SECTION 083513 - FOLDING DOORS

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Accordion folding doors.

Panel folding doors.

Metal bifold doors.

Mirrored metal bifold doors.

Fire-rated folding doors.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.
			1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include construction details, manufacturer’s installation instructions, material descriptions, dimensions of individual components and profiles, and finishes for folding doors.

* + - * 1. Sustainable Design Submittals:

[Chain-of-Custody Certificates](http://www.arcomnet.com/sustainable_design.aspx?topic=146): For certified wood products. Include statement of costs.

* + - * 1. Shop Drawings:

Include plans, elevations, sections, and installation details.

Include clearances required for operation, [**operating and control mechanisms,**] [**access requirements,**] [**storage pockets and pocket doors,**] and accessory items.

Retain "Fire-Release System" subparagraph below for fire-rated folding doors.

Fire-Release System: Describe system, including testing and resetting instructions for fire-rated folding doors.

Retain subparagraph below for electronically operated, fire-rated folding doors.

Include diagrams for power, signal, and control wiring.

* + - * 1. Samples: For each exposed product and for each color and texture specified.

Retain "Product Schedule" paragraph below if more than one type or size of folding door is required.

* + - * 1. Product Schedule: For folding doors. Use same designations indicated on Drawings.
				2. Quality Control Submittals:

Qualification Data: For Installer.

Retain "Product Test Reports" and "Evaluation Reports" paragraphs below for fire-rated folding doors and/or sound rated folding doors.

Product Test Reports:

For each fire-rated folding door, for tests performed by a qualified testing agency.

For each sound-rated folding door, for tests performed by a qualified testing agency.

Evaluation Reports: For fire-rated folding doors, from ICC-ES.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code

* + - 1. Contract Closeout Submittals:

Operation and Maintenance Data: For folding doors to include in operation and maintenance manuals.

* + - 1. QUALITY ASSURANCE

Retain "Installer Qualifications" paragraph below for manufacturer-authorized Installer of fire-rated folding doors.

* + - * 1. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of fire-rated folding doors.

Retain "Certified Wood" paragraph below for LEED v4 "MRc Building Product Disclosure and Optimization - Sourcing of Raw Materials, Option 2 - Leadership Extraction Practices."

* + - * 1. [Certified Wood](http://www.arcomnet.com/sustainable_design.aspx?topic=25): Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.

Retain "Vendor Qualifications" paragraph below if required for LEED v4.

* + - * 1. [Vendor Qualifications](http://www.arcomnet.com/sustainable_design.aspx?topic=26): A vendor that is certified for chain of custody by an FSC-accredited certification body.
			1. FIELD CONDITIONS
				1. Environmental Limitations: Do not deliver or install folding doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for building occupants after completion of construction during the remainder of the construction period.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. ACCORDION FOLDING DOORS
				1. Description: Top-supported, horizontal-sliding, manually operated accordion folding doors, with chain controlling the spacing and extension of pantographic or X-type accordion folding frames. Continuous inner and outer covers completely cover the folding frames and pleat as the door retracts.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=28) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

CornellCookson.

Custom Door and Mirror, Inc.

Panelfold, Inc.

Woodfold Mfg., Inc.

Or equal.

* + - * 1. Covers: Attached to accordion folding frames with concealed fasteners at sufficient intervals to prevent the cover from sagging and separating from the frame. Fastened to allow on-site cover removal and repair. Covers fabricated from material indicated with vertical seams located in valleys of pleats, formed when door is retracted, and with bottom and top hems or bindings.

Usually retain "Surface-Burning Characteristics" subparagraph below; revise to comply with requirements of authorities having jurisdiction. Verify that covers retained for Project comply with requirements.

Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: [**25**] <**Insert value**> or less.

Smoke-Developed Index: [**50**] [**450**] <**Insert value**> or less.

Retain "Vinyl Cover Material," and "Fabric Cover Material," subparagraphs below to suit Project. If retaining more than one subparagraph, indicate locations of each type of cover material on Drawings or in schedules. Custom cover materials must be approved by manufacturer.

Vinyl Cover Material: Reinforced with woven backing weighing not less than [**20 oz./linear yd.**]

Color, Texture, and Pattern: [**As indicated by manufacturer's designation**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from manufacturer's full range**] <**Insert color, texture, and pattern**>.

Fabric Cover Material: Weighing not less than [**6.7 oz./linear yd.**] [**12 oz./linear yd.**] <**Insert value**>, treated to resist stains.

Color, Texture, and Pattern: [**As indicated by manufacturer's designation**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from manufacturer's full range**] <**Insert color, texture, and pattern**>.

* + - * 1. Sweep Seals: Manufacturer's standard top and bottom sweep seals on [**both sides**] [**one side**] of door.
				2. Carriers: Four-wheel carriers at lead post and two-wheel carriers at intermediate spacing, as necessary for size and weight of partition, to ensure secure, easy, and quiet operation. Wheels are ball-bearing type and equipped with nylon tread and steel shafts.
				3. Tracks: Manufacturer's standard metal track, made of extruded aluminum or formed steel with factory-applied, corrosion-resistant finish. Limit track deflection, independent of structural supporting system, to no more than 80 percent of bottom clearance. Design and fabricate track to support accordion folding doors; to enable their operation without damage to track, folding unit, or adjacent surfaces; and with the following features:

Mounting: [**Recessed**] [**Surface**] mounted.

Retain "Ceiling Guard," "Center Stop," "Curved Track Sections," "Glide Switch," "Pivot Switch," and "Cross-Track Switch" subparagraphs below to suit Project.

Ceiling Guard: Metal guard to protect adjacent ceiling surfaces from damage by door operation; with finish matching other exposed metal.

Center Stop: For center-opening doors.

Curved Track Sections: With ceiling clips to accommodate configuration indicated.

Glide Switch: To divert door to auxiliary track.

Pivot Switch: To change track direction.

Cross-Track Switch: To allow one door to cross another.

* + - * 1. Hardware: Manufacturer's standard heavy-duty, manually operated metal pulls and latches as follows:

Finish: [**Clear-anodized aluminum**] [**Satin stainless steel**] [**Dull chromium-finish brass**] [**Dull chromium-finish steel**] [**Manufacturer's standard**] <**Insert finish**>.

Latch: Operable from [**both sides**] [**one side**] of closed door[**with coin-slot release on opposite side**].

Lock: [**Manufacturer's standard key-operated cylinder lock, operable from both sides**] [**Manufacturer's standard key-operated cylinder lock, operable from one side; privacy lock on other side**] [**Deadlock to receive cylinder, operable from both sides. See Section 087100 "Door Hardware" for cylinder requirements**] <**Insert requirements**>.

Retain "Foot Bolts" subparagraph below for bolts that hold door in partially open position.

Foot Bolts: On lead post where indicated. Secure to post to avoid interference with seals.

* + - * 1. Jamb Molding: Manufacturer's molding at closing jamb as required for light-tight jamb closure.

Jamb Strip: Nonferrous for end-opening doors to ensure tight closure by engaging rubber bumper on lead post.

* + - * 1. Posts: Manufacturer's standard steel or extruded-aluminum posts formed for rigidity and to provide light seal at supporting construction.

Retain "Fixed Jamb Post," "Rolling Jamb Post," "Sliding Jamb," and "Lead Post" subparagraphs below to suit Project.

Fixed Jamb Post: To anchor door to stack jamb.

Rolling Jamb Post: To allow door to disconnect from stack jamb.

Before retaining "Sliding Jamb" subparagraph below, verify availability of sliding jamb with manufacturers. If retaining, detail storage-pocket and jamb-stop requirements on Drawings.

Sliding Jamb: To allow door to stack in storage pocket.

Lead Post: At closing edge of door.

* + - * 1. Tiebacks: To maintain door in stacked position.
				2. Stacking Configuration: [**As indicated on Drawings**] <**Insert configuration**>.
			1. FIRE-RATED FOLDING DOORS
				1. Description: [**Electrically**][**Gravity-**]operated folding-door assembly, automatic or self-closing, listed and labeled for fire-resistance ratings indicated by a qualified testing agency, top supported, and complete with hardware, seals, track, closing devices, releasing devices, controls, and accessories necessary for intended operation.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=32) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

CornellCookson.

[McKeon Rolling Steel Door Company, Inc](http://www.specagent.com/Lookup?uid=123457104083).

[Won-Door Corporation](http://www.specagent.com/Lookup?uid=123457104084).

Or equal.

Always retain "Listed Assemblies" paragraph below and revise to suit Project.

* + - * 1. Listed Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

Retain "Oversize Doors" subparagraph below if fire-rated folding doors exceed sizes of tested assemblies and if acceptable to authorities having jurisdiction.

Oversize Doors: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

* + - * 1. Configuration: [**As indicated on Drawings**] [**Side opening**] [**Center opening**].
				2. Features:

McKeon offers floor tracks as an option; Cornell and Won-Door do not.

Track: [**Overhead track without floor guide**] [**Overhead and floor tracks**].

Normal Position: Assembly's normal position is the open (stacked) position. Signal from fire-alarm system initiates self-closing operation.

Manual Operation: Allow manual operation in either conventional or emergency mode. When opened manually during emergency mode, control mechanism automatically closes assembly.

Access Control/Monitoring: [**Exit hardware does not respond until activated by signal from smoke detector or fire alarm**] [**Electromagnetic lock resists manual opening until activated by a signal from fire alarm**] [**Synchronized, computerized control system continuously controls and monitors up to 120 doors**] <**Insert requirements**>.

Non-Sway Construction: To resist differential air pressure.

* + - * 1. Fire Rating: [**1**] [**1-1/2**] [**3**] <**Insert number**> hour(s).

Cornell, McKeon, and Won-Door manufacture fire-rated folding doors from steel sheet panels; only McKeon manufactures fire-rated folding doors from stainless-steel sheet panels.

* + - * 1. Panel Construction: [**Formed-galvanized-steel or formed-steel**] [**Formed-stainless-steel**] sheet panels connected by hinges of matching material.
				2. Perimeter Seals and Closures: Manufacturer's standard vinyl or neoprene vertical seals, horizontal top and bottom seals, and closures identical to products tested for fire rating indicated, and forming an effective smoke and draft seal.

Points of Access to Elevators: Provide smoke seals that comply with requirements of authorities having jurisdiction for seals at points of access to elevators where indicated.

* + - * 1. Track and Trolley System: Single or dual steel or aluminum track systems, with ball-bearing roller trolleys and adjustable steel hanger rods for overhead support; designed for type of operation, size, and weight of fire-rated folding door indicated. Provide a continuous system of track sections and accessories identical to products tested for fire rating indicated, to accommodate configuration and layout indicated for door operation and storage.
				2. Lead Posts: Metal sheet material matching door-panel construction and connected to panels by specially adapted panels and equipped with manufacturer's standard handle on each side.

Retain "Electric Operators and Controls" paragraph below for electric operation; revise for gravity-operated system.

* + - * 1. Electric Operators and Controls:

Operators: Factory-assembled power-drive unit consisting of motor,[**remote-located**] control panel, limit switches, torque-limiting devices, clutch, reversing magnetic motor operator, leading-edge obstruction detectors, and key-switch control for conventional operation.

Motor: [**In horsepower required for proper operation of door height and weight**] [**1/3 hp**] [**1/2 hp**] <**Insert horsepower**>, controlled by reversing magnetic starter and equipped with overload protection.

Limit Switches: To prevent overtravel.

Roller Chain or Cable: Connected to lead posts by means of vertical stabilizer bar assembly.

Drive Mechanism: Protected by torque limiter and emergency clutch.

Travel Speed: 18 inches per second, maximum; 6 inches per second, minimum.

In case of fire, closing system is activated by building's fire- and smoke-detection equipment and automatically closes fire-rated folding doors.

Electrical Service: Equip for [**120-V, single-phase, 60-cycle ac**] <**Insert service requirements**>.

Battery: Electrical current connects through relay to battery charger that continuously charges 12-V dc battery and automatically maintains battery at capacity. Automatic audible signal device sounds off if battery falls below or exceeds proper charge, power loss has occurred, or high-ac line voltage has been experienced.

Leading-Edge Obstruction Detector:

Equip with pressure-sensitive leading edge that, on contact with an obstruction, causes door to stop and pause before attempting to re-close.

Retain first subparagraph below for swinging doors at storage pockets.

Disable leading-edge obstruction detector until fire-rated folding door has opened swinging door on the storage pocket (pocket door).

Fire-rated folding doors can be manually opened by pushing against leading edge.

Audible alarm sounds at automatic closing of door.

* + - * 1. Accessories:

Indicate locations of accessories on Drawings.

Vision panels.

Exit Hardware: Located on both sides of fire-rated folding door. In emergency mode, slight pressure on hardware causes door to open a minimum of 32 inches, pause for three seconds, and then automatically close. Furnish hardware that can be field programmable to allow automatic opening distances of up to the entire opening width. In conventional mode, hardware is used to operate door and move it back into storage pocket.

Only McKeon offers swinging egress doors.

Swinging egress doors.

<**Insert accessory**>.

* + - * 1. Finishes:

Factory-applied polyester or powder-coat finish for panels and hinges in [**manufacturer's standard color**] [**colors as selected by Director’s Representative from manufacturer's full range**] <**Insert color**>.

Manufacturer's standard finish for handles.

Retain "Pocket Door" paragraph below if required. Swinging door at storage pocket is not typically provided by fire-rated folding-door manufacturer; however, requirements must be coordinated.

* + - * 1. Pocket Door: Swinging door that closes to conceal the storage pocket.

Solid-core pocket doors with [**reverse-action spring**] [**continuous**] hinge; 90-degree minimum swing.

Face Finish: [**Match adjacent finishes**] <**Insert finishes**>.

Magnetic Catch: Holding force of no more than 30 lbf.

Maximum Opening Force: 50 lbf.

Bumper on interior side of pocket door as required by fire-rated folding-door manufacturer to prevent interference with opening or retracting operation of fire-rated folding door.

Coordinate pocket door sizes with fire-rated folding-door manufacturer.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Always retain paragraph below.

* + - * 1. Proceed with installation only after unsatisfactory conditions have been corrected.
			1. PREPARATION
				1. For folding doors supported by or anchored to permanent construction, advise installers of specific requirements for placement of anchorage devices. Furnish installers of other work with templates and drawings indicating locations of anchorage devices and similar items.

Retain "Fire-Rated Folding Doors" paragraph below to ensure that header is level with floor; coordinate installation tolerance with manufacturers.

* + - * 1. Fire-Rated Folding Doors: Level floor with header in path of fire-rated folding doors to tolerance of plus or minus 1/16 inch across opening; grind or fill floor as necessary.
			1. INSTALLATION
				1. General: Install folding doors complying with manufacturer's written installation instructions. Install track in one piece.

Verify requirement in "Fire-Rated Folding Doors" subparagraph below with authorities having jurisdiction.

Fire-Rated Folding Doors: Comply with NFPA 80 requirements for installation.

* + - * 1. Standard Floor Clearances: 1/4 to 3/4 inch maximum (above floor finish).

Verify requirement in "Fire-Rated Folding Doors" subparagraph below with authorities having jurisdiction.

Fire-Rated Folding Doors: Comply with NFPA 80 requirements for floor clearances.

Retain option in "Fire-Rated Folding Doors" paragraph below for electrically operated doors.

* + - * 1. Fire-Rated Folding Doors: Coordinate provisions for sensing devices[**, electrical service,**] and final connections for fire-rated folding doors.
			1. ADJUSTING
				1. Adjust units to ensure smooth, quiet operation without warping or binding. Adjust hardware to function smoothly. Confirm that latches engage accurately and securely without forcing or binding.

Retain "Fire-Rated Folding Doors" subparagraph below if required.

Fire-Rated Folding Doors: Verify that all operations are functional and comply with requirements of authorities having jurisdiction.

Retain "Pocket Doors" paragraph below for swinging doors on folding-door storage pockets.

* + - * 1. Pocket Doors: Adjust to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly. Confirm that latches and locks engage accurately and securely without forcing or binding.
			1. DEMONSTRATION

Retain this article for fire-rated folding doors.

* + - * 1. Engage a Company Service Advisor to train Director’s Representative's maintenance personnel to adjust, operate, and maintain fire-rated folding doors.

END OF SECTION 083513