
USACE / NAVFAC / AFCEA UFGS-10650 (August 2004)

Preparing Activity: USACE Superseding
UFGS-10650A (December 2003)
UFGS-10652N (August 2001)
UFGS-10655N (August 2001)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

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SECTION 10650

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08/04

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SECTION 10650

OPERABLE PARTITIONS 08/04

NOTE: This guide specification covers the requirements for panel and accordion folding operable partitions.

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: Designer should require materials, products, and innovative construction methods and techniques which are environmentally sensitive, take advantage of recycling and conserve natural resources.

The following information should be shown on the drawings:

1. Location and size of partitions.
2. Direction of operation.
3. Partition supporting structure. The structural support for the partition is not part of this section; it must be indicated and specified

separately.

4. For electrically operated partitions, show power source and desired switch location.

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 A 653/A 653M | (2003) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| ASTM B 221 | (2002) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes |
| ASTM B 221M | (2002) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) |
| ASTM C 423 | (2002a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method |
| ASTM E 336 | (1997e1) Measurement of Airborne Sound Insulation in Buildings |
| ASTM E 413 | (1987; R 1999) Rating Sound Insulation |
| ASTM E 557 | (2000) Installation of Operable Partitions |
| ASTM E 84 | (2003) Surface Burning Characteristics of Building Materials |
| ASTM E 90 | (2002) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements |

CHEMICAL FABRICS & FILM ASSOCIATION (CFFA)

| | |
|--------------|---|
| CFFA-W-101-D | (2000) Vinyl Coated Fabric Wallcovering |
|--------------|---|

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 252 (2003) Fire Tests of Door Assemblies
NFPA 70 (2002) National Electrical Code
NFPA 101 (2003) Life Safety Code

UNDERWRITERS LABORATORIES (UL)

UL 10B (1997; Rev thru Oct 2001) Fire Tests of
Door Assemblies

1.2 GENERAL REQUIREMENTS

**NOTE: The designer will edit this specification for
manual or electric operation; and for operable wall
or accordion partitions as required for the project.**

The Contractor shall supply and install [manual] [and] [electric]
operation, acoustical operable partitions, factory finished, supported from
overhead track without floor guides, as shown on the drawings including all
hardware, seals, track and rollers as needed to close the specified
opening. This operable partition specification covers [wall panel] [and]
[accordion] partitions.

1.2.1 Manual Operation

The manual operation shall be accomplished with less than [89] [_____] N
[20] [_____] lbf force to start movement at the rate of 1.02 m/s 3.33 ft/s
(200 ft/min). A removable handle shall be used to extend and retract the
bottom operable seals; vertical movement of seals shall be [50] [_____] mm
[2] [_____] inches. Closure to the lead wall shall be by use of a flexible
bulb; final closing shall be accomplished by means of a lever exerting
pressure against wall.

1.2.2 Electric Operation

The pressure-sensitive leading edge shall be designed so that a [17.8]
[_____] N [4] [_____] lbf force will stop the forward motion; system shall
stop the partition movement if people or objects are in the path of the
partition when it is being extended or in the pocket area when the panels
are being stacked. Weight-sensitive floor mat in the storage pocket shall
prevent partition movement with as little as 2.3 kg 5 lbs of weight
applied. The electric control shall be wall mounted.

1.3 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.] [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

Installation[; G][; G, [____]]
Wiring Diagrams[; G][; G, [____]]
Layouts[; G][; G, [____]]

Drawings containing complete schematic diagrams and details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show dimensions and weight of stacked partition; layout of the work, track and jamb fastening methods; seal details and installation details; proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation. [Submit wiring diagram and installation details for electrical operator.]

SD-03 Product Data

Operable Partitions[; G][; G, [____]]

Manufacturer's descriptive data, performance charts, catalog cuts, and installation instructions for framework, suspension system, covering, accessories, and electrical operators.

SD-04 Samples

Operable Partitions[; G][; G, [_____]]

[Three] [_____] Color samples of specified surfaces and finishes to match those specified. Finish and color requirements shall not be limited to manufacturer's standard selections in order to meet these requirements.

SD-06 Test Reports

Acoustical Test[; G][; G, [_____]]

Flame and Smoke Development Tests[; G][; G, [_____]]

Reports on laboratory acoustical requirements and acoustical test. Reports on flame and smoke development tests.

SD-07 Certificates

Materials[; G][; G, [_____]]

Operable Partitions[; G][; G, [_____]]

Certificate attesting that the materials meet the requirements specified and that partitions have specified acoustical and flame retardant properties, as determined by test.

SD-10 Operation and Maintenance Data

Operable Partitions

Data Package 1 for wall panel and accordion partitions, and Data Package 5 for electrical operators in accordance with Section 01781 OPERATION AND MAINTENANCE DATA. Six complete copies of operating instructions outlining the procedures required for electrically operated partitions. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and operating features. Data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of the parts recommended by the manufacturer to be replaced after 1 year and 3 years of service. Six complete copies of maintenance instructions explaining routine maintenance procedures including inspection, adjustments, lubrication, and cleaning. The instructions shall list possible breakdown, methods of repair, and a troubleshooting guide. The instructions shall include equipment layout and simplified wiring and control diagrams of the system as installed.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the jobsite in the manufacturer's original, unopened, and undamaged packages with labels legible and intact. Provide labels to indicate the manufacturer, brand name, size, finish, and placement location. Store partitions and accessories in unopened packages in a manner that will prevent damage. Handle partition materials in accordance with manufacturer's instructions. Materials shall be protected from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend

beyond a 1 year period shall be provided. In addition, the pantographs, trolleys and tracks shall be guaranteed for 10 years from date of acceptance for beneficial use.

PART 2 PRODUCTS

2.1 MATERIALS

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 year prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Provide heavy-duty type hardware standard with the manufacturer. Provide pulls and latches for all partitions. Provide partitions with [keyed locks] [privacy latches] [magnetic contact latches] [foot bolts]. Hardware shall be [anodized aluminum [clear] [bronze]] [chrome plated] [brass plated metal] [painted] finish.

2.2 OPERABLE WALL PANEL PARTITIONS

Operable wall panel partitions shall consist of top hung ball bearing carriers which support modular panels.

a. Provide partitions made up of a series of rigid panels, each panel being a one-piece assembly. Unless otherwise specified, the wall shall comprise the least number of panels. The mechanical seal of the panel shall actuate with a single operating action.

b. Provide panels [paired] [single] [center stacked] [omni-directional] [continuously hinged] type as indicated.

2.2.1 Panels

NOTE: Steel skin should be a minimum of 0.6 mm (24 gage) for 1200 mm (48 inch) panels, and 0.8 mm (22 gage) for 1500 mm (60 inches) panels.

Provide panels of [steel skin,] [reinforced aluminum,] [particleboard,] [tackable base,] laminated to appropriate structural acoustical backing, mounted in full perimeter protective frame. Steel for the panel frames shall be a minimum of [_____] mm gauge thick steel with minimum 0.80 mm 22 gauge thick face panels spot welded to the frame. Frame shall enclose and protect all edges of the surface material. Panels shall be not more than 1.2 m 4 feet wide, except for end closure panels, and shall be full height to track. Panels shall lock in place to form a stable, rigid partition; low profile hinges shall project 6 mm 1/4 inch maximum from panel edge. Panel surfacing shall wrap around the vertical panel edges without vertical trim.

2.2.2 Finish Covering

NOTE: Wood veneer and glass are finish options for operable, not accordion partitions.

Finish material shall be minimum [1371 mm 54 inches] [_____] wide, [vertically-ribbed acoustical material of 100 percent polyolefin] [Type II vinyl with a minimum total weight of [441 grams/square m 13 ounces/square yard and 620 grams/linear m 20 ounces/linear yard] [_____] in accordance with CFFA-W-101-D. Vinyl shall contain a non-mercury based mildewcide and shall be manufactured without the use of cadmium-based stabilizers] [acrylic backed fabric of [100 percent polyolefin] [_____]]. Fabric shall be stain-resistant, shall not mildew, rot or support growth of bacteria and shall be non-allergenic].

2.2.3 Track

Track shall be recessed as shown and shall be of extruded aluminum or enamel finish steel. Track shall be manufacturer's standard product designed for the weight of the finished partition, including door. Track sections shall be provided in the maximum lengths practicable, not less than 1.8 m 6 feet long except for narrow doors and at ends of runs where short length is required. Suitable joint devices such as interlocking keys shall be provided at each joint to provide permanent alignment of track.

2.2.4 Suspension System

Provide a suspension system consisting of steel or heavy duty extruded aluminum track connected to the structural support by threaded rods, and trolleys designed to support the weight of the partition. Provide steel track of 5 mm 7 gage minimum, phosphate treated or painted. Provide extruded aluminum track with minimum thickness of 3 mm 1/8 inch. [Provide center hung panel with 1 trolley with four ball bearing nylon or steel tired wheels per panel.] [Provide 2 trolleys per panel with 2 ball bearing polymer or steel tired wheels.]

2.2.5 Tackboard

Provide tackboard with steel or aluminum frame. Minimum 6 mm 1/4 inch thick, tacking surface covered with self-sealing decorative vinyl. Tacking surfaces laminated to rigid backing substrate.

2.2.6 Markerboards

Provide markerboards with aluminum or steel frame with writing surface of [cast acrylic plastic with color fused to surface] [porcelain steel] and shall not protrude 3 mm 1/8 inch beyond panel face. Color shall be [white] [_____] .

2.3 ACCORDION PARTITIONS

Provide accordion partitions with completely concealed framework mechanism that gives stability and maintains uniform spacing of partition folds in all partition positions. Partitions shall be [bi-parting] [and] [one-way] type as indicated. [Provide manufacturer's standard pendant pull on leading edge of manually operated partitions over 3600 mm 12 feet high.]

2.3.1 Framework

Fabricate framework, including posts, pantographs, hinges, hinge plates, and rods from either extruded aluminum or ferrous metal. Arrange frames requiring pantographs for horizontal pantograph action with pantographs located at top and bottom of the frame. Provide pantographs spaced not over 1200 mm 4 feet apart. Provide intermediate pantograph at center of

doors less than 2400 mm 8 feet high unless the door has vertical metal reinforcing. The pantographs shall operate smoothly with positive folding action and shall have a control device to prevent flattening of the folds when the panel is fully extended. Ferrous metal shall be either cadmium plated or zinc coated, except posts at the option of the door manufacturer shall have phosphate treatment and manufacturer's shop finish paint. Aluminum extrusions shall conform to ASTM B 221M ASTM B 221, Alloy 3003. Steel sheets shall conform to ASTM A 653/A 653M, [Z 180 G90 coating designation]. Provide [multiple meeting posts] [rolling posts] [switches] [recessed tracks] [curved tracks] as indicated. Furnish partitions with ceiling guards or integral track and ceiling guards as recommended by the manufacturer. Provide hardware of the heavy-duty type standard with the manufacturer.

2.3.2 Finish Covering

NOTE: Specify minimum total weight and minimum coating weight for the vinyl covering type selected using the listing below:

Total Weight (kilograms per square meter): Type I - 0.237; Type II - 0.442; Type III - 0.748

Coating Weight (kilograms per square meter): Type I - 0.170; Type II - 0.237; Type III - 0.407

Total Weight (ounces per square yard): Type I - 7; Type II - 13; Type III - 22

Coating Weight (ounces per square yard): Type I - 5; Type II - 7; Type III - 12

Wood veneer is a finish option for accordion partitions.

Attach finish material to the framework with fasteners that permit easy removal of the cover but prevent sagging or separation. Position vertical seams in bottoms of valleys and reinforce. Provide top and bottom edges of finish material with 12 mm 1/2 inch minimum turned hems. Finish material shall be minimum [1371 mm 54 inches] [_____] wide, [vertically-ribbed acoustical material of 100 percent polyolefin] [Type II vinyl with a minimum total weight of [441 grams/square m 13 ounces/square yard and 620 grams/linear m 20 ounces/linear yard] [_____] in accordance with CFFA-W-101-D. Vinyl shall contain a non-mercury based mildewcide and shall be manufactured without the use of cadmium-based stabilizers] [acrylic backed [100 percent polyolefin] [_____] fabric. Fabric shall be stain-resistant, shall not mildew, rot or support growth of bacteria and shall be non-allergenic] [[oak] [_____] wood veneer].

2.3.3 Track

Provide steel or aluminum track and trolleys designed to support the weight of the partition. Provide steel track of 1.5 mm 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated. Provide extruded aluminum track with minimum thickness of 3 mm 1/8 inch. Trolleys shall have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

2.3.4 Air Release

Provide an air release system which will allow trapped air within the partition to be released during the stacking process.

2.3.5 Suspension System

Provide a suspension system consisting of steel or aluminum track and trolleys designed to support the weight of the partition. Provide steel track of 1.5 mm 16 gage minimum, phosphate treated and finished, or zinc or cadmium coated. Provide extruded aluminum track with minimum thickness of 3 mm 1/8 inch. Tracks may have an integral ceiling guard. Trolleys shall have at least two ball bearing nylon or steel tired wheels spaced according to manufacturer's design criteria and four at an end post.

2.4 ACCESSORIES

2.4.1 Doors

Doors shall have vinyl sweep top seals which compress against the bottom of the top track. Doors shall be nonfire rated and shall be manually operated.

2.4.2 Ceiling Guards

Furnish partitions with ceiling guards or integral track and ceiling guards as recommended by the manufacturer.

2.4.3 Metal Soffit

Soffit shall be provided when steel track is recessed. Soffit shall be of metal of adequate thickness to protect the ceiling from damage by door operation and shall be provided with the door manufacturer's standard neutral-color applied finish. Soffit on aluminum track shall be an integral part of the track

2.5 SEALS AND SWEEPSTRIPS

NOTE: Partitions need a floor and ceiling seal to avoid gaps that will lower the advertised sound transmission rating. For any partition that requires a sound rating, use seals and ceiling guards provided by the manufacturer of the partition. Provide a baffle in the ceiling plenum above the partition with a STC rating equal to the partition. Provide a floor surface that will allow the bottom sweep to make a positive seal. Panels need vertical and end seals.

Provide perimeter seals or sound insulation, of manufacturer's standard product, to achieve the sound transmission class specified [and to pass the visual field test specified], without crack or craze when subjected to severe usage. [Provide mechanical seal top and bottom of the fire rated panel.] [Provide mechanical bottom seal that can be raised or lowered for positive control.] Provide manufacturer's vertical seals between panels to ensure acoustical [and fire] rating. Bottom seals shall consist of a vinyl sweep mechanical seal which will expand in place or shall be accomplished

by using panels which can be lowered by a removable operating device. Vertical seal between panels shall be anodized, architectural grade, aluminum extrusion with [vinyl] [_____] sound seal. Sweep strips shall be vinyl or other material which will not crack or craze with severe usage. Sweep strip shall control STC to the specified rating.

2.6 ELECTRICAL OPERATORS

NOTE: Specify electrical operators for those partitions whose size and weight preclude manual operation. Refer to manufacturers' literature. Indicate those partitions requiring electrical operation on the project drawings. Delete this paragraph when electrically operated partitions are not required in the project.

Provide manufacturer's recommended standard electrical operator for [each partition] [partitions indicated]. Provide wiring diagrams.

2.7 PERFORMANCE REQUIREMENTS

2.7.1 Fire Endurance

NOTE: Select flame spread and smoke developed criteria to suit project.

For partitions more than 5.6 square meters 60 square feet in area, provide covering and lining with flame spread rating of 25 or less, fuel contribution rating of 15 or less, smoke generation of 50 or less in accordance with NFPA 101 when tested in accordance with ASTM E 84. [1 hour fire rating, UL 10B, or NFPA 252.] The Contractor shall submit flame and smoke development tests reports. Door and partition finishes shall have a Class A rating when tested in accordance with ASTM E 84.

2.7.2 Laboratory Acoustical Requirements

NOTE: Specify sound transmission class as determined by project requirements. The requested rating should be between 35 and 54 STC. 39 and 40 STC are widely available. If more is required, another type of moveable partition should be used. Specify a panel weight of no less than 14 kg per square meter (3 psf) for STC of 35, 24 kg per square meter (5 psf) for STC of 45.

Partitions shall have been tested in accordance with ASTM E 90 by a laboratory accredited by the U.S. Bureau of Standards and have attained a sound transmission class (STC) of not less than [39] [40] [_____] in a fully extended position, with a Noise Reduction Coefficient (NRC) of [0.25-0.30 for napped, tufted or looped fabric] [0.65-0.75 for perforated steel in accordance with ASTM C 423] [_____]. Partition tested shall be of the same construction, materials, and model number as the partition to be provided and shall be fully operable. Test specimen shall be not less than

[12 square meters in area] [4200 by 2700 mm] [126 square feet in area] [14 feet by 9 feet]. Panel weight shall be a minimum of 26 kg/square meter 5.5 psf for STC up to 40, 36 kg/square meter 7.5 psf for STC up to 45, and 41 kg/ square meter 8.5 psf for STC up to 50, 48 kg/square meter 10.0 psf for STC up to 53. Panel thickness (100 mm 4 inch nominal) and composition shall be designed to provide the required STC rating in accordance with ASTM E 90 and ASTM E 413.

2.8 COLOR

NOTE: Editing of color reference sentence(s) must 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 will be selected from manufacturers standard colors or identified in this spec only when the project has minimal finishes.

When the government directs that color be located in the drawings, a Note shall be added stating: "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 selection of equal colors from other manufacturers].

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the manufacturer's approved instructions.

3.1.1 Preparation Work

NOTE: Show the structural support necessary to accommodate the size and weight of the partition. ASTM E 557 has design as well as installation criteria.

Check openings scheduled to receive operable partitions for correct dimensions. Install partitions in accordance with the approved partition layouts, manufacturer's directions, and ASTM E 557. Structural support for the track support elements shall be as indicated.

3.1.2 Electrical Operators

NOTE: Delete this paragraph when electrically operated partitions are not required.

Conform electrical components and installation to the requirements of NFPA 70 and Section 16415A ELECTRICAL WORK, INTERIOR. Provide the partition manufacturer's standard drive and control components required to operate the partition. Power source is as indicated.

3.1.3 Adjustment

[Adjust manually operated partitions to open and close from any position with a maximum horizontal force as specified in paragraph Manual Operation applied to pendant pull, box or handle.] [Adjust drive components and limit switches of electrically operated partitions to ensure the partitions operate properly upon activation of the control switch.]

3.2 FIELD TESTS

3.2.1 Operational Test

In the presence of the Contracting Officer, operate partition at least three times to demonstrate that partition is capable of being moved from the stored position to the fully extended position smoothly and quietly [and without overloading the drive components]. [Activate the emergency release mechanism and demonstrate proper operation of the partition in the manual mode.] [Activate mechanical seals top and bottom.] Adjust partitions which do not operate properly and retest.

3.2.2 Visual Test

NOTE: Delete this paragraph when light leakage will not be objectionable.

Conduct visual field tests for light leakage with all room lights turned on in the space on one side of the partition. Darken space on the other side of the partition. There shall be no light leakage from the lighted space to the darkened space. If light leakage does occur, adjust the partition to correct the problem and retest.

3.2.3 Acoustical Test

NOTE: Delete this paragraph in projects requiring STC ratings of less than 40. Noise Isolation Class (NIC) is a number that can be measured, and usually runs up to 10 points below laboratory results, i.e.

lab STC 40, field NIC 30. This test is expensive
and rarely necessary.

Field sound performance: partition shall be tested by an independent
certified acoustical consultant in accordance with ASTM E 336, and achieve
a Noise Isolation Class (NIC) of [_____] plus or minus two. Adjust and/or
modify partitions which do not comply, and retest.

3.3 CLEANING

Clean any soiled parts of the partition in accordance with manufacturer's
printed instructions.

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