

SECTION 102219
MOVEABLE WALLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

- 1. Non-progressive, moveable and reconfigurable system of unitized panels, from a single manufacturer
- 2. Trim, Sealants, Hardware and Accessories.

- B. Products supplied but not installed under this Section: Voice/data cabling, devices, faceplates for thermostats and other devices.

1.3 RELATED SECTIONS

- A. Section 012500 – Substitution Procedures
- B. Section 081416 – Wood Doors
- C. Section 087100 – Door Hardware
- D. Section 088000 – Glass and Glazing
- E. Section 262000 – Power System
- F. Section 270000 – Communication System

1.4 REFERENCES

- A. Aluminum Association (AA)
 - 1. AA DAF45-R03, Designation System for Aluminum Finishes, 9th Edition
- B. American National Standards Institute (ANSI)
 - 1. ANSI Z97.1-2004, Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Method of Test.
- C. American Society of Testing and Materials International (ASTM)
 - 1. ASTM B221-06, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profile and Tubes
 - 2. ASTM C36, Standard Specification for Gypsum Wallboard

3. ASTM C1036, Standard Specification for Flat Glass
 4. ASTM C1396, Standard Specification for Gypsum Board
 5. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
 6. ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 7. ASTM E413, Classification for Rating Sound Insulation
 8. ASTM E1300, Standard Practice for Determining Load Resistance of Glass in Buildings
- D. National Fire Protection Association (NFPA) 70
1. National Electrical Code, 2008 Edition
- E. Architectural Woodwork Institute (AWI)
1. Architectural Woodwork Standards, Edition 1, 2009
- F. Consumer Product Safety Commission
1. Regulation 16 CFR 1201, Safety Standard for Architectural Glazing Materials.
- G. Occupational Safety and Health Administration (OSHA)
1. Regulation 29 CFR 1919.1200 – Material Safety Data Sheets
- H. International Building Code, 2006 Edition
- I. Underwriters Laboratories, Inc. (UL), Fire Resistance Directory

1.5 PERFORMANCE REQUIREMENTS

- A. Acoustic Performance
1. Solid panels, when tested in accordance with ASTM E90, shall achieve the following acoustic performance ratings in accordance with ASTM E413, without site alteration:
 - a. Steel faced panels: Minimum STC 45
 - b. Gypsum board panels: Minimum STC 43
 - c. Wood composite panels: Minimum STC 40
 2. Provide butt hinged doors where acoustic performance of the wall system is paramount.
 3. Provide sliding doors where indicated.
- B. Surface Burning Performance

1. Painted steel panels: Maximum Flame Spread of 25 when tested in accordance with ASTM E84.
2. Wall covering faced panels: Maximum Flame Spread of 25 when tested in accordance with ASTM E84.

C. Structural Performance

1. Design and size the moveable walls and components to withstand dead and live loads as calculated in accordance with the International Building Code 2006 Edition.
2. Design and size moveable walls and components to withstand seismic loads as calculated in accordance with International Building Code 2006 Edition.
3. Load bearing capacity: Tested to not less than the requirements for panel systems as defined by ANSI/BIFMA X5.6, latest edition. Specifically, a load of 300 lbs on either side of each panel at both overhead and desktop elevations with a CG of no greater than 8" from the panel face.
4. Panels or panel framing members shall exhibit lateral deflection not greater than 1/240 of span when subjected to a uniformly distributed load of 5 psf.
5. At a minimum, glass thickness shall conform to the requirements of ASTM E1300.
6. Glass framing members shall be sized to limit glass edge deflection not greater than 1/175 or .75", whichever is less, when subjected to a uniformly distributed load of 5 psf.
7. Glazing materials shall comply with the requirements of 16 CFR Part 1201 and/or ANSI Z97.1-2004, and shall bear markings as required by Chapter 24 of the International Building Code.

D. Electrical and Communications

1. Assembled panels with prewired components (boxes, cables, devices and faceplates) fully assembled shall be UL Classified to comply with NFPA 70 National Electric Code 2011 Edition.
2. Modular Wiring System Components shall be UL Listed to comply with NFPA 70, National Electric Code, Article 604 – Manufactured Wiring Systems.

E. Indoor Air Quality Performance: Product shall be certified by Greenguard Environmental Institute (GEI) indoor air quality standard for building materials, finishes and furnishings for conformance to the requirements of California 1350 specification (Ca-DHS-EHLB-R-174 addendum 2004-1), and the Collaborative of High Performance Schools.

F. Combustibility Performance: Product shall have finishes and construction acceptable for use in Non-Combustible buildings, in accordance with Chapters 6 and 8 of the International Building Code, 2006 Edition.

1.6 DESIGN REQUIREMENTS

- A. The moveable wall system (the system) shall be rectilinear in design and expression with crisp corners and well defined horizontal and vertical elements.
- B. The system shall be 4" thick minimum, and designed and sized in horizontal and vertical modules to accommodate the partition layout indicated.
 - 1. Panel heights shall be available in 1/16" increments from a minimum of 8" to maximum of 144" as required. Actual floor to ceiling heights shall be verified in field.
 - 2. Solid panel widths shall be available in 1/16" increments from a minimum of 8" to maximum of 48" for solid panels and 60" for glass panels.
- C. Gypsum board, glass and steel panels shall be constructed of materials acceptable for use in non-combustible construction. Painted metal and wallcovering finishes shall exhibit Class 1 or Class A Surface Burning Performance.
- D. The system shall be non-progressive, allowing for removal and re-installation of panels, including door frames, at any position, without disturbing adjacent panels.
- E. Solid panels shall have [monolithic][horizontally segmented] panel faces on each side. Panel faces shall be removable and reusable, attached to the panel frame without the use of screws or other mechanical fasteners.
- F. Each unitized panel shall be able to be removed, relocated and re-installed in different layouts, with all parts reusable. Scribing and fitting of panels on site to individual locations is not acceptable.
- G. The panel/floor interface shall have a reveal, recessed 3/4" from the face of the panel on both sides and adjustable in height from 1 1/4" to 2 1/2". Surface mounted base trim not permitted.
- H. The panel/ceiling interface shall have a reveal, recessed 3/4" from the face of the panel on both sides and adjustable in height from 5/8" to 1 3/8". Surface mounted top trim not permitted.
- I. The system shall provide a vertical adjustment of not less than 2" in overall height to accommodate floor and ceiling irregularities.
- J. The system shall include a freestanding option that does not require a connection or attachment to the ceiling.
- K. The system must be erected and removed in a manner to prevent damage to adjacent building surfaces and elements, including floors, walls, ceilings, columns and window mullions. All system connectors to fixed-in-place building components shall be non-marking, removable and reusable.
- L. The system shall be capable of extending in multiple directions using 2-way, 3-way, 4-way and variable angle corner posts.

- M. Doors: [Single][Double], [sliding][butt hinged], doors utilizing adjustable metal frames. All door panels shall utilize standard panel connection methods and be reversible in field without additional modifications or materials.
- N. Provide cut-able panels in order to address irregularities in the interface between the panel system and fixed-in-place construction (i.e. sills, columns, bulkheads).
- O. Solid panels shall be capable of providing integrated, factory installed modular power & voice/data distribution utilizing plug-and-play technology for ease of panel reconfiguration.
- P. The system shall include an integrated, factory installed, modular power option. Power distribution shall be consistent and compatible with power system used in furniture system and below raised access floor.
- Q. Components shall be free of distortion and uniform in dimension, construction and appearance.

1.7 SUSTAINABILITY CRITERIA

- A. Total recycled content shall be greater than 10% combining both post-consumer and pre-consumer recycled content.
- B. Steel, aluminum and glass components shall be 100% recyclable.
- C. Polyethylene film, corrugated cardboard and wood packaging materials shall be readily recyclable.
- D. Product shall be free of hexavalent chrome, CFC's, PDBE's, persistent organic pollutants (POP's) and heavy metals.
- E. Fiberglass insulation materials shall be formaldehyde-free and have a minimum of 25% recycled content.
- F. Product shall be SCS IndoorAdvantage™ Gold certified as a low emitting product.
- G. No ozone depleting substances (ODS's) shall be used in the manufacturing process.

1.8 SUBMITTALS

- A. Product Data: Submit manufacturer's detailed materials and fabrication specifications and installation instructions. Include catalog cuts of hardware, fastenings and other data as required.
- B. Shop Drawings: Plans, sections, elevations, details and attachments to other work.
 - 1. Indicate materials, methods of construction, attachment or anchorage details, erection diagrams of pre-assembled components, connections, explanatory notes and other information necessary for completion of work. Cross reference to design drawings and specifications.
 - 2. Indicate wall layout, including doors and hardware, elevations, opening locations, special panels and conditions at adjacent construction.

3. Do not commence manufacture or order materials before shop drawings are reviewed and accepted by professional of record.
 4. Revisions to shop drawings must be provided digitally within 24 hours of request.
- C. Samples: Submit samples of each required finish and color. Prepare samples on same materials which will be used in partition assemblies.
1. Finish Samples
 - a. For initial selection: For units with factory-applied color finishes.
 - b. For verification: For each type of exposed finish and trim required.
- D. Copies of OSHA-Hazard Communication Standard; MSDS - Material Safety Data Sheets.
- E. Product test reports from approved independent testing laboratory, certifying compliance with STC Rating, Surface Burning Rating, Structural Performance and Indoor Air Quality Performance requirements.
- F. Lead Time: Provide the lead time duration from the date of shop drawing approval to the date of product shipment.

1.9 LEED SUBMITTALS

- A. Submit product data for the following credits in accordance to LEED 2009 for Commercial Interiors (CI):
1. Energy and Atmosphere (EA)
 - a. Credit EA 1.1 – Optimize Energy Performance – Lighting Power
 2. Materials and Resources (MR)
 - a. Credit MR 2 – Construction Waste Management
 - b. Credit MR 3.2 – Materials Reuse – Furniture and Furnishings
 - c. Credit MR 4 – Recycled Content
 - d. Credit MR 5 – Regional Materials
 3. Indoor Environmental Quality (IEQ)
 - a. Credit IEQ 3.2 – Construction IAQ Management Plan, Before Occupancy
 - b. Credit IEQ 8.1 – Daylight and Views – Daylight
 - c. Credit IEQ 8.2 – Daylight and Views – Views
 4. Innovation & Design Process (ID)
 - a. Credit IDP 1 – Innovation in Design
- B. Submit product data for the following credits in accordance to LEED 2009 for New Construction (NC):
1. Energy and Atmosphere (EA)

- a. Credit EA 1 – Optimize Energy Performance
 2. Materials and Resources (MR)
 - a. Credit MR 2 – Construction Waste Management
 - b. Credit MR 3 – Materials Reuse
 - c. Credit MR 4 – Recycled Content
 - d. Credit MR 5 – Regional Materials
 3. Indoor Environmental Quality (IEQ)
 - a. Credit IEQ 3.2 – Construction IAQ Management Plan, Before Occupancy
 - b. Credit IEQ 8.1 – Daylight and Views – Daylight
 - c. Credit IEQ 8.2 – Daylight and Views – Views
 4. Innovation & Design Process (ID)
 - a. Credit IDP 1 – Innovation in Design
 - C. Submit product data for the following credits in accordance to LEED 2009 for Existing Buildings (EB):
 1. Energy and Atmosphere (EA)
 - a. Credit EA 1 – Optimize Energy Efficiency Performance
 2. Indoor Environmental Quality (IEQ)
 - a. Credit IEQ 2.4 – Daylight and Views
 - D. Submit product data for the following credits in accordance to LEED 2009 for Core and Shell Development:
 1. Energy and Atmosphere (EA)
 - a. Credit EA 1 – Optimize Energy Performance
 2. Materials and Resources (MR)
 - a. Credit MR 2 – Construction Waste Management
 - b. Credit MR 3 – Materials Reuse
 - c. Credit MR 4 – Recycled Content
 - d. Credit MR 5 – Regional Materials
 3. Indoor Environmental Quality (IEQ)
 - a. Credit IEQ 8.1 – Daylight and Views – Daylight
 - b. Credit IEQ 8.2 – Daylight and Views – Views
- 1.10 QUALITY ASSURANCE
- A. Manufacturer Qualifications

1. All primary products specified in this Section shall be supplied by a single manufacturer with a minimum of ten (10) years experience.
 2. The manufacturer of the moveable wall system shall operate under an ISO 9001 certified quality management system.
- B. Installer Qualifications: All products listed in this section shall be installed by a single installer with a minimum of two (2) years documented experience in installing products of the same type and scope as specified, and must be approved by the manufacturer.
- 1.11 DELIVERY, STORAGE, AND HANDLING
- A. Deliver moveable wall system components cartoned or crated to provide protection during transit and job storage.
 - B. Inspect moveable wall system components upon delivery for damage. Minor damages may be repaired, provided finish items are equal to new work and acceptable to Architect. Remove and replace damaged items as directed.
 - C. Store moveable wall system components on raised platforms in vertical positions with blocking between units to allow air circulation. Keep stored material covered and protected from damage.
- 1.12 PROJECT CONDITIONS
- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install the system components under environmental conditions outside manufacturer's absolute limits.
 - B. Environmental Limitations: Do not deliver or install the system components until building is enclosed and finishing operations, including ceiling and floor covering installation and painting, are completed.
 - C. Field measurements: Indicate all site dimensions including ceiling heights and "hold-to" dimensions on shop drawings.
 - D. Coordination of work: Coordinate layout and installation of the system components with other units of work. Installation of ceilings, floor coverings, lighting fixtures, HVAC equipment and fire suppression systems should be complete before the system components are installed.
- 1.13 WARRANTY
- A. Submit, for Owner's acceptance, manufacturer's standard limited warranty document executed by authorized company official.
 1. Warranty period: Ten (10) years from date of substantial completion.
- 1.14 ATTIC STOCK
- A. Furnish items in original packaging clearly labeled with part number and description. Store in location designated by the Owner.
 - B. Provide additional moveable wall system components to match installed materials.

1. Unitized Panels, including frames and accessories required for installation.
 - a. Solid Panels: ____
 - b. Glazed Panels: ____
 - c. Combination Panels: ____
 - d. Cut-able Panels: ____
 - e. Door Panels: ____

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Haworth, Inc. One Haworth Center, Holland, MI 49423-9576, telephone 616.393.3000, www.haworth.com.
- B. Substitutions: Not permitted.
- B. Requests for substitutions will be considered in accordance with provisions of Section 012500, Substitution Procedures.

2.2 PRODUCT

- A. Basis of Design: Provide Enclose by Haworth, Inc., or comparable product by one of the following:
 1. [As determined by Architect]
 - 2.
 - 3.
 - 4.

2.3 MATERIALS

- A. Aluminum extrusions: ASTM B221
- B. Insulation: Urea-formaldehyde free batt insulation, factory installed in all solid panels.
- C. Cladding/Panel Faces
 1. Steel panels: Minimum 18 gauge steel, epoxy powder coated.
 2. Wood Composite Panels: Factory finished wood composite available with low pressure laminate, high pressure laminate or wood veneer to manufacturer's standard.
 3. Wall covering-faced gypsum board: ASTM C1396, 1/2" thick gypsum board with edges enclosed in an aluminum frame, surfaced with a minimum 0.15mm thick wall covering.
 4. Glass Marker Board: ASTM C1036, 3/8" thick available as standard or low iron Glass, and either back painted white or steel backed/magnetic.

5. Panels faces containing MDF must utilize fire rated material with no added urea formaldehyde and shall be certified to SCS Air Advantage Gold.

D. Doors and Hardware

1. Provide doors in accordance with Section 081416, Flush Wood Doors.
2. Provide hardware in accordance with Section 087100, Door Hardware.
3. Provide woodwork in accordance with AWI, Architectural Woodwork Standards, Custom Grade.

E. Glass and glazing materials

1. Provide glass and glazing in accordance with Section 088000, Glazing.
2. Glazing sections: Resilient ABS, extruded glazing section to suit glazing channel retaining slot, to partition system manufacturer's standard, gaskets for setting glass.

2.4 UNITIZED PANEL TYPES

A. Solid Panels

1. Cladding
 - a. Steel panel
 - b. Wall covering-faced gypsum board
 - c. Wood composite panels with wood veneer or laminate
 - d. Glass marker board
 - e. Porcelain or powder coated steel marker board
2. Solid panel faces shall be secured to panel frame with continuous ABS retention strip.
3. Extruded aluminum frame: Minimum 0.05" thick, stile and frame with corner brackets, installed for full frame rigidity.
4. Acoustical insulation core: Urea-formaldehyde free batt insulation.

B. Glazed Panels

1. Extruded aluminum frame; minimum 0.05" thick, stile and frame with corner brackets, installed for full frame rigidity.
 - a. Monolithic: [1/4"][5/16"][3/8"] thick glass panel, [tempered][laminated], ceiling height, fit to frame with neoprene glazing gaskets.
 - b. Segmented: [1/4"][5/16"][3/8"] thick glass panels, [tempered][laminated], in up to eight (8) horizontal segments as per approved elevations, fit to aluminum frame with ABS glazing gaskets and supported/separated horizontally by muntins.
 - c. Width of vertical mullions and horizontal muntins: 7/8" maximum

- C. Combination Panels: Full height, extruded aluminum frame, with horizontally segmented solid panel faces and glazed panels, separated by horizontal, extruded aluminum cross member not to exceed 7/8" high.
- D. Cut-able Panels: Solid panels with the inclusion of extended panel faces on one vertical edge providing cut-able surfaces to fit to irregularities in fixed-in-place construction (i.e. sills, columns, bulkheads) where required.
- E. Door panels
 - 1. Door frames: Extruded aluminum, ceiling height, to accommodate and support [1-3/4" thick, [solid core wood doors][aluminum door with 1/4" [tempered][laminated] glass panel][3/4" tempered glass slab door], with fixed stops.
 - a. Prepare for hardware specified in Section 087110, Door Hardware.
 - b. Pivot doors must include continuous vinyl seal or brush on door stop.
 - 2. Provide door frames with integrated glazed transom; dimensions as per approved elevations.

2.5 FABRICATION

- A. Fabricate the moveable wall system off-site in a controlled factory environment and deliver panels fully finished to site for installation with no additional assembly, construction or finishing required.
- B. Frameless glass wall assemblies greater than 60" wide may be delivered and site assembled as non-unitized components.

2.6 FURNITURE INTEGRATION REQUIREMENTS

- A. Moveable wall system shall be a companion system to a compatible furniture product line from the same manufacturer. Companion products shall include systems furniture, wood office suites, storage components, tables and architectural case goods. The companion wall and furniture systems must incorporate identical/compatible surface finishes, trim details and design logic.
- B. Solid panels shall come standard with integral support for wall mounted furniture components at any elevation. Furniture mounting capability must include work surfaces, storage units, systems furniture panels, flat screen monitors and shelving. Support must be provided without compromising acoustic performance and without the addition of external or surface mounted support mechanisms.
- C. Provide off-module mounting of furniture components and accessories (whiteboards, tack boards, storage components) at any elevation through the use of a horizontal accessory rail. This rail must not impact the wall system STC performance when in use. The horizontal, off-module mounting rail shall be removable and relocateable for application at any solid wall location. Do not mount at locations where its function is not required.

2.7 CONNECTION METHODS

- A. Moveable wall system to ceiling: Extruded aluminum track, attached to ceiling grid using non-marking clip, lined with closed cell neoprene seal. Ceiling track shall support extruded ABS top reveal profile, friction fit to track providing a continuous top channel for panel system. ABS channel shall fit securely against interior panel faces to ensure integrity of acoustic and visual barrier.
- B. Moveable wall system to floor: Integrated extruded aluminum channel/base assembly, designed to grip and hold to carpet flooring without damage to floor surface. Threaded adjustable leveling legs with leveler saddles set into floor channel. Sidewalls of channel shall fit securely against interior panel face on both sides of panel without gaps.
- C. Moveable wall system to fixed-in-place construction: Extruded aluminum wall start channel, affixed to permanent building components without the use of permanent fasteners, lined with closed cell neoprene seals.
- D. Panel to panel, door frame or post connector: Continuous, extruded ABS connector applied to aluminum frame providing a 5/16" reveal, recessed 3/16" from panel face and ensuring integrity of sound and light seal.
- E. Panel face to frame: Continuous, extruded ABS retention clip affixed to back of panel face secured to aluminum frame.
- F. Moveable wall system to furniture; Solid panels shall be capable of supporting furniture components at any elevation, by means of slotted channels incorporated in the upright sections of the extruded aluminum panel frame.
- G. Cut-able panel to fixed-in-place construction: Panels cut on site, fitted with extruded aluminum end cap and closed cell neoprene seal providing a continuous, clean interface with the panel and fixed-in-place elements.
- H. For all exposed ends and corners, provide one piece aluminum extrusion to match panel finish, attached to end panel with standard panel-to-panel connector.

2.8 FINISHES

- A. Aluminum surfaces: Finish exposed surfaces of aluminum components to AA DAF45. Textured or metallic powdercoat finish. Non-repairable, anodized aluminum finishes are unacceptable.
- B. Wood Surfaces: [Wood veneer][Laminate] to manufacturer's standard and AWS Custom Grade.
- C. Steel Surfaces: Epoxy powder coated. Color as selected by Architect from manufacturer's standard range.
- D. Gypsum Board Wall Covering: Minimum .15 mm thick vinyl, fabric or environmental wall covering. Color and pattern as selected by Architect from manufacturer's standard range.
- E. ABS extrusions: Selected from manufacturer's samples.

2.9 POWER AND COMMUNICATIONS

- A. In solid panels, provide a factory installed [8-wire, 3-Circuit][8-wire, 4-circuit] modular power system including conduit, power feeds, power distribution assembly and panel mounted boxes with [15 amp][20 amp] triplex receptacles. Locate devices in accordance with [approved Shop] Drawings.
- B. Supply power to the panel power distribution assembly via [ceiling/panel top][floor/panel base][horizontal/panel base], [internal hardwire pigtail][internal powerbase quick-connect].
- C. Provide horizontal, solid panel-to-solid panel power distribution by the use of internal jumpers in the panel base cavity.
- D. Provide device boxes containing receptacles to provide voice/data housing with faceplate knock-out.
- E. Provide power/communications devices on either panel face at height[s] of [51 ½",][35 ½",][19 ½"][and] [6 ¼"] from center of receptacle to the bottom edge of the panel.
- F. Provide factory installed light switches on either panel face at 41-5/8" from center of device to bottom edge of the panel.
- G. Furnish voice/data cabling, devices, and faceplates for thermostats and other devices.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install the moveable wall system under manufacturer's approved, direct supervision to ensure performance and compatibility with design and specification intent.
- B. Erect the moveable wall system rigid, level, plumb and aligned. Install continuous light and sound seals at connection to floors, ceilings, fixed walls and abutting surfaces.
- C. Coordinate the moveable wall system installation with work of other trades which are affected. Avoid damage to installed work.
- D. Repair damaged or defaced work or replace with new work, as acceptable to Architect. Completely refinish defaced partition components with factory finished materials, or replace defaced components.
- E. Install doors and hardware as specified in Sections 081416 and 087100. Adjust hardware and doors and leave in proper operating condition.
- F. Installation of voice/data cabling and devices: See Divisions 26 and 27.
- G. Acoustical Gaskets and Sealant: Seal cut-outs in panels, penetrations through partitions, and intersections with adjacent construction. Use gaskets where practical; use sealant at other locations and at fire rated partitions.

3.2 PROTECTION

- A. Protect installed moveable wall system components until completion of project.

Enclose

- B. Touch-up, repair or replace damaged moveable wall system components before Substantial Completion.

END OF SECTION