

**SPECIFICATION
FOR
SEATING, AUDITORIUM**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification is intended to cover auditorium seating assembled in rows with a common arm between the seats with standards attached to the floor or risers. It is not intended to cover the wide variety of nonmovable classroom and assembly room furniture commercially available.

I. CLASSIFICATION

Auditorium seating covered by this specification shall be classified in the following types, styles and classes:

TYPE I - Floor Mounted

Style A - Upholstered seat and back

Class 1 - Upholstered spring seat and upholstered back

Class 2 - Upholstered padded (foam) seat and upholstered back

Style B - Upholstered or plywood seat and plywood back

Class 1 - Upholstered spring seat and plywood back

Class 2 - Upholstered padded (foam) seat and plywood back

Class 3 - Plywood seat and plywood back

Style C - Upholstered or plastic seat and plastic back

Class 1 - Upholstered spring seat and plastic back

Class 2 - Upholstered padded (foam) seat and plastic back

Class 3 - Plastic seat and plastic back

TYPE II - Riser Mounted

Styles and classes same as for Type I

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bids shall form a part of this specification:

NEMA LD-3 - High Pressure Decorative Laminates
National Electrical Manufacturer's Association (NEMA)
155 East 44th Street
New York, NY 10017

North Carolina State Building Code
Volume V - Fire Prevention
Appendix B - Upholstered Furniture
North Carolina Building Code Council
and
North Carolina Department of Insurance
P.O. Box 2638
Raleigh, North Carolina 27611

Technical Information Bulletin 116
Technical Information Bulletin 117
State of California
Department of Consumer Affairs
Bureau of Home Furnishing
3485 Orange Grove Avenue
North Highlands, California 95660-5595

III. REQUIREMENTS

A. STANDARDS

Standards shall be constructed of grey iron casting, permanent mold aluminum castings or fabricated steel tubing either round, square or rectangular in shape. Standards material to be specified in Invitation for Bids. The entire standard structure may be enclosed in a die formed sheet steel housing.

All standards shall provide for secure attachment of arm rest, backs and seat hinges or supports as required.

End standards may be open or closed and shall be equipped for attaching decorative end panel or other enclosure when required. Aisle light, when required, shall be incorporated into the end standard in such a manner that it is protected from impact damage and all light is in a downward direction.

Intermediate standards may be open or closed panel type and shall be so constructed as to allow installation on a minimum 25' (7.6 mm) radius.

Type I, floor mounted standards, shall be provided with a mounting foot applied so as to fit the slope of the floor when required with holes provided for anchoring to the floor.

Type II, riser mounted standards, shall be so constructed that the bottom of the standard

terminates on a vertical mounting plate. This mounting plate shall be of adequate strength to support the weight and stress of the seating and be provided with sufficient holes for mounting securely to the riser.

B. SEAT HINGES

Hinges shall be self-compensating for radius installation, self-aligning and shall be self-folding to minimum 3/4 position and manual fold to full fold position. Class 3 seats may be manual fold, if permitted by building code. Two hinges for each seat shall operate on maintenance free oil impregnated metal, nylon, or ball bearings. Cushioned up and down stops shall be provided for quiet operation.

C. SEAT

Upholstered seats shall be of two piece construction and consist of a removable upholstered cushion and a seat foundation. The cushion shall be as described below. Padding shall be contoured molded polyurethane foam and meeting seating density requirements (See Section VI.D, Flammability Requirements).

Class 2 seats shall have padding as described above, minimum 2 1/2" (63 mm) thick at thickest part applied over a seat panel of 7/16" (11.0 mm) 5-ply plywood or 3/4" (19.0 mm) thick high density particleboard. The cushion shall be upholstered with a durable grade of upholstery fabric neatly tailored inside panel design and attached in acceptable manner to the bottom of the seat panel. Seat covers may be applied by a hemmed in drawstring or other quick attachment method in order that seat cover replacement may be accomplished quickly and easily.

Class 1 cushions shall be composed of a foundation of sinuous arc or coil springs mounted to a steel frame with proper bracing to support the springs. Attaching clips for sinuous springs shall be padded and permanently lubricated to give free and quiet spring action. Coil springs shall be preformed units anchored to seat frame so as to provide quiet spring action. Springs shall have insulator of burlap or other suitable material and padded with foam as described above, minimum 1 1/2" (38.0mm) in thickest part. Number of springs shall be as required to provide a comfortable spring action seat.

The bottom of the seat, except Class 3, shall be covered with a plastic or metal foundation to conceal hinges, rising spring(s), and edges of upholstery. Seat pan shall be formed so as to be smooth, with edges rolled or edged with a vinyl or other durable composition edging permanently applied to present a smooth termination that eliminates any scratching or snagging hazard.

Seats for Class 3 seating shall be of contour molded plywood or plastic to form a comfortable seat. Plywood shall be maple, birch or other similar species approved by the Standards Section, Division of Purchase and Contract. It shall be minimum 5-ply, 7/16" (11 mm) thick. All plies shall be free from defects that would affect the structural or visual integrity of the finished seat. Edges shall be shaped and sanded to eliminate any sharp edges.

Plastic seats for Style C seating shall be of solid formed or laminated melamine or other acceptable plastic or double wall blow molded linear polyethylene. Color shall be incorporated into the plastic so as to make it permanent. Surface may be textured for pleasing appearance, but there shall be no deep grooves or crevices that would catch and hold dirt.

Seat widths shall be as specified or as required for row length and curvature. Widths shall be specified on seating layout plan.

D. UPHOLSTERY FABRICS

Upholstery fabrics shall be of a type suitable for heavy duty use, and shall be similar in durability to 32 oz/sq. yd. fabric reinforced vinyl (See Section VI.E.F., Flammability Requirements). Fabric type and color to be specified in Invitation for Bids.

E. BACKS

Upholstered backs shall consist of an upholstered inner panel with wraparound metal or plastic shelf and a rear exterior panel having a return flange or cuff. Inner panel shall be formed of minimum 20 U.S. gauge steel into a compound curved shape reinforced with minimum 12 U.S. gauge steel reinforcing plate welded along each side or shall be formed of a minimum of 7/16" (11.2 mm) thick plywood into a laterally curved shape. A minimum 1 1/2" (38.0 mm) polyurethane foam pad shall be cemented to inner panel. Back assembly shall be covered with upholstery cover which shall be cemented to the exterior of the inner panel. The outer panel shall be a molded plywood, plastic or metal back covering the rear top and sides of the back and extended below seat level sufficient distance to properly protect the upholstery of folded seat from feet of occupant of seat behind. Plastic, when used shall be high impact resistant with textured surface to provide pleasing appearance. Plywood shall be minimum 1/4" (6.3 mm) thick and as described under seats above. The rear contour shall provide comfort and maximum space savings. Back type to be specified in Invitation for Bids.

Plywood back for Style B shall be as described for Class 3 seats, minimum 3/8" (9.5 mm) thick.

Plastic back for Style C shall be as described for Style C seats under Section III.C. above.

F. ARM RESTS

Arm rests may be upholstered or plain as specified. Upholstered arm rests shall have minimum 1/4" (6.0 mm) foam padding under upholstery cover applied over wood or other suitable forms. Plain arm rests shall be wood or plywood or maple or birch or other approved wood or molded plastic as specified in the Invitation for Bids. Color shall match other wood parts or be compatible with other chair decor. Top surface may be plastic laminate to match tablet arm or decorative panels on standards.

G. TABLET ARMS

Tablet arms when specified for Type I shall be of minimum 5/8" (15.9 mm) 5-ply lumber core or 5-ply plywood or flakeboard core, 45 lb/cu. ft. (720 Kg/cu.m) density with NEMA approved high pressure plastic laminate writing surface with plastic balancing backing sheet. Edges shall be either rounded and filled to give smooth surface and finished or have vinyl "T" or "bull nose" molding applied securely. Finish color shall be compatible with chair decor. Tablet arms shall be mounted on a durable and easy working hinge that allows the writing arm to be folded and stored in an out of the way position between the seats when not in use and raised to writing position when needed. Must comply with building code.

H. NUMBER PLATES

When specified, number plates shall be provided. The design and location to be specified in the Invitation for Bids. Numbering sequence shall be specified by the owner.

I. WORKMANSHIP

All seating shall exhibit good workmanship in all respects. All edges shall be deburred and eased so as to present no safety hazard to persons or clothing. Attachments and joinings shall be secure and neatly accomplished. Upholstery shall be smooth and seams straight and neat. Any construction details not specifically covered shall be by manufacturer's standard manufacture and performed in accordance with good industry practice.

J. FINISH

All metal parts shall be properly cleaned and given a phosphatizing treatment before painting. Baked enamel finish shall be applied with all surfaces thoroughly coated and exposed surfaces smooth and free of any graininess. Wood parts shall be smoothly sanded, with stain applied as may be required, sealed and topcoat applied that is highly resistant to abrasion, scuffing and staining.

K. INSTALLATION

A layout plan shall be submitted to the owner for approval. Such layout shall have been prepared by exact measurements made by the bidder. Such layout shall conform to all local codes regarding aisle widths and row spacing, etc. Installation shall be in accord with approved layout and shall be accomplished in a proper workmanship manner. Assembly of units shall be neat and secure. Mounting to concrete floor shall be by 1/4" (6.3 mm) and to risers by 3/8" (9.5 mm) expansion bolts or drive anchors or other secure fastening device affording secure and lasting attachment. The job shall be left free of debris and all chairs completely ready for use.

L. OPTIONS

1. Tablet arm
2. Aisle lights
3. Number plates (Design and location to be specified in IFB)
4. Open or closed standards
5. Material for standards (grey iron casting, cast aluminum or fabricated steel)

IV. WARRANTY

The contractor warrants to the owner that all auditorium seating furnished under this specification will be new and shall be guaranteed against defects in materials, workmanship, and performance in accordance with the manufacturer's standard warranty, except that in no event shall such coverage be for less than one (1) year for parts, labor, travel, etc. Warranty coverage shall begin on the date of acceptance by the ordering agency. Warranty service shall be available on site at any location within the state of North Carolina, and defective units shall be repaired or replaced

during the warranty period at no cost to the owner or his/her representative.

V. SERVICE, PARTS, AND MANUALS

This section is not applicable to this specification.

VI. ACCEPTANCE INSPECTION AND TESTING

The chairs shall be capable of meeting the following tests. Certified test results from an independent testing facility may be required.

A. VERTICAL DROP IMPACT TEST

A 10" (254 mm) diameter 40 pound (18 Kg) sandbag shall be dropped on the seat of the middle chair of a unit of three chairs assembled and mounted to the floor. The center of the impact shall be 7" (177.8 mm) from the front edge of the seat. The rate of impact shall be approximately 18 per minute. The initial seat height measurement shall be made after 100 impacts.

The following impacts shall not lower the front edge of the seat height more than 3/4" (19.0 mm) from the initial height.

- 25,000 impacts from a height of 6" (152 mm)
- 25,000 impacts from a height of 8" (203 mm)
- 25,000 impacts from a height of 10" (254 mm)
- 25,000 impacts from a height of 12" (304 mm)

B. SWINGING IMPACT TEST

For this test the three chair unit shall be rearranged so that no parts of the previously tested center chair shall be a part of the center chair. The center chair back shall be impacted by two 40 pound (18 Kg) 10" (254 mm) diameter by 28" (711 mm) high sandbags. Bags shall be pivotally hung on 13" (330 mm) centers below a reciprocating bar moving in a horizontal plane at approximately 35 cycles per minute with bags traveling in a vertical plane and impacting the chair back 10" (254 mm) below top of chair back.

The following number of impacts shall not cause failure of the standards or any other conditions that would impair the usefulness of the chair.

- 30,000 impacts through a distance of 4" (101 mm)
- 20,000 impacts through a distance of 6" (152 mm)
- 10,000 impacts through a distance of 8" (203 mm)

C. OSCILLATING TEST

One of the upholstered seats in the set of three not previously used for a test shall be used. Two hardwood rollers shall be dually attached to the end of an actuation bar. The action shall be such that the rollers contact the seat approximately 5 1/2" (140 mm) from the rear edge and push it down against the down stop and then release it so that it folds against the up stop immediately at approximately 20 cycles per minute. The seat shall be still operating as designed without adjustment after 125,000 cycles. Not applicable on Class 3 chairs without self-folding seat.

D. LATERAL STRENGTH TEST

A single chair shall be assembled and mounted to the floor. Attach a loading device so that the load can be applied at the most forward point of the arm rest area. Apply a load of 100 pounds (45 Kg) horizontally and in a side-to-side line with the chair. Apply the load once in opposite directions on each arm. Each time the load is to be applied for a minimum of one minute and maintained until deflection is stabilized. The chair shall be capable of withstanding the 100 pound load without structural failure or permanent deflection that will in any way effect serviceability.

E. FLAMMABILITY REQUIREMENTS

Upholstery fabrics and cushioning materials shall meet all applicable requirements of North Carolina Building Code, Volume V - Fire Prevention, Appendix B, for Upholstered Furniture and all requirements of California Technical Bulletins 116, 117.

VII. ORDERING DATA

Purchasers should exercise any desired option offered herein and should specify the following in the Requisition and the Invitation for Bids:

1. Title, number, and date of this specification
2. Type, style, and class of seating
3. Radius or straight rows (furnish seating plan if possible)
4. Upholstery fabric if applicable
5. Type, style, material, and color of armrest.
6. Type, style, material, and color of decorative panels used in end standards
7. Type outer back required
8. Options in Section III.L.
9. Additional flammability requirements in applications without automatic sprinkler systems