89 mm) minimum. Breaking strength, warp direction: 270 pounds (123 kg) minimum. (Test procedure: 4.4.5)
Sheet webbing (seat or back)	Polypropylene plain woven. Weight: 5 oz./sq. yd. (169 g/m ²) minimum. (Test procedure: 4.4.3). Breaking strength, warp and fill direction: 200 pounds (91 kg) minimum. (Test procedure: 4.4.5)

3.2.12 Polyurethane foam.

- Seat: Slab or molded, high resilience type, polyurethane foam with a minimum 2.2 lb/cu. ft. (35 kg/m³) polyurethane polymer density.
Minimum 38 Indentation Force Deflection (IFD) (25 percent deflection) required.
- Back: Slab or molded, conventional or high resilience type polyurethane foam with a minimum 1.5 lb/cu. ft. (24 kg/m³) polyurethane polymer density.
24 to 30 IFD (25 percent deflection) required.
- Arms: Slab or molded, or high resilience type polyurethane foam with a minimum 2.2 lb/cu. ft. (35 kg/m³) polyurethane polymer density.
Minimum 31 IFD (25 percent deflection) required.

All foam shall have a minimum recovery ratio of 70% when tested as specified in 4.4.6 and meet flame retardant requirements in 3.2. Flame retardant additives are permitted. Pull strips are required for attaching foam to frame. Foam shall be buffed when necessary, to provide required final appearance.

3.2.13 Seat and back foundation springs. Any steel coil or sinuous wire spring system is acceptable provided it meets test requirements in 4.5 and comfort requirements in 3.4.1. Stabilize springs together with twine (3.2.8.2) knotted to the springs. Squeaks, clicks, or other noise is not acceptable.

3.2.14 Upholstery nails. The upholstery nails for the outside trim shall be convex-head No. 9 natural brass, with heads 7/16 inch in diameter. Individual nails required.

3.3 Hardware.

3.3.1 Casters.

Single wheel - The casters for Type II, III, and IV chairs shall be ball bearing swivel style, 2 inch diameter wheel, hard phenolic composition wheel of Commercial Item Description A-A-1011. Casters shall be hooded type with a satin brass finish. Furniture manufacturer is responsible for ensuring that caster hood finish, and scuff plate finish match each other.

Dual Wheel – The casters for Type V chairs shall be ball bearing swivel style, 2 inch diameter wheel, hard phenolic composition wheel of Commercial Item Description A-A-1011. Casters shall be dual wheel and shall be hooded. The hood shall have a satin brass finish.

3.3.2 Glides (for Type I chairs). Steel, cushioned nail type with antique finish in brass, bronze, or copper, 1-1/16 inch diameter base, and min. 3/4 inch long serrated nail.

3.3.3 Ventilators. Ventilators shall be brass or bronze with fine perforations or brass wire screening. Finish shall match that of the upholstery nails (3.2.14) as closely as possible. Minimum outside diameter: 3/4 inch (19 mm).

3.3.4 Rotary mechanisms.

All chairs except the type I and type II, style B shall have a suitable metal rotary mechanism having four contact points to the platform (underside frame of the seat), tension adjustment for back tilt, and a positive adjustment for height of seat of 2 inches (51 mm) minimum.

Type III and type V chairs shall have, in addition to the above requirements, a positive adjustment for height of back, independent of the seat, and a positive adjustment for horizontal position of the back.

Adjustments for tilting shall be by means of a suitable handwheel conveniently located at the front or rear of the chair swivel and tilt mechanism. Adjustment for raising shall be by means of a suitable handwheel located concentrically on the pivotal axis of the chair and shall be self-locking and permit swiveling. The mechanisms shall operate and rotate freely and easily without turning the base, and be free from play or wobble. Rotary mechanisms shall have a positive stop in upper-most position to prevent seat from accidentally disengaging from base.

All moving parts shall be properly graphite-lubricated. The metal surfaces of mechanisms shall be smooth and finished in dark brown or black enamel. The materials used shall be free from hazardous surfaces, rust, and other defects which affect appearance or which might affect the safety of the user, the durability or the serviceability of

the finished mechanisms.

3.3.5 Stationary base and chair control. The stationary base for the type II, style B jury chairs shall be Collier-Keyworth Model No. 515 or equal. Self-centering swivel-tilt chair control, attached to base, shall return chair to starting position. The total height of the base and chair control mechanism shall be approximately 14 inches. All surfaces shall be thoroughly cleaned of grease or foreign matter and receive a prime coat and not less than one coat of baked enamel, color, (without graining) to match the overall color of the wood.

3.3.6 Scuff plates. The scuff plates shall be made of cast brass or cast bronze and shall be of the design shown in the figures. The castings shall be cast true, without noticeable air or sand holes or other defects appearing in the finished product, and shall be chased to a smooth and even surface. The bottom edges and corners shall be smoothed and rounded after assembly to the base to prevent scuffing the shoes of the user. All scuff plates shall have a satin brass finish to match casters and be coated with a clear, protective top coat. Attach each plate with four screws.

3.4 Construction/Design. The chairs shall be of traditional design, either leg or rotary type, as specified (see 1.2.1 and 6.2) and as shown in figures 1 through 12. They shall be constructed of solid hardwood frames, glued and doweled mortise and tenoned. Chairs are required to meet test requirements in 4.5. All leg chairs shall be furnished with glides and all rotary chairs except jury base with casters and scuff plates.

Cover chairs as specified below:

Class 1 - all leather (3.2.2)

Class 2 - fabric (3.2.1) seat top and leather covered seat boxing, welts, back and upholstered arms.

Class 3 - all vinyl (3.2.3)

Class 4 - fabric seat top and vinyl covered seat boxing, welts, back and upholstered arms.

3.4.1 Chair comfort. Seats shall be moderately firm and not "bottom out." In addition, spring seats shall have adequate "ride" and crown. Back shall be moderately firm and provide good lumbar support. Seat back, and arms shall be adequately and evenly padded to provide a comfortable chair.

Acceptability of "ride," firmness, padding, pitch, and comfort will be determined, during bid sample evaluation.

3.4.2 Tolerances. The following tolerances will be permitted:

- Over-all width, depth, and height plus or minus 1/2 inch (13 mm)
- Height of arms from seat plus or minus 1/2 inch (13 mm)
- Dimensions of wood parts plus or minus 1/2 inch (13 mm)
- Dimensions of upholstered parts plus or minus 1/2 inch (13 mm)
- Dimensions between arms plus or minus 1/2 inch (13 mm)
- Contour of bent arm from top of arm to the rail (see figures 2 and 5) plus or minus 1/2 inch (13 mm)
- Depth of seat plus or minus 1/2 inch (13 mm)

3.4.3 Arms.

3.4.3.1 Arms for Type I and Type II chairs. See figures.

3.4.3.2 Arm padding. Pad arms to provide required comfort, appearance, and thickness. Cover arm with required upholstery material and welting as required for each arm type. See 3.4 and figures.

3.4.4 Star Bases. The star bases shall be shaped as shown in the applicable figures and shall consist of five legs that shall have a steel sub-frame (See figure 12). The five star base will replace all of the four star bases. The sub-frame shall be designed so that when the wooden caps are placed on the sub-frame, the overall height of the chair in the figures will not change. The base assembly shall be free from play when moved in any direction. Each leg shall be accurately machined to receive the scuff plate, (3.3.6)

The sizes for bases will be as follows:

Type II, Style A 26 inch (660 mm) minimum diameter or 13 inch (330 mm) minimum from center to end of

Type III	scuff plate 29 inch (737 mm) minimum diameter or 14.5 inch (368 mm) minimum from center to end of scuff plate
Type IV	29 inch (737 mm) minimum diameter or 14.5 inch (368 mm) minimum from center to end of scuff plate
Type V	23 inch (585 mm) minimum diameter or 11.5 inch (292 mm) minimum from center to end of scuff plate

3.4.5 Joinery. All frames shall be rigidly constructed and assembled as shown in the figures and as specified herein. All exposed parts shall be of wood specified in 3.1.1.2. The seat frame members shall be of any of the solid woods specified in 3.1.1.2 and unless otherwise specified, shall be a minimum of 1-1/16 inches (270 mm) thick. All joints shall be carefully fitted, thoroughly glued and secured with not less than two dowels, specified in 3.1.2, mortise and tenon, or screws and bolts. Corner blocks of any of the solid woods specified in 3.1.1.2 shall be carefully fitted, glued and secured by not less than one screw in each side. The corner blocks shall be not less than 1 inch (25 mm) thick and shall be the same height (to minus 1/4 inch (6 mm)) as the rails. When wood plugs are used, the grain of the plug shall run the same as the piece into which it is fitted. All exposed squared edges shall be eased to a minimum of 1/16 inch (2 mm) radius.

3.4.6 Filling and upholstery. Minimum filling requirements are described in construction paragraphs. Additional filling may be necessary to ensure the appearance and cushion dimensions comply with figures, with no hollows, voids, flat or hard spots. Frame members shall be padded. Filling and padding shall be installed to prevent shifting during use. Covers shall be tailored carefully and so applied that they are neat and tight, free from wrinkles and bulges. The type and number of stitches shall be suitable to meet all performance tests. Seam allowance shall be maintained and seams properly sewn so that no raw edges, run offs, broken or skipped stitches, twists, pleats or puckers result. Top and bottom threads shall be adjusted to the upholstery materials with proper tension so there will be no looped stitches, puckering of materials, or cracking when cover is stretched to fit the chair. Welts shall lie straight and uniform. Covers for all chairs shall be attached with tacks or staples. All chair seat bottoms shall be covered with cambric (3.2.4). Where upholstery nails are specified (see figures), the borders shall be uniform and the nails positioned slightly less than overlapping. Artificial leather or leather covered spring backs shall be furnished with a minimum of two ventilators (3.3.3). When upholstering in leather, flank areas of the hide and healed scar areas shall be placed in inconspicuous places of the chair.

3.4.7 Type I, Style A and B straight chairs. The type I chairs shall be either with arms (style A) (figures 1 and 2) or without arms (style B) (figure 3).

3.4.7.1 Frame. The frame shall be as specified in 3.4.5. The back posts shall be of one piece of steam bent walnut. The back post shall become an integral part of the side rails and back rail. The arms for the style A chair shall be secured to the back post by means of 1/4 inch (6 mm) bolt as shown in figure 2. The arm stump shall be fitted over the seat rail and secured to the rail by means of a 1/4 inch (6 mm) bolt as shown in figure 2. All exposed bolt heads shall be countersunk and concealed by carefully matched, flush wood plugs. Alternatively, the back post may be shaped, spliced, and double doweled to an upper unexposed wood position of the post. Bandsaw exposed lower portion of back post to minimize crossgrain. Arms for Style A chair shall be as specified in figures.

3.4.7.2 Seat (Type I, Style A and B straight chairs).

Spring system - (3.2.13)

Edge roll - Machine made, minimum 3/4 inch (19 mm), resilient product. Securely attach to four sides of seat frame.

Cover spring system with securely attached wire reinforced sheet fabric (3.2.10). Cover sheet fabric with any combination of polyurethane foam (3.2.12) and batting materials (3.2.5, 3.2.6, 3.2.7) to provide the required comfort, firmness, and final appearance. Cover with specified upholstery material (3.4) in accordance with 3.4.6. Apply upholstery nails as shown in figures.

3.4.7.3 Back (Type I, Style A and B straight chairs). Construct inside back with the following materials. Sheet fabric (3.2.10) securely attached to frame. Cover sheet fabric with any combination of foam (3.2.12) and/or batting (3.2.5, 3.2.6, 3.2.7) to provide the required comfort and uniform thin profile, final appearance. Fill the back cavity and pad outside back with any combination of foam (3.2.12) and or batting (3.2.5, 3.2.6, 3.2.7) to

provide the required final appearance. Cover inside and outside back with specified upholstery material (3.4) in accordance with 3.4.6. Apply upholstery nails as shown in figures.

3.4.8 Type I, Style C Straight chair, fiddle back, with arms.

3.4.8.1 Frame. Frame shall be as specified in 3.4.5 and figures.

3.4.8.2 Seat (Type I, Style C fiddle back chair). Same as type I, style A and B chairs

3.4.8.3 Back and arm assembly (Type I, Style C fiddle back chair). See figures.

3.4.9. Type II, Style A and B, all classes, tilting, fixed seat and back.

3.4.9.1 Frame. Same as Type I, Style A chair except that arms are padded (3.4.3.2) and the bottom frame of the seat shall be attached to a rotary tilting star base (3.4.4) or swivel tilt stationary base (3.3.5) jury type as applicable.

3.4.9.2 Seat. Same as Type I, Style A chair.

3.4.9.3 Back. Same as Type I, Style A chair.

3.4.10 Type III rotary, posture chair.

3.4.10.1 Frame. The frame construction shall be as specified in 3.4.5. All arm stumps (front and back) shall be fitted and securely attached to the seat rail with a minimum 1/4 inch (6 mm) bolt and screw as shown in figure 8A. The chair back post shall be secured to the metal back plate of the rotary mechanism by means of a screw and a minimum 1/4 inch (6 mm) carriage bolt with exposed smooth head finished in statuary bronze color. All exposed screw and bolt heads, except the carriage bolt, and the screws used to attach the back plate to the back posts shall be countersunk and concealed by matched side grain wood plugs. The screws used to attach the back plate to the back posts shall either be countersunk into the back plate or be button or round head design. Padded arms shall be as specified in (3.4.3.2).

3.4.10.2 Seat (Type III chair). Spring system- (3.2.13). Edge roll- Machine made minimum 3/4 inch (19 mm) resilient product. Securely attach to four sides of seat frame. Cover coil spring system with securely attached sheet fabric (3.2.10)

Cover sinuous spring system with securely attached wire reinforced sheet fabric (3.2.10). Cover sheet fabric with any combination of polyurethane foam (3.2.12) and batting materials (3.2.5, 3.2.6, 3.2.7) to provide required comfort, firmness, and final appearance.

Cover seat and frame with specified upholstery material (3.4) in accordance with 3.4.6 to simulate a separate cushion as shown in figures.

3.4.10.3 Back (Type III chair). Spring system - (3.2.13). Edge roll - Machine made, 3/4 inch (19 mm) resilient product. Securely attach to two sides of back frame.

Cover spring system with securely attached sheet fabric (3.2.10).

Cover sheet fabric with any combination of polyurethane foam (3.2.12) and batting materials (3.2.5, 3.2.6, 3.2.7) to provide required comfort, firmness, and final appearance. Pad outside back. Cover entire back with specified upholstery material (3.4) in accordance with 3.4.6.

3.4.11 Type IV, Style A and B, all classes, rotary, tilting, fixed seat and back, with loose cushion (judges).

3.4.11.1 Frame. The frame shall be as specified in 3.4.5. Arm stump shall be fitted and securely attached to the seat rail with a minimum 1/4 inch (6 mm) bolt and a screw as shown in figures 9 and 10. Padded arms (3.4.3.3). The back post shall become an integral part of the side rails and back rail.

3.4.11.2 Seat (Type IV chairs). Spring system - (3.2.13). Edge roll - Machine made, minimum 3/4 inch (19 mm) resilient product. Securely attach to four sides of seat frame. Cover coil spring system with securely attached

sheet fabric (3.2.10). Cover sinuous spring system with securely attached wire reinforced sheet fabric (3.2.10). Cover sheet fabric with any combination of polyurethane foam (3.2.12) and/or batting materials (3.2.5, 3.2.6, 3.2.7) to insulate springs and provide required comfort, firmness, and final appearance when covered loose cushion.

Cover the four sides, and minimum 3 inches on four sides of the top, with specified upholstery material (3.4) in accordance with 3.4.6. Cover center portion with a minimum 4.5 oz/sq. yd. (153 g/m²), beige sateen, velvet or felt finished nylon material.

Loose cushion shall be reversible with a 4 inch (102 mm) thick, polyurethane (3.2.12) core. Shape foam when necessary, to ensure it properly fits cover. 3-1/2 inch (89 mm) boxing required on cover. Close back of cushion with sewn zipper, not visible in normal use position.

3.4.11.3 Back (Type IV chairs). Spring system - (3.2.13). Edge roll- Machine made, 3/4 inch (19 mm) resilient product. Securely attach to two sides of back frame.

Cover spring system with securely attached sheet fabric (3.2.10). Cover sheet fabric including head roll (style A chair), with any combination of polyurethane foam (3.2.12) and batting materials (3.2.5, 3.2.6, 3.2.7) to provide required comfort, firmness, and final appearance. Pad outside back. Cover entire back with specified upholstery material (3.4) in accordance with 3.4.6.

3.4.12 Type V, rotary secretarial posture chair.

3.4.12.1 Frame. The frame shall be rigidly constructed and assembled as shown in figure 11. All joints shall be carefully fitted and secured. The standard (backpost) of the back assembly shall be black and shall be securely attached to be back plate of the rotary mechanism. The chair shall have a pneumatic lift which shall provide a minimum of 5 inches of adjustment. The seat height when the chair is at its lowest position shall be 17 inches (plus or minus 1/2 inch). The chair shall have an articulating back which allows the backrest to tilt to either side of perpendicular. The chair shall have a locking seat tilt with a minimum 20 degree tilt range. The chair shall also have an adjustable height back. Casters shall be dual wheel in accordance with paragraph 3.3.1.

3.4.12.2 Seat (Type V chair). Seat pan - plywood (3.1.1.4) with minimum 5 vent holes. Cover seat pan with any combination of polyurethane foam (3.2.12) and batting materials (3.2.5., 3.2.6, 3.2.7) to provide required comfort, firmness, and final appearance. Cover seat with specified upholstery material (3.4) in accordance with 3.4.6.

3.4.12.3 Back (Type V chair). Back panel-plywood (3.1.1.4) with double bumper welt (3.2.9.3). Cover back panel with polyurethane foam (3.2.12) to provide required comfort, firmness, and final appearance. Cover seat with specified upholstery material (3.4) in accordance with 3.4.6.

3.5 Exposed wood finish. Finish to match, as closely as possible, the overall color of GSA Standard Sample FSS-W-01001 Federal Walnut wood and FSS-W-01002 – Federal Mahogany wood. Staining shall be used to equalize color. Suitable clear natural or synthetic top coat, 2 coat process with adequate "build" and a closed pore (filled), satin finish. Final finish shall pass finish test (4.4.2)

3.6 Fabric standard samples colors shall be FSS-F03009 Dark red, FSS-F-03010 Light blue, FSS-F-03011 Dark blue, FSS-F-03012 Green, FSS-F-03013 Brown, FSS-F-03014 Rust, FSS-F-03015 Dark beige, FSS-F-03016 Black.

3.7 Leather standard sample colors shall be FSS-X-00017 Dark red, FSS-X-00018 Light blue, FSS-X-00019 Dark blue, FSS-X-00020 Green, FSS-X-00021 Brown, FSS-X-00022 Saddle, FSS-X-00023 Dark beige, FSS-X-00024 Black.

3.8 Vinyl standard sample colors shall be FSS-V-04009 Dark red, FSS-V-04010 Light blue, FSS-V-04011 Dark blue, FSS-V-04012 Green, FSS-V-04013 Brown, FSS-V-04014 Saddle, FSS-V-04015 Dark beige, FSS-V-04016 Black.

3.9 Identification marking. Each item shall be permanently and legibly marked with contrasting ink, in an inconspicuous place with the contractor's name/trademark, contract number, national stock number, month and year of manufacture, and specification number.

3.10 Workmanship. A high degree of craftsmanship shall be exercised in order to produce chairs suitable for use in executive offices. The methods of construction, assembly, upholstering, finishing and the appearance of the chairs shall be in strict accordance with the requirements of this specification. Chairs shall have a neatly tailored, taut, stuffed appearance complying with applicable figures. Loosely fitted upholstery or uneven padding is not acceptable. Rotary mechanisms shall operate and rotate freely and easily without turning the base and be free from excessive play or wobble. Casters shall rotate smoothly and be attached to prevent accidental removal. All moving parts shall operate smoothly and quietly. All wood surfaces not covered with upholstery materials, shall be finish sanded smooth and all corners and edges eased, thoroughly cleaned, and finished. The natural grain of the wood shall not be clouded by the finishing materials. Bleaching agents or materials shall not be used. The application of materials, drying time, sanding, cleaning, and rubbing shall be controlled to produce items of smooth, uniform exposed surfaces without blisters, pits, wrinkles, runs, tackiness or more than a trace of orange peel.

4. QUALITY ASSURANCE PROVISIONS

4.1 First article inspection and testing. The first article samples shall be inspected and tested as specified herein for all the requirements of this specification. The samples shall be manufactured in the same manner, using the same materials, equipment, processes, and procedures as used in regular production. All parts and materials, including packaging and packing, shall be obtained from the same source of supply as used in regular production. In addition, first article samples shall be compared to and shall match bid samples for style/design, workmanship, comfort, and finish (except color). Bid sample rejection points (if any) shall be corrected in the first article sample. Manufacturer shall maintain bid samples and first article samples as manufacturing standard samples until the last order is shipped, received and accepted by the ordering activity.

4.2. Production item inspection and testing. During production, items shall be inspected by the contractor in accordance with 4.3. No item shall be shipped unless it fully conforms with all contract requirements. Production items shall also comply with the manufacturing standard samples (4.1).

4.3 Inspection provisions.

4.3.1 Responsibility for inspection. Unless otherwise specified, the contractor is responsible for the performance of all inspection requirements and may use any commercial facilities (including the contractor's own facilities) suitable for the performance of the inspection requirements, unless disapproved by the Government. The Government reserves the right to perform any inspections deemed necessary to assure the item conforms to the specified requirements.

4.3.2 Visual and dimensional examination. Examination shall be performed in accordance with Inspection Level – II, and Acceptable Quality Level (AQL) - 4.0 of ANSI/ASQC Z1.4. Items shall be inspected for visual and dimensional requirements of this specification paying close attention to filling and upholstery (3.4.6), Finish (3.5), workmanship (3.10).

4.3.2.1 Overall examination. In addition to visual and dimensional examination, inspect each chair at a viewing distance of 2 m for the following defects. Reject the item if one or more of the following defects is found.

- Wood finish streaked or not uniform.
- Piece visually off level.
- Scratch or bruise marks on wood.
- Poor fit of upholstery as evidenced by wrinkles, bulges, uneven padding, or other defects.
- Welts not straight.
- Chair upholstery and filling not symmetrical.

4.3.3 Packaging, packing, marking examination. Examine items for compliance with requirements stated in this document and the contract. Score areas of noncompliance with requirements as defects.

Inspection Level - S-4. Acceptable Quality Level (AQL) - 4.0.

4.4 Testing. Failure to comply with the following test requirements will be cause for rejection. Testing is required for first article inspection. See production item testing requirements in 4.2.

4.4.1 Test for adhesives.

Component	Characteristic	Requirement reference	Test Method
Adhesive	Block shear test	3.1.3	ASTM D 905

Rerun test if all three of the following criteria are met: the average shear strength of all samples is below 19,300 kPa; there is a 10 percent or greater difference between high and low specimen values, and at least one test specimen broke at more than 19,300 kPa.

Disregard a test specimen in computing the average if it breaks at less than 19,300 kPa; and it has 50 percent or more wood failure.

4.4.2 Finish tests and requirements. The following tests shall be performed on a sample panel finished in the same manner as units are finished in production. Perform all finish tests at first article inspection. All test panels shall be produced from finish materials currently being used in production. All samples tested shall meet the following test requirements.

4.4.2.1 Cold check. Age panel one week. Follow ASTM D 1211 test procedure. After exposure of 10 cycles, there shall be no checking or cracking. True film checking is one or more wavy or straight lines which cross the grain and do not appear related to grain structure. When a panel displays veneer checks, check running parallel to the grain, or glue line fracture, the panel shall be disregarded and another panel tested.

4.4.2.2 Cold print. Age panel 48 hours. A 50 x 50 mm (approx.) piece of duck material (canvas) 280 g/m², minimum count of 23.6 x 22.8 yarns per cm, shall be placed on the panel. Place a 455 g weight on the material for 24 hours at 24°C. Bottom (contact surface) of the weight shall be flat and have a 28 mm diameter. After the weight is removed, light polishing with a soft cloth and liquid polish must remove any imprint.

4.4.2.3 Ultra violet light resistance. One solid wood panel in each finish color, finished in the same way as in production, shall be tested. Allow panels to age for a minimum of ten days at 25°C (± 3°C) and 35 to 75% R.H. Perform exposure test at the same ambient conditions. Mask off one half of panel with aluminum foil or cut off a control portion of sample to be used later for comparison with the exposed portion. Place test panel 150 mm from ultraviolet lights (two 48 inch, UV 351 fluorescent lamps) for 72 hours. After exposure, remove and compare exposed and unexposed sections for discoloration, fading, loss of gloss, film embrittlement, cracking or any other failures. There shall be no more than a very slight change between the tested panel and the control panel after testing. UVA-351 fluorescent lamps are available from Q-Panel Co., Cleveland, OH.

4.4.2.4 Toughness and adhesion. Perform test for toughness and adhesion on a sample panel finished in the same manner as the furniture using Organic Coating Adhesion Tester, Model No, 1001 in accordance with manufacturer's instructions. Mar the panel both parallel and perpendicular to the grain. Film must conform to resulting indentation. Whitening (film separation) or cracking is not acceptable. Organic Coating Adhesion Tester Model No. 1001 is available from U.S. Testing Company, Inc. Instrument Marking Division, 1415 Park Avenue, Hoboken, NJ 07030.

4.4.2.5 Plasticizer migration. Perform test on a sample panel finished in the same way as production pieces according to ASTM D 2199, Standard Method for Measurement of Plasticizer Migration From Vinyl Fabrics to Lacquers.

4.4.3 Test method for determining weight of material per square area. Method No. 5041 of Fed. Test Method Std. 191 or ASTM D 3776.

4.4.4 Test method for determining breaking strength of twine. Method No. 4100 of Fed. Test Method Std. 191 or ASTM D 1233 or D 2256

4.4.5 Test method for determining recovery ratio of polyurethane foam. ASTM D 3770. Recovery ratio. Use this test method for both conventional and high resilience type foam.

4.4.7 Leather test methods. Sampling procedures and location from which the sample unit is to be obtained shall be in accordance with FED-STD-311. All tests are to be performed on individual sample units, with the

exception of pH which is to be run on a composite. All test reports shall contain individual values utilized in expressing the final result. The lot shall be rejected if any one of the following conditions exists:

- a. More than 25% of thickness measurement taken do not fall within the required range;
- b. More than three test failures occur for breaking force, elongation, or stitch tear;
- c. More than one test failure occurs for the remaining requirements applicable to the sample unit;
- d. Any composite fails to meet the specific requirement.

Test	Method	Requirement
Thickness	Fed Std. 311, Method No. 1011.1	See 3.2.2
Breaking force (grab method)	Fed. Std. 311, Method No. 2031	See 3.2.2
Elongation	Fed Std. 311, Method No. 2031 at 100 lb load	See 3.2.2
Stitch tear (double hole)	Fed Std. 311, Method No. 2151	See 3.2.2
Crocking (colorfastness, resistance to rubbing) Test all colors	Fed Std. 311, Method No. 3031.1	See 3.2.2
Blocking	Fed Std. 311, Method No. 3121.1	See 3.2.2
pH	Fed Std. 311, Method No. 6621.1	See 3.2.2
Fade resistance(colorfastness) Test all colors	Fed Std. 191, Method No. 5660.2 72 hour exposure	See 3.2.2
Abrasion resistance	ASTM D 3884 1000 cycles using CS-10 wheels and 1000 gram weights	See 3.2.2
Flexibility	ASTM D 2097 60,000 cycles	See 3.2.2

4.4.8 Vinyl test methods.

Test	Method
Total Weight	Fed Std 191, 5041
Breaking Strength	Fed Std 191, 5100
Elongation	Fed Std 191, 5100
Tear Strength	Fed Std 191, 5136
Crocking	Fed Std 191, 5651
Abrasion Resistance	ASTM D 3884

4.5 Tests for chairs. Test at least one chair of each type and style listed below in accordance with ANSI/BIFMA X5.1. Tests shall be conducted at the time of the First Article Inspection.

Test Schedule

Type	I			II		III	IV		V
	Style A	Style B	Style C	Style A	Style B		Style A	Style B	
Section									
5				X	X				X
6						X			X
7	X	X	X			X			X
8			X			X	X	X	X
9	X	X	X	X	X	X	X	X	X
10				X	X	X	X	X	X
11				X	X				
12	X	X	X	X	X	X	X	X	X
13	X	X	X	X		X	X	X	X
14	X		X	X		X	X	X	
15	X		X	X	X	X	X	X	
16				X	X		X	X	
17	X	X	X			X			X
18				X		X	X	X	X
19	X	X	X						
20	X	X	X						

Type	I			II		III	IV		V
	Style A	Style B	Style C	Style A	Style B		Style A	Style B	
Section									
21									

5. PACKAGING, PACKING, MARKING

Package, pack and mark shipping containers in accordance with the contract or order.

6. NOTES

6.1 Intended use. The executive office type chairs in traditional styling were designed for use in executive offices, courtrooms, libraries, and conference rooms of Federal agencies. The chairs should compliment the traditional decor of executive areas when used with other furniture items within the group.

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, style, and class (see 1.2.1 and 3.4).
- (c) Upholstery color required (see 3.6, 3.7 and 3.8).

6.3 SI - English unit equivalents.

1 m ² (square meter)	= 1.19617 yd ² (square yard)
1 kg/m ³ (kilogram/cubic meter)	= 0.06242 lb (mass)/ft ³
1 mm (millimeter)	= 0.03937 inch (thickness of one dime)
1 m (meter) = 1 000 mm	= 1.0936 yard (39.37 in)
1 N (Newton)	= 0.225 lb (force)
1 kg (kilogram)	= 2.2 lb (mass)
1 g (gram)	= 0.0022 lb (mass)
1 g (gram)	= 0.03527 oz (mass avoirdupois)
1 kPa (kilo Pascal)	= 0.14514 lb (force)/in ² (PSI)
(C° x 9/5) + 32 (Celsius)	= F° (Fahrenheit)
1 g/m ² (gram per square meter)	= 0.02949 oz/yd ² or 0.04426 oz/linear yard (54" W basis)

To convert SI units to English units, multiply SI measurement by the appropriate English conversion factor listed above. See example below:

$$900 \text{ mm} \times 0.03937 \text{ in/mm} = 35.43 \text{ inches}$$

To convert Celsius temperature to Fahrenheit temperature use the above conversion equation. See example below:

$$(20^{\circ}\text{C} \times 1.8) + 32 = 68^{\circ}\text{F}$$

6.4 Known sources of supply.

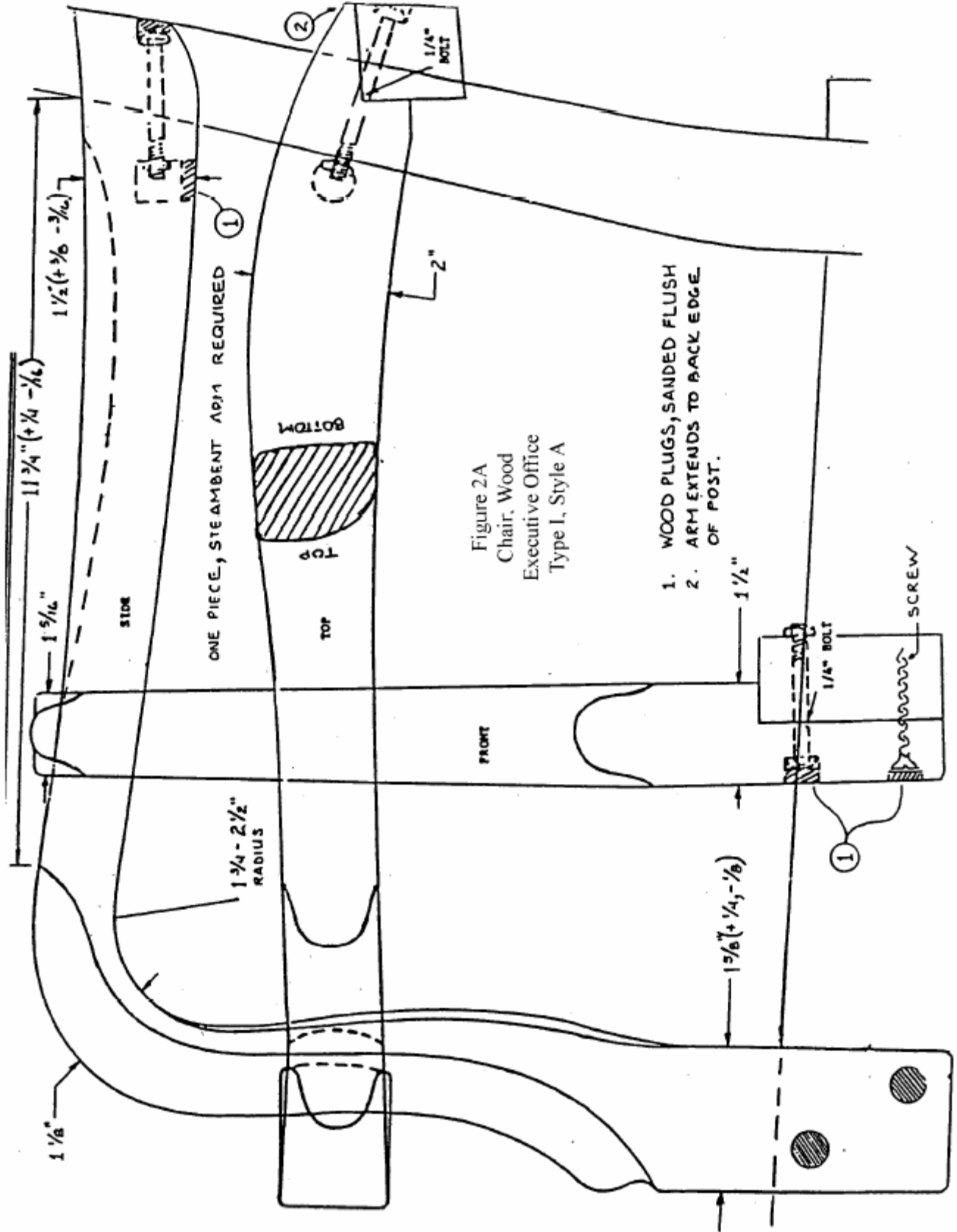
Sheet webbing: Ultra Flex or equal.

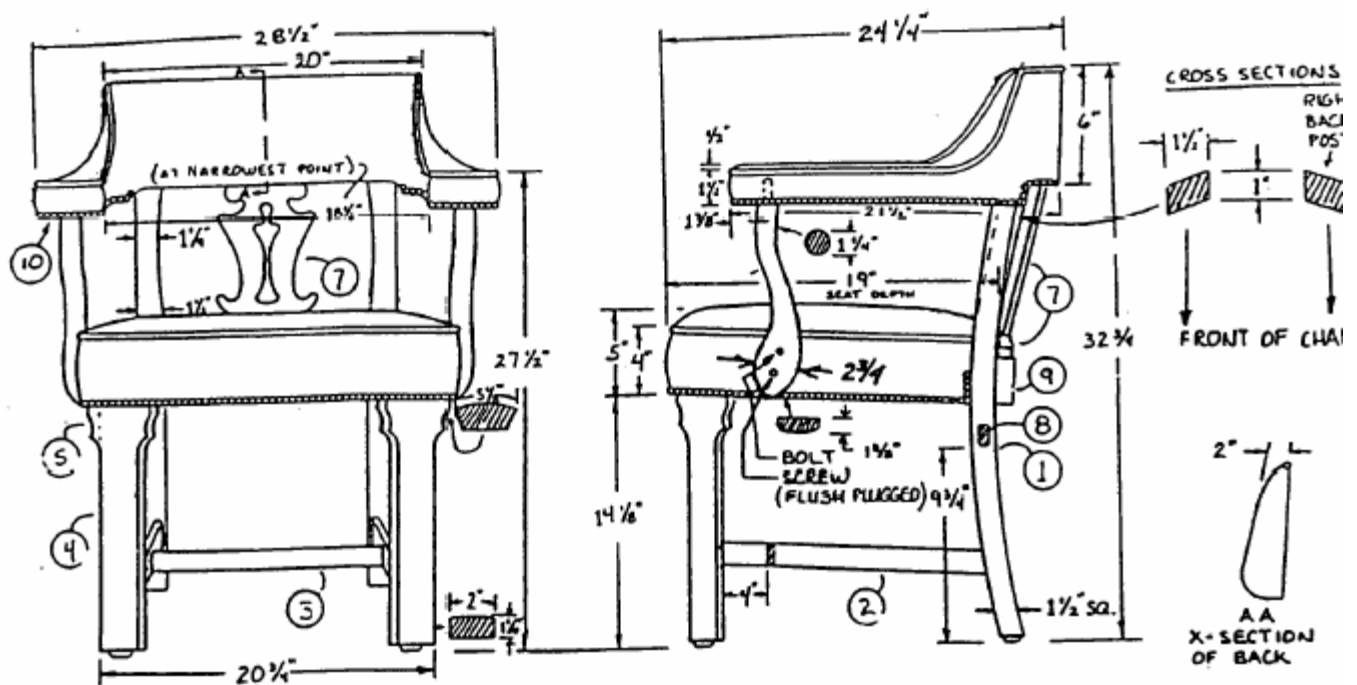
3.3.4 Jury (stationary) base. Collier-Keyworth, model no. 515 or equal.

3.3.6 Back height adjusting mechanism. International Mechanical Instruments, Model no. 4821 or equal.

3.3.7 Arm adjustment mechanism. International Mechanical Instruments, Model no. A031-96 or equal.

Drawings of each type of chair (Figures 1-11) are incorporated by reference into this purchase description.





NOTES:

1. BACK POST, RADIUS EXPOSED EDGES
2. SIDE STRETCHERS 11/16 x 1-3/16"W, MIN. 1/16" RADIUS ON ALL EDGES
3. CROSS STRETCHER 11/16 x 1-1/4"W, MIN. 1/16" RADIUS ON ALL EDGES
4. FRONT LEG 1-1/4 x 2 w, RADIUS EXPOSED EDGES
5. LEG BLOCKS 1-1/2 x 2-1/2 L, CUT TO SHAPE
6. ARM STUMP, MOULDED TO SHAPE
7. BACK BANISTER AND BANISTER BLOCK (SEE FIGURE 5 DETAIL)
8. BACK CROSS STRETCHER 1-1/2 x 3/4, MIN 1/16" RADIUS ON ALL EDGES
9. EXPOSED BACK RAIL 15" R, 2-3/8 W X 1-1/4 THICK
10. BOTTOM EDGE OF ARMS SHALL BE SMOOTHLY SANDED, SEALED AND LACQUERED

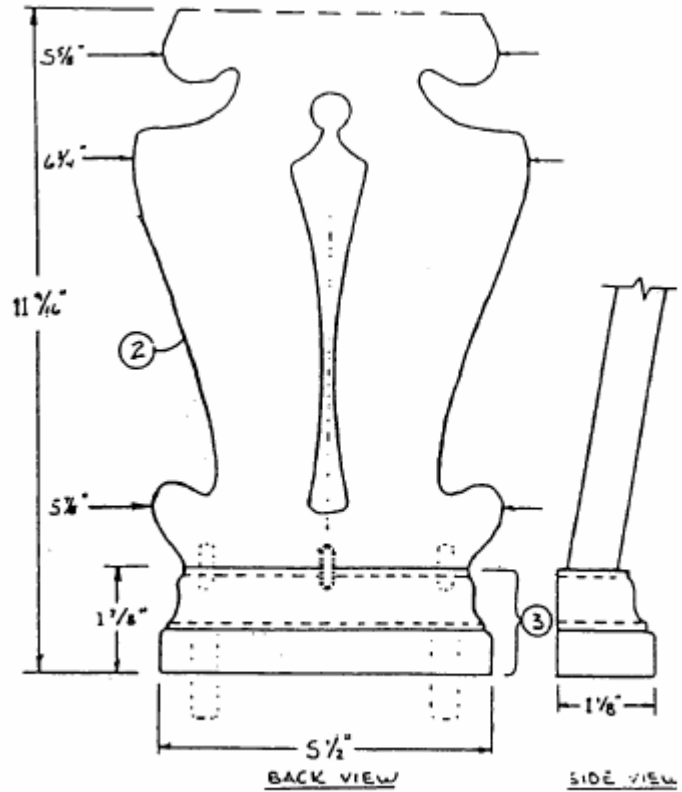
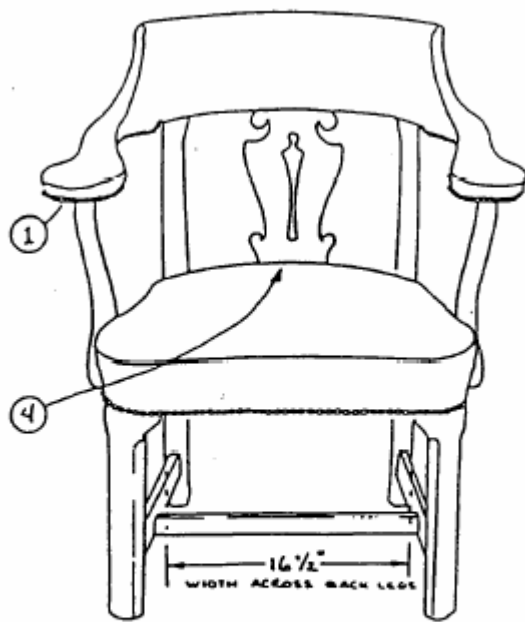
SEAT CUSHIONING:

1. SPRING SYSTEM (3.2.13)
2. EDGE ROLL, REQ'D 4 SIDES
3. WIRE REINFORCED SHEET FABRIC (3.2.10)
4. ANY COMBINATION OF FOAM (3.2.12) AND BATTING (3.2.5, 3.2.6, 3.2.7) TO ACHIEVE REQUIRED COMFORT, FIRMNESS AND APPEARANCE
5. COVER WITH SPECIFIED UPHOLSTERY MATERIAL (3.4) IN ACCORDANCE WITH 3.4.6

BACK & ARM CUSHIONING:

1. ANY COMBINATION OF FOAM (3.2.12) AND BATTING, APPLIED TO ACHIEVE REQUIRED COMFORT AND APPEARANCE

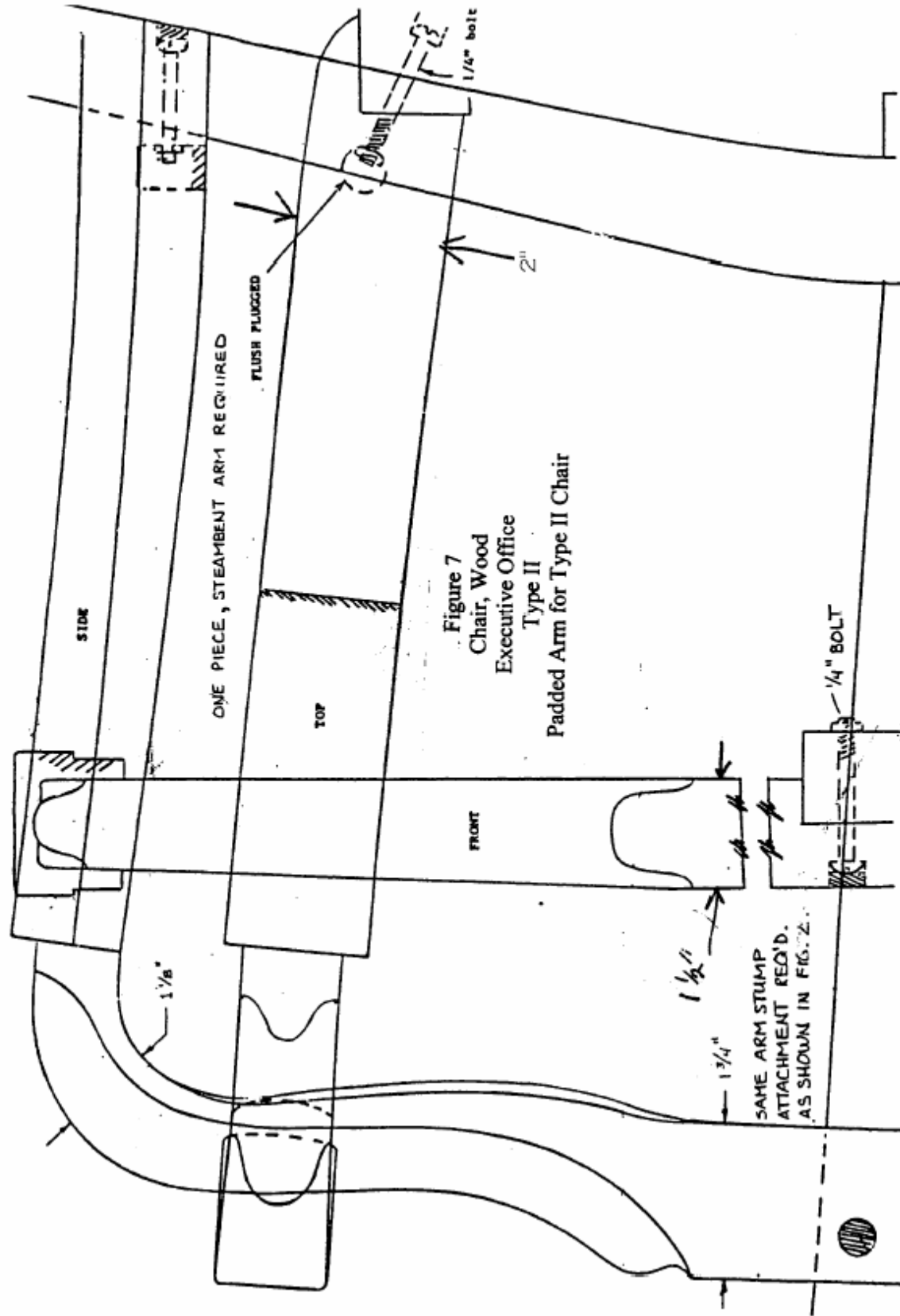
Figure 4A
Chair, Wood
Fiddle Back Chair with Arms
Type I, Style C

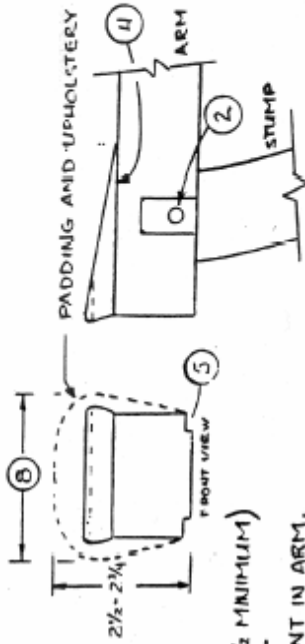


NOTES:

1. CLOSE NAILING REQUIRED WHERE SHOWN
2. BANISTER 1/2" THICK SOLID WOOD OR UNI-DIRECTIONAL LAMINATED (ALL PLYS SAME SPECIES).
3. BANISTER BLOCK, SHAPE IS TYPICAL THREE SIDES. FRONT AND BACK EDGES OF BANISTER BLOCK ARE CURVED TO CONFORM TO RADIUS OF EXPOSED BACK RAIL.
4. BACK EDGE OF SEAT CUSHION IS CURVED TO CONFORM TO RADIUS OF EXPOSED BACK RAIL.

Figure 5A
 Chair, Wood
 Executive Office
 Type I, Style C





NOTES: SECURELY GLUE ALL THE FOLLOWING JOINTS.

1. ROUND OR OVAL STUMP CROSS SECTION IS REQUIRED (1 1/2 X 1 1/2 MINIMUM). A ROUNDED SQUARE CROSS SECTION IS NOT ACCEPTABLE.

2. ARM-STUMP JOINTS. JOIN WITH CHUCK TENON ON STUMPS. PIN (NOT PIN NAIL) JOINT IN ARM.

OR
 3. MIN. 5/8" X 2 1/2" DOWELS BLIND WEDGED INTO STUMPS. PIN (NOT PIN NAIL) JOINT IN ARM. (A SCREW IS PERMITTED IN LIEU OF REQUIRED PIN.) COPE AND SECURELY GLUE AND SCREW ARM TO BACK.

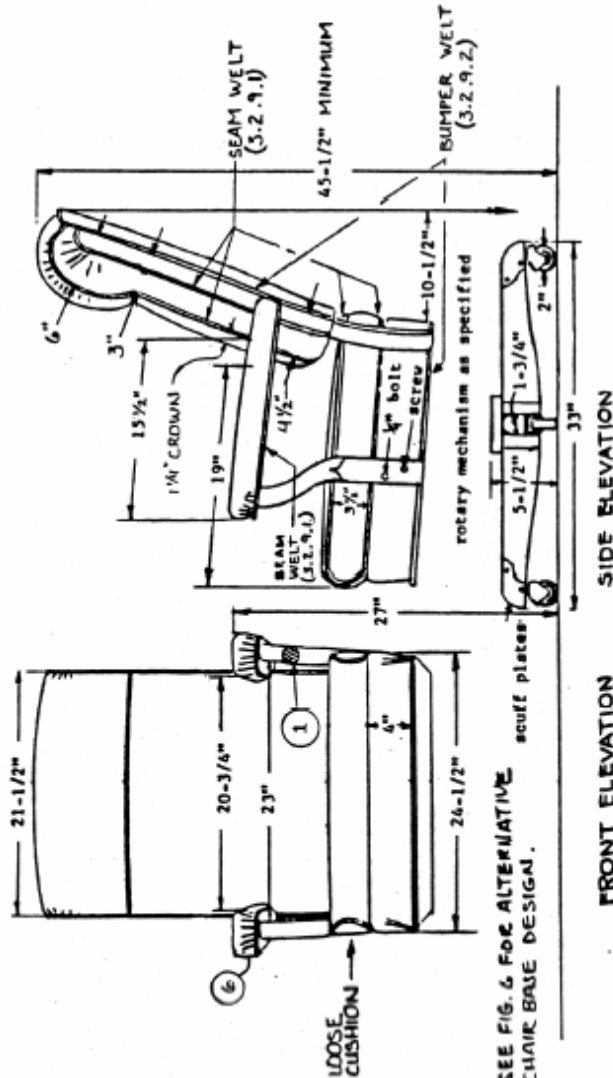
4. SECURELY GLUE A HARDWOOD WEDGE TO FRONT EDGE OF ARM TO PREVENT SAG IN ARM PADDING.

5. RABBIT BOTTOM OF ARMS FOR BUMPER WELT.

6. 7 TO 10 NEATLY FOLDED UPHOLSTERY PLEATS ARE REQUIRED ON FRONT EDGE OF ARM.

7. OUTSIDE BACK-CLOSE MAILED ON THREE EDGES AS SHOWN IN FIGURE 9.

8. 3 1/2 INCHES WIDE (UPHOLSTERED WIDTH) AT THE FRONT, TAPERING TO 2 1/2" WIDE NEAR WHERE ARM JOINS BACK.



SEE FIG. 6 FOR ALTERNATIVE CHAIR BASE DESIGN.

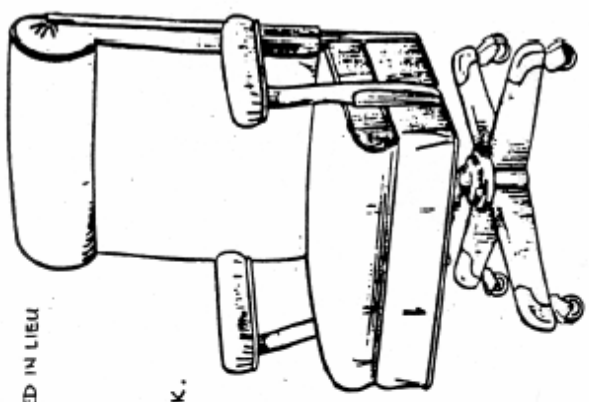
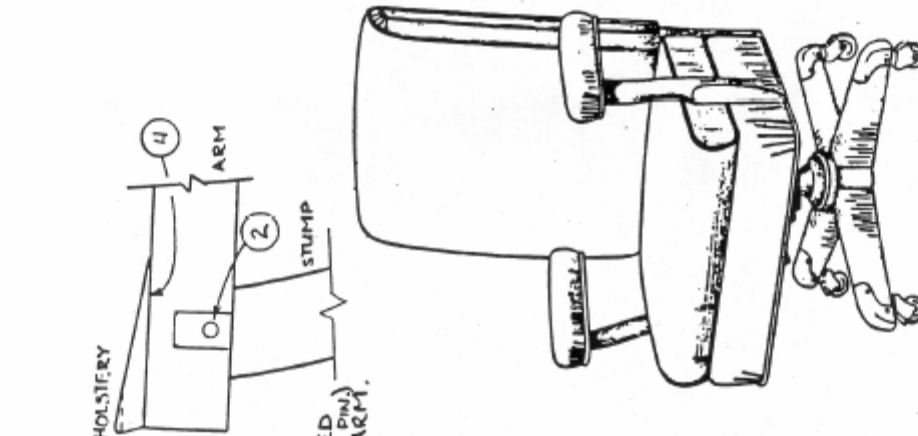


Figure 9
 Chair, Wood
 Executive Office
 Type IV, Style A
 Judges, Full Tilting, with Head Roll



NOTES:
 1. ROUND OR OVAL STUMP CROSS SECTION IS REQUIRED, (1/2 X 1 1/2 MINIMUM). A ROUNDED SQUARE CROSS SECTION IS NOT ACCEPTABLE.
 2. ARM-STUMP JOINTS JOIN WITH CHUCK TENSION ON STUMPS. GLUE AND PIN (NOT PIN NAIL) JOINT IN ARM. (A SCREW IS PERMITTED IN LIEU OF REQUIRED PIN.)
 3. MIN. 3/4" X 2 1/2" DOWELS BLIND WEDGED AND GLUED INTO STUMPS. GLUE AND PIN (NOT PIN NAIL) JOINT IN ARM.
 4. COPE, GLUE AND SCREW ARM TO BACK.
 5. RABBIT BOTTOM OF ARMS FOR BUMPER WELT.
 6. 7 TO 10 NEATLY FOLDED UPHOLSTERY PLEATS ARE REQUIRED ON FRONT EDGE OF ARM.
 7. OUTSIDE BACK - CLOSE NIBLED ON THREE EDGES AS SHOWN IN FIGURE B.
 8. 3 1/2" W (UPHOLSTERED WIDTH) AT THE FRONT, TAPERING TO 2 1/2" W NEAR WHERE ARM JOINS BACK.

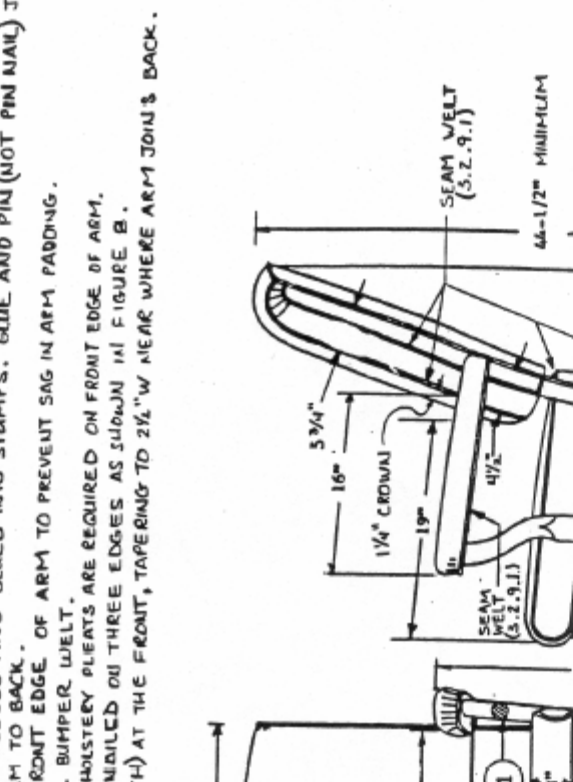


Figure 10
 Chair, Wood
 Executive Office
 Type IV, Style B
 Judges, Full Tilting, without Head Roll

SEE FIG. 6 FOR ALTERNATIVE CHAIR BASE DESIGN.

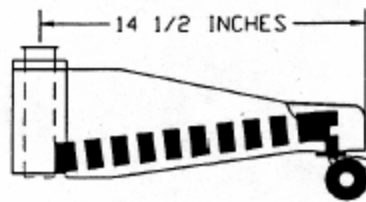
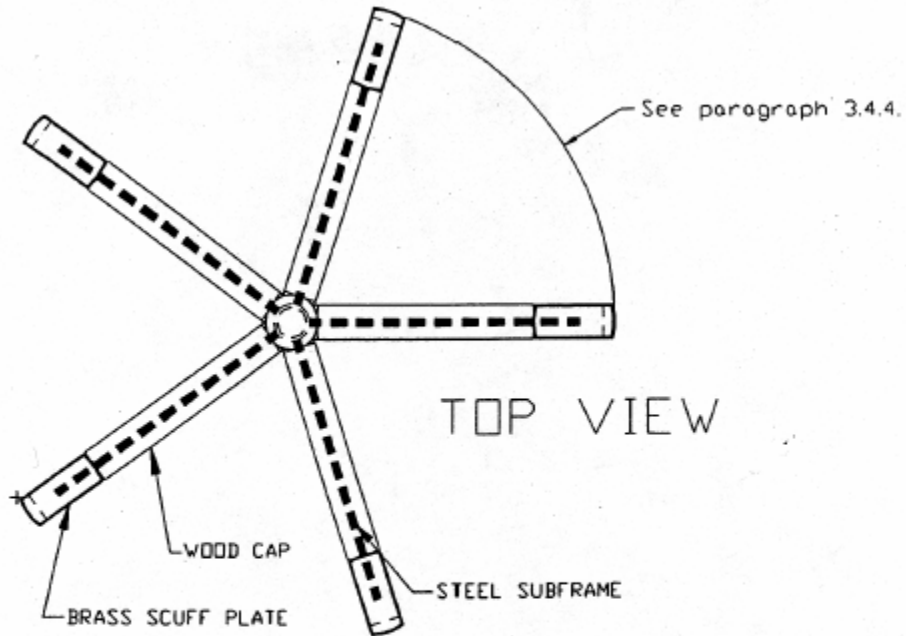
Features:

- Pneumatic height adjustment
- Adjustable height back
- Locking seat tilt which locks seat in any position throughout range
- Seat tilt tension adjustment
- Back tilt adjustment
- Front tilt stop lever
- 360 degree swivel
- Telescoping cylinder shroud

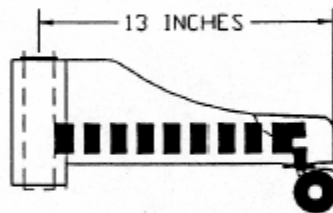


Width	Depth	Overall Height (At lowest position)	Seat Depth
21 inches	23 inches	34 inches	20 inches

Figure 11A
Type V – Rotary, Ergonomic Task Chair Without Arms



SIDE VIEW OF LEG
FOR TYPE II, III, AND IV CHAIRS



SIDE VIEW OF LEG
FOR TYPE V CHAIRS

Figure 12
Five Star Base