

\*\*\*\*\*  
USACE / NAVFAC / AFCEA UFGS-12610 (November 2003)  
-----  
Preparing Activity: USACE Superseding  
UFGS-12610 (October 2003)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

Latest change indicated by CHG tags

\*\*\*\*\*

SECTION TABLE OF CONTENTS

DIVISION 12 - FURNISHINGS

SECTION 12610

FIXED SEATING

11/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 WARRANTY

PART 2 PRODUCTS

- 2.1 MATERIALS
  - 2.1.1 Artificial Leather Upholstery
  - 2.1.2 Woven Fabric Upholstery
  - 2.1.3 Polyurethane Foam
  - 2.1.4 Plywood
  - 2.1.5 Laminated Plastic Sheets
  - 2.1.6 Molded Plastic
- 2.2 SEATING SYSTEM
  - 2.2.1 Backs
    - 2.2.1.1 Steel Panels
    - 2.2.1.2 Plastic Panels
    - 2.2.1.3 Wood Front Panels
    - 2.2.1.4 Foam Padding
  - 2.2.2 Seats
    - 2.2.2.1 Steel Seat Units
    - 2.2.2.2 Plywood Seat Units
  - 2.2.3 Hinges
  - 2.2.4 Standards
    - 2.2.4.1 Floor Standards
    - 2.2.4.2 Riser Standards
    - 2.2.4.3 Cantilevered Standards
    - 2.2.4.4 Aisle and End Standards
  - 2.2.5 Armrests
  - 2.2.6 Tablet Arm
  - 2.2.7 Metal Plates

- 2.2.8 Electronic Audio Response Control
- 2.2.9 Aisle Lighting
- 2.2.10 Electrical Work
- 2.3 COLOR

PART 3 EXECUTION

- 3.1 PLACEMENT OF STANDARDS
- 3.2 INSTALLATION

-- End of Section Table of Contents --

\*\*\*\*\*  
USACE / NAVFAC / AFCESA UFGS-12610 (November 2003)  
-----  
Preparing Activity: USACE Superseding  
UFGS-12610 (October 2003)

## UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

Latest change indicated by CHG tags

\*\*\*\*\*

### SECTION 12610

#### FIXED SEATING 11/03

\*\*\*\*\*

NOTE: This guide specification covers the requirements for upholstered fixed seating.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

\*\*\*\*\*

## PART 1 GENERAL

\*\*\*\*\*

NOTE: On the drawings, show: (1) Seating layout including row length and locations for wheelchair seating as required by Architectural & Transportation Barriers Compliance Board, "ADA Title III, Americans with Disabilities Act - Buildings and Facilities"; (2) Color and pattern for outer covering upholstery materials; and (3) Row and seat number identification.

\*\*\*\*\*

## 1.1 REFERENCES

\*\*\*\*\*

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest guide specification. Use of

SpecsIntact automated reference checking is recommended for projects based on older guide specifications.

\*\*\*\*\*

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 3597 (2002) Woven Upholstery Fabrics-Plain, Tufted, or Flocked

ASTM D 3690 (2002) Vinyl-Coated and Urethane-Coated Upholstery Fabrics-Indoor

HARDWOOD PLYWOOD AND VENEER ASSOCIATION (HPVA)

HPVA HP-1 (2000) American National Standard for Hardwood and Decorative Plywood

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (2000) High-Pressure Decorative Laminates

1.2 SUBMITTALS

\*\*\*\*\*

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy projects.

Submittal items not designated with a "G" are considered as being for information only for Army

**projects and for Contractor Quality Control approval  
for Navy projects.**

\*\*\*\*\*

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

**SD-02 Shop Drawings**

Placement of Standards[; G][; G, [\_\_\_\_]]  
Installation[; G][; G, [\_\_\_\_]]

Drawings indicating metal thickness, fastenings, details of hinge mechanism, seat and back dimensions, proposed finish, and including seating plans showing row spacing, row lengths, the varying lateral spacing at backs and seats, back pitch, and seat widths for the various section lengths, floor pitch, and riser height, where applicable.

**SD-03 Product Data**

Seating System[; G][; G, [\_\_\_\_]]

Manufacturer's descriptive data, catalog cuts, and installation instructions.

**SD-04 Samples**

Seating System[; G][; G, [\_\_\_\_]]

Samples of upholstery, plywood, laminate, paint, and plastic finish materials and one complete chair. Fabric samples shall be of sufficient size to show color range, pattern, and finish. Chair sample may be incorporated into the installation, provided it is identified and the location noted.

**1.3 DELIVERY AND STORAGE**

Components shall be delivered to the site in unopened containers clearly labeled with the manufacturer's name and container contents. Materials shall be stored in a safe, dry, and clean location. Handling of items shall be in a manner that will protect the materials from damage.

**1.4 WARRANTY**

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

Recyclable materials (seat padding, plastics, etc.) shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

### 2.1.1 Artificial Leather Upholstery

Artificial leather shall conform to ASTM D 3690, Class [A, heavy duty] [B, medium duty].

### 2.1.2 Woven Fabric Upholstery

Woven fabric shall conform to ASTM D 3597, except that it shall be [100 percent flat nylon homespun weave] [or] [\_\_\_\_\_]. Fabric shall be treated to resist staining and soiling.

### 2.1.3 Polyurethane Foam

Polyurethane foam shall be high density, fire retardant, nonhardening and nonoxidizing and shall have a high resistance to alkalis, oils, grease, soaps, abrasions, moisture, mildew, and tearing.

### 2.1.4 Plywood

Plywood shall conform to HPVA HP-1. Face veneers for exposed surfaces shall be of Grade A [birch] [hard maple] [walnut]. Unexposed veneers shall be sound grade hardwood or Grade A fir. All face veneers shall be not more than 1.6 mm 1/16 inch in thickness, of clear stock, and free from imperfections.

### 2.1.5 Laminated Plastic Sheets

Laminated plastic sheets shall conform to NEMA LD 3, Type 1, Grade GP 50, nominal thickness 1.27 mm 0.050 inch.

### 2.1.6 Molded Plastic

Molded plastic shall be high density with a minimum tensile strength of 23 MPa 3300 psi. Material shall be capable of withstanding outdoor temperatures ranging from plus 80 degrees to minus 45 degrees C 175 degrees to minus 50 degrees F. Pigments used shall be of such quality to eliminate painting plastic parts. Component surfaces shall have a textured finish.

## 2.2 SEATING SYSTEM

Components and assembly shall be free from objectionable projections or irregularities. Corners and edges shall be smooth and rounded. Bolts, nuts, and other fastenings shall be capped. Steel shall be well-formed to shape and size required. Jointing of members shall be welded, riveted, or interlocked. Exposed welds shall be ground and dressed smooth. Casting shall be fine textured, sound, and free of pits, blow holes, and fins. Lines shall be true, accurate, and true-to-pattern with excess metal or imperfections removed. Fastening shall be concealed where possible.

### 2.2.1 Backs

\*\*\*\*\*  
**NOTE: This paragraph provides for backs of upholstered front panel and a steel or plastic rear panel. The option of a steel or plastic rear panel should remain since few manufacturers produce a back with a steel rear panel. Other types of backs such as fully upholstered may be substituted as**

appropriate.

\*\*\*\*\*

Back assembly shall consist of an [upholstered] [exposed] steel, plastic or plywood rear panel with an upholstered steel or plywood front panel. Back assembly length shall be between 500 and 700 mm 20 and 27-1/2 inches for a total height of 725 to 950 mm 29 to 38 inches above the floor measured parallel to the back. Rear panel shall completely conceal and protect the rest of the seat assembly when in the raised position. Back shall be [fixed] [rocker] type.

#### 2.2.1.1 Steel Panels

Steel panels shall be fabricated from not less than 1 mm (20 gauge) 20 gauge, compound-curved, die-formed steel. The perimeter of the front upholstered panel shall be hemmed.

#### 2.2.1.2 Plastic Panels

Plastic rear panels shall be one-piece injection molded plastic or high pressure laminated plastic adhered to hardboard or plywood. Color and texture of plastic panels shall be as selected.

#### 2.2.1.3 Wood Front Panels

Plywood upholstered front panels shall be fabricated from cross-banded plywood of not less than 3 ply, 9.5 mm 3/8 inch thick hardwood veneers.

#### 2.2.1.4 Foam Padding

\*\*\*\*\*

**NOTE: Specify polyurethane foam thickness of 32, 38, 50, 75, or 100 mm (1-1/4, 1-1/2, 2, 3, or 4 inches) depending on comfort desired.**

\*\*\*\*\*

Polyurethane foam shall be high density, fire retardant and shall be not less than approximately [\_\_\_\_\_] mm inches in thickness and shall be securely attached to the steel or plywood panel and completely covered with the approved upholstery material.

#### 2.2.2 Seats

Foundation for upholstered seats shall be formed of not less than 1 mm (20 gauge) 20 gauge [upholstered] [exposed] steel or electronically glued hardwood plywood. The seat foundation shall be free from visible screws, bolts, open holes, and projections on the bottom, front, and sides. [The front edge of each seat shall be embossed to receive a number plate.] The upholstered seat unit shall be easily removable without removing the foundation unit; and the covering shall be fastened to the frame in a manner that will permit easy reupholstering.

##### 2.2.2.1 Steel Seat Units

Upholstered steel seat unit shall be coil-spring type construction or nonsag spring-type construction. Springs shall be attached to a die-formed steel framework. Coil-spring units shall contain no less than 16 coil springs. Springs shall be connected in both directions to control spring axial depression. Nonsag spring units shall contain at least five

serpentine design springs suspended under tension; cross bracing, if required, shall be welded to frame so as not to interfere with spring action. Cushions shall be polyurethane foam cemented to burlap sheeting; shall have a minimum thickness of 44 mm 1-3/4 inches throughout for coil-spring type construction, and 75 mm 3 inches at front edge, 44 mm 1-3/4 inches at rear edge, and 25 mm 1 inch throughout the other portions for nonsag spring units. Panel side covers shall be made without welts. Top and front cover shall have size boxing of fabric upholstery material.

#### 2.2.2.2 Plywood Seat Units

Upholstered plywood seat unit shall be minimum 19 mm 3/4 inch thick, 7-ply, electronically-glued hardwood plywood with minimum of four 1/4-20 threaded inserts for attachment of seat hinges. Cushion material shall be high-density fire-retardant polyurethane foam, minimum 89 mm 3-1/2 inches thick, cored for comfort. Outside of seat bottom shall be fully encapsulated in 6 mm 1/4 inch slab polyurethane foam. Padding materials shall be fully glued to plywood panels with contact cement.

#### 2.2.3 Hinges

\*\*\*\*\*  
**NOTE: Push-back mechanisms provide more aisle space when the seats are not occupied. Normally, this type of accessory is used only when appearance and convenience is of prime importance, and would not be used in auditoriums.**  
\*\*\*\*\*

Hinges shall be a counterweight mechanism using gravity to return to the upright position or of the full compensating type, completely enclosed, totally independent, free and easy in operation, and capable of compensating for circular installation, variation in installation conditions, and unevenness of floors. [Hinge mechanism shall be of the push-back type to allow additional aisle space while in an open position.] Each hinge shall have a noiseless, self-rising seat device, shall rise automatically to a uniform safety position of 3/4 fold at all times, and shall fold 100 percent when additional pressure is applied, to provide additional clearance. The hinges shall have oil-impregnated, self-lubricating, metal or brass alloy bearings that will not require further lubrication, or nylon bushings. Hinges shall have a spring tension adjustment mechanism to allow manual compensation for normal wear and fatigue.

#### 2.2.4 Standards

##### 2.2.4.1 Floor Standards

\*\*\*\*\*  
**NOTE: Few manufacturers use cast iron standards compared to those using steel risers; standards should not be specified without options.**  
\*\*\*\*\*

Floor standards shall be tublar steel, sheet steel, or cast iron. The standards shall be formed to fit the floor incline so that the standards will be vertical and the hinge point will be at a height that will maintain proper relation of seat to floor. The feet shall be formed to eliminate tripping hazards and shall have holes for bolt attachment to the floor.

#### 2.2.4.2 Riser Standards

Riser standards shall meet the requirements for floor mounted standard, except the standard shall be formed to approach the riser face at an angle to allow maximum clearance. Riser attachment shall be made through a 6 mm 1/4 inch steel plate welded to the standard or on an integrally cast foundation.

#### 2.2.4.3 Cantilevered Standards

The assembly shall be of not less than 3.1 mm 11 gauge seamless tube-steel construction, designed to support three seats by the use of continuous horizontal rail and stanchions with floor plates welded thereto. Horizontal rails shall be provided in the longest practicable lengths with welded spliced ends centered on stanchions. Each length of horizontal rail shall be supported by not less than two stanchions. Stanchions shall be located at the center of every other seat, except at aisles where they shall be 300 mm 12 inches in from aisle lines. Floor plates shall be formed to floor incline so stanchions will be vertical and hinge point at a height that will maintain proper relation of seat to floor.

#### 2.2.4.4 Aisle and End Standards

Aisle or end standard panels shall be of the design indicated and shall have decorator panels of [molded plastic] [laminated plastic] [upholstered] [\_\_\_\_\_]. Middle standards shall be designed to match basic aisle or end standard configuration.

#### 2.2.5 Armrests

Armrests shall be [solid first grade [hard maple] [birch] [or] [walnut] with manufacturer's standard natural finish] [solid hardwood with poly foam and an upholstered cover] [wood with laminated plastic] [wood with cupholder] [plastic with cupholder] [\_\_\_\_\_].

#### 2.2.6 Tablet Arm

Each chair shall be equipped with a fold-away tablet arm assembly. Tablet arm shall be fabricated of manufacturer's standard core material faced with plastic laminate. All edges shall be rounded. When in a writing position, the arm shall lock firmly in place so that it cannot be accidentally disengaged. A spring actuated device shall automatically lock the folded tablet arm in position beside the seat.

#### 2.2.7 Metal Plates

Metal number and letter plates for seat and row designations shall be the manufacturer's standard brass or chromium plated brass or satin finished anodized aluminum [\_\_\_\_\_] having letters and numbers countersunk and filled in black.

#### 2.2.8 Electronic Audio Response Control

An audio response system control box shall be located where shown below the armrest panel. The control box shall be located for maximum utility. Audio response wiring shall be routed through concealed casing into floor.

### 2.2.9 Aisle Lighting

\*\*\*\*\*  
NOTE: Aisle lights normally are used only in  
theaters and forums which are used primarily with  
low level lighting intensities.  
\*\*\*\*\*

Aisle or end standard panels shall have [concealed] [surface mounted]  
[\_\_\_\_\_] aisle lights. Light wiring shall be routed through concealed  
casing into floor.

### 2.2.10 Electrical Work

Electrical materials shall conform to the requirements of Section 16402  
INTERIOR DISTRIBUTION SYSTEM.

### 2.3 COLOR

\*\*\*\*\*  
NOTE: Editing of color reference sentence(s) shall  
be coordinated with the Government. Generally the  
09915 COLOR SCHEDULE or drawing is used when the  
project is designed by an Architect or Interior  
designer. Color shall be selected from  
manufacturers standard colors or identified as a  
manufacturers color in this specification only when  
the project is very simple and has minimal finishes.

When the Government directs that color be located in  
the drawings a note shall be added that states:  
"Where color is shown as being specific to one  
manufacturer, an equivalent color by another  
manufacturer may be submitted for approval.  
Manufacturers and materials specified are not  
intended to limit the selection of equal colors from  
other manufacturers. The word "color" as used  
herein includes surface color and pattern."

Prior to specifying a custom color finish, research  
to determine if additional cost and lead time is  
feasible. Note there is often a minimum order  
requirement; this requirement will also affect  
future orders.

When a manufacturer's name, stock number, pattern,  
and color is used, be certain that the product  
conforms to this specification, as edited.

\*\*\*\*\*

Color shall be [in accordance with Section 09915 COLOR SCHEDULE.] [as  
indicated on the drawings.] [selected from manufacturers standard colors.]  
[[\_\_\_\_\_.] Color listed is not intended to limit the selection of equal  
colors from other manufacturers.]

## PART 3 EXECUTION

### 3.1 PLACEMENT OF STANDARDS

\*\*\*\*\*  
NOTE: Generally, the width of seat units should be  
525 or 550 mm with 500 mm (21 or 22 inches with 20  
inch) wide units restricted to the exit seat  
location if needed to meet specific dimension  
requirements.  
\*\*\*\*\*

The system shall permit the standards to be installed on radial lines from a common center for which concentric circles are determined with each row of units utilizing common middle standards. Standards in each row shall be placed laterally so the aisle-end standards will be in alignment as indicated on seating layout drawing. The angle of inclination of backs shall be adjusted for variations in sightlines. Mechanical attachment of components shall be of sufficient flexibility so that when permanently assembled they will compensate for the changing dimensions laterally between standards caused by convergence toward the center. Seat and back attachments shall absorb inaccuracies in lateral spacing of standards at point of attachment caused by unevenness of floor. Varying lateral dimensions of backs and seats shall be in accordance with approved seating layout. Minimum width of seating unit shall be 500 mm 20 inches and may be used only to complete a specific row dimension.

### 3.2 INSTALLATION

Installation of the seating system shall be in accordance with the seating drawings and approved installation instructions.

-- End of Section --