SECTION 083323 - OVERHEAD COILING DOORS

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

Service doors.

Insulated service doors.

Fire-rated service doors.

Fire-rated, insulated service doors.

* + - 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 and size of overhead coiling door and accessory.

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

Retain first subparagraph below for power-operated doors.

Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

Retain subparagraph below for fire-rated doors.

Include description of automatic-closing device and testing and resetting instructions.

* + - * 1. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

Include plans, elevations, sections, and mounting details.

Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.

Include points of attachment and their corresponding static and dynamic loads imposed on structure.

For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.

Retain option in first subparagraph below for fire-rated doors.

Show locations of controls, locking devices[**, detectors or replaceable fusible links**], and other accessories.

Retain subparagraph below if equipment includes wiring.

Include diagrams for power, signal, and control wiring.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

Include similar Samples of accessories involving color selection.

Request “Samples for Verification” when several doors are required.

* + - * 1. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

Revise subparagraphs below to suit Project; delete items not required.

Curtain slats[**, including full vision window secured to slat**].

* + - * 1. Quality Control Submittals:

Qualification Data: For [Installer] [and] [testing and inspecting agency].

Retain "Fire-Rated Door Inspector" Subparagraphsubparagraph below, or delete and retain second subparagraph below. Certification in second subparagraph below should be acceptable by all authorities having jurisdiction. See the Evaluations.

Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.

Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

Retain "Oversize Construction Certification" Paragraphparagraph below if oversize fire-rated doors are required and acceptable to authorities having jurisdiction.

Oversize Construction Certification (UL Certification): For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

Sample Warranty: For special warranty.

Retain applicable subparagraphs in “Contract Closeout Submittals.” Delete subparagraphs 1, 2, and 5 if Automatic closing fire doors are not specified.

* + - * 1. Contract Closeout Submittals

System acceptance test for automatic closing fire doors.

Replacement parts list.

Special warranty.

Maintenance Data: For overhead coiling doors to include in maintenance manuals.

Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

* + - * 1. Maintenance Material Submittals:

Spare Parts: For each fire door, furnish four spare 160 degrees F fusible links.

* + - 1. QUALITY ASSURANCE
				1. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

Retain "Maintenance Proximity" Subparagraphsubparagraph below if retaining "Maintenance Service" Article.

Maintenance Proximity: Not more than [**two**] <**Insert number**> hours' normal travel time from Installer's place of business to Project site.

* + - * 1. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

Retain subparagraph below if requiring fire door inspectors to be certified under DHI's certification program. Verify, with authorities having jurisdiction, if other DHI certifications are acceptable, such as Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), and Architectural Openings Consultant (AOC).

Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

* + - 1. WARRANTY

When warranties are required, verify with Owner's Director’s Representative counsel that warranties stated in this article are not less than remedies available to Owner Director’s Representative under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

Verify available warranties and warranty periods for lifts and components.

Warranty Period: [**Two**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS
	* + 1. MANUFACTURERS
				1. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

Retain subparagraph below or revise to suit Project.

Obtain operators and controls from overhead coiling-door manufacturer.

* + - 1. PERFORMANCE REQUIREMENTS

Retain "Fire-Rated Door Assemblies" Paragraphparagraph below if applicable. Overhead coiling doors are labeled by UL for sizes not exceeding 152 sq. ft. (14 sq. m), with no dimension exceeding 13 ft. 6 inches (4.11 m). See the Evaluations. NFPA 252 Standard Methods of Fire Tests of Door Assemblies. UL 10B, Fire Tests of Door Assemblies.

* + - * 1. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to [**NFPA 252**] [**or**] [**UL 10B**].

Retain "Oversize Fire-Rated Door Assemblies" Subparagraphsubparagraph below if required and acceptable to authorities having jurisdiction.

Oversize Fire-Rated Door Assemblies: 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.

Retain "Temperature-Rise Limit" Subparagraphsubparagraph below if required. The BCNYS allows an exception for buildings equipped throughout with fire-suppression sprinklers.

Temperature-Rise Limit: [**Where indicated**] [**At exit enclosures and exit passageways**], provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

Smoke Control: [**Where indicated**] [**In corridors and smoke barriers**], provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing according to UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. (0.01524 cu. m/s x sq. m) of door opening at 0.10 inch wg (24.9 Pa) for both ambient and elevated temperature tests.

Retain "Sound-Control Doors" Paragraphparagraph below if acoustically rated doors are required.

* + - * 1. Sound-Control Doors: Assemblies tested in a laboratory for sound-transmission-loss performance according to ASTM E90, calculated according to ASTM E413, and rated for not less than the STC value indicated.

Generally, retain only one of first two options in "Accessibility Standard" Paragraphparagraph below. Retain first option for facilities covered under the Americans with Disabilities Act (ADA) of 1990. Retain second for facilities covered under the Architectural Barriers Act (ABA). Retain last option for compliance with the BCNYS.

* + - * 1. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

Retain "Structural Performance, Exterior Doors" Paragraphparagraph below for exterior doors.

* + - * 1. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

Second option in "Design Wind Load" Subparagraphsubparagraph below is minimum design pressure advertised by manufacturers. Usually indicate on Drawings the design wind loads, as determined by Project's structural engineer. Verify requirements of authorities having jurisdiction. See the Evaluations.

Design Wind Load: [**As indicated on Drawings**] [**Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and outward**] <**Insert loads**>.

Retain "Testing" Subparagraphsubparagraph below if required by authorities having jurisdiction. Consult manufacturers for availability of tested assemblies.

Testing: According to ASTM E330/E330M[**or DASMA 108 for garage doors and complying with acceptance criteria of DASMA 108**] <**Insert requirement**>.

Revise "Deflection Limits" Subparagraphsubparagraph below to suit Project; verify deflection limits with manufacturer. If using doors as storm shutters to protect glass, stricter deflection limits may be required.

Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

"Operability under Wind Load" Subparagraphsubparagraph below is an uncommon requirement; verify availability with manufacturer. See "Wind Loads" Article in the Evaluations.

Operability under Wind Load: Design overhead coiling doors to remain operable under [**design**] [**uniform pressure (velocity pressure) of 20-lbf/sq. ft. (960-Pa)**] <**Insert load**> wind load, acting inward and outward.

Retain "Windborne-Debris Impact Resistance" Paragraphparagraph below to suit Project. The BCNYS establishes criteria for buildings in hurricane-prone locations. In paragraph, "enhanced" option applies to essential facilities and has additional requirements. Retain only one of first four options; retain DASMA 115 option only for glazed garage doors. Verify requirements of authorities having jurisdiction. Verify which manufacturers have tested products and can demonstrate compliance.

* + - * 1. Windborne-Debris Impact Resistance: Provide [**glazed**] [**and**] [**impact-protective**] overhead coiling doors that pass ASTM E1886 missile-impact and cyclic-pressure tests according to [**ASTM E1996 for Wind Zone 1**] [**ASTM E1996 for Wind Zone 2**] [**ASTM E1996 for Wind Zone 3**] [**ASTM E1996 for Wind Zone 4**] [**or DASMA 115**] for [**basic**] [**enhanced**] protection.

Insert increased heights if different from those in "Large-Missile Test" and "Small-Missile Test" subparagraphs below. "Large-Missile Test" and "Small-Missile Test" subparagraphs below refer only to ASTM E1996 testing. DASMA 115 testing includes only large missiles. For enhanced protection, also delete "Small-Missile Test" Subparagraphsubparagraph.

Large-Missile Test: For overhead coiling doors located within [**30 ft. (9.1 m)**] <**Insert dimension**> of grade.

Small-Missile Test: For overhead coiling doors located between 30 ft. (9.1 m) and [**60 ft. (18.3 m)**] <**Insert dimension**> above grade.

Retain "Seismic Performance" Paragraphparagraph below if required for Project. Nonstructural architectural components in Seismic Design Category A are exempt from seismic design requirements; and in Seismic Design Category B, nonstructural architectural components are generally exempt if the Component Importance Factor is 1.0. Coordinate requirements with Project's structural engineer.

* + - * 1. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to [**ASCE/SEI 7**] <**Insert requirement**>.

The value in "Component Importance Factor" Subparagraphsubparagraph below is determined according to ASCE/SEI 7 based on anticipated risk and need. Revise subparagraph if more than one coiling door is required and they have different component importance factors. Coordinate requirement with Project's structural engineer.

Component Importance Factor: [**1.5**] [**1.0**].

* + - 1. DOOR ASSEMBLY <**Insert drawing designation**>

Copy this article and re-edit for each non-fire-rated coiling-door unit. This article is intended as a guide if Project requires several units of varying sizes, characteristics, and capacities. For each door assembly, retain required options in this article and their related requirements in other Part 2 articles. Consult manufacturers for recommendations and availability.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. [**Service**] [**Insulated Service**] Door: Overhead coiling door formed with curtain of interlocking metal slats.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=7627) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[C.H.I. Overhead Doors, Inc](http://www.specagent.com/Lookup?uid=123457176319).

[Clopay Building Products](http://www.specagent.com/Lookup?uid=123457176321).

[Cookson; a CornellCookson company](http://www.specagent.com/Lookup?uid=123457176322).

[McKeon Rolling Steel Door Company, Inc](http://www.specagent.com/Lookup?uid=123457176325).

[Overhead Door Corporation](http://www.specagent.com/Lookup?uid=123457176327).

[Raynor Garage Doors](http://www.specagent.com/Lookup?uid=123457176329).

[Wayne-Dalton Corp](http://www.specagent.com/Lookup?uid=123457176330).

Or equal.

Retain one of five options in "Operation Cycles" Paragraphparagraph below. The two options are for high-cycle operation, corrosive environments, and severe or abusive use. Consult manufacturer for recommendations.

* + - * 1. Operation Cycles: Door components and operators capable of operating for not less than [**50,000**] [**100,000**]. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

Retain subparagraph below if high-cycle doors are specified.

Include tamperproof cycle counter.

Retain "Air Infiltration" Paragraphparagraph below if required for exterior doors. Rates in first two options are examples only. First option is for "garage doors" and second is for "rolling doors" according to the ECCNYS. Coiling-door manufacturers typically comply with second option. Retain "DASMA 105" option for garage doors. According to DASMA 105, air-infiltration testing is based on ASTM E283 but is performed at wind velocities of 15 and 25 mph (24.1 and 40.2 km/h) across the specimen, not at specified pressure differences as required by ASTM E283. Manufacturers generally do not publish air-infiltration testing or values according to ASTM E283 or DASMA 105. Verify availability of tested assemblies and tested values with manufacturer.

* + - * 1. Air Infiltration: Maximum rate of [**0.4 cfm/sq. ft. (2.03 L/s per sq. m)**] [**1.0 cfm/sq. ft. (5.1 L/s per sq. m)**] <**Insert rate**> at 15 and 25 mph (24.1 and 40.2 km/h) when tested according to [**ASTM E283**] [**or**] [**DASMA 105**].

Retain "STC Rating" Paragraphparagraph below for acoustically insulated doors. Verify STC rating availability with manufacturers.

* + - * 1. STC Rating: [**26**] <**Insert value**>.

Retain "Insulated Door Curtain R-Value" Paragraphparagraph below for thermally insulated doors.

* + - * 1. Insulated Door Curtain R-Value: [**4.5 deg F x h x sq. ft./Btu (0.792 K x sq. m/W)**] <**Insert value**>.
				2. Insulated Door Assembly U-Factor: [**0.90 Btu/deg F x h x sq. ft. (5.1 W/K x sq. m)**] <**Insert value**>.

Galvanized steel is standard, but doors are available from some manufacturers with aluminum or stainless steel curtain, hood, and guides.

* + - * 1. Door Curtain Material: [**Galvanized steel**] [**Stainless steel**] [**Aluminum**].

Slat profile and sizes in "Door Curtain Slats" Paragraphparagraph below vary among manufacturers. Revise size to a range if exact size is not important.

* + - * 1. Door Curtain Slats: Flat profile slats of [**2-5/8-inch (67-mm)**] [**3-1/4-inch (83-mm)**] center-to-center height.

Retain opening size and spacing in "Vision Panels" Subparagraphsubparagraph below or revise to suit Project. Retain last option for use in thermally insulated doors. Do not use with fire doors. Coordinate vision panel location and arrangement with Drawings.

Vision Panels: Approximately 10- by 1-5/8-inch (254- by 41-mm) openings spaced approximately 2 inches (51 mm) apart and beginning 12 inches (305 mm) from end guides; in [**two**] [**three**] <**Insert number**> rows of slats at height indicated on Drawings; installed with[**insulated**] vision-panel glazing.

Revise "Insulated-Slat Interior Facing" Subparagraphsubparagraph below to suit Project. This facing functions as a thermal barrier and its material is restricted for garage doors according to the IBC. See the Evaluations.

Insulated-Slat Interior Facing: Metal.

* + - * 1. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from hot-dip galvanized steel [**or**] [**aluminum extrusions**] and finished [**to match door**].

First two options in "Curtain Jamb Guides" Paragraphparagraph below are most commonly used for service doors.

* + - * 1. Curtain Jamb Guides: [**Galvanized steel**] [**Stainless steel**] [**Aluminum**] with exposed finish matching curtain slats.

If used for emergency egress, pass doors must comply with the egress door requirements of the local code.

* + - * 1. Pass Door(s): [**Hinged**] [**Rigid**] frame with [**lockset**] [**exit hardware**].
				2. Hood: Galvanized steel.

First option in "Shape" Subparagraphsubparagraph below is standard. Verify availability of second option with manufacturer.

Shape: [**Round**] [**Square**] [**As indicated on Drawings**] <**Insert shape**>.

Mounting: [**Face of wall**] [**Between jambs**] [**As indicated on Drawings**].

Retain one of first two options in "Locking Devices" Paragraphparagraph below. Retain last option for chain-hoist-operated doors or emergency chain-hoist operation. The industry generally discourages using locks on motor-operated coiling doors; see the Evaluations.

* + - * 1. Use slide bolts on push-up doors, chain locking keeper on chain operated doors, and locking device assembly on crank operated doors. Cylinder lock on bottom bar is available, but on motor operated door also include protective electrical interlock. Locking Devices: Equip door with [**slide bolt for padlock**] [**locking device assembly**] [**and**] [**chain lock keeper**].

Retain "Locking Device Assembly" Subparagraphsubparagraph below if retaining "locking device assembly" option in "Locking Devices" Paragraphparagraph above.

Locking Device Assembly: [**Single-jamb side**] [**Cremone-type, both jamb sides**] locking bars, operable from [**inside with thumbturn**] [**outside with cylinder**] [**outside only, with cylinder**] [**inside and outside with cylinders**] <**Insert requirement**>.

Retain "Manual Door Operator" or "Electric Door Operator" Paragraphparagraph below.

* + - * 1. Manual Door Operator: [**Push-up operation**] [**Chain-hoist operator**] [**Wall-crank operator**].

Retain first subparagraph below for chain or crank operator if located on other side of wall from door curtain.

Provide operator with through-wall shaft operation.

Retain subparagraph below for crank operator if required.

Provide operator with manufacturer's standard removable operating arm.

* + - * 1. Electric Door Operator:

Retain one of four options in "Usage Classification" Subparagraphsubparagraph below or revise to suit Project. Usage classification varies among manufacturers and for each operator design; it is a durability requirement separate from whole-door "operation cycles." Consult manufacturer for specific recommendations.

Usage Classification: [**Heavy duty, 25 or more cycles per hour and more than 90 cycles per day**] [**Standard duty, up to 25 cycles per hour and up to 90 cycles per day**] [**Medium duty, up to 12 cycles per hour and up to 50 cycles per day**] [**Light duty, up to 10 cycles per hour**] <**Insert classification**>.

Operator Location: Wall [**Through wall**].

Retain "Safety" Subparagraphsubparagraph below if door is used as an automatic garage door; consider retaining it for all power-operated doors. Option is requirement of UL 325; revise to suit Project. The BCNYS requires listing for automatic garage door openers.

Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use[**; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. (2.44 m) or lower**].

Retain one of two options in "Motor Exposure" Subparagraphsubparagraph below or revise to suit Project. The operating environment, including hazardous conditions, may require other motor types and enclosure modifications.

Motor Exposure: [**Interior**] [**Exterior, wet, and humid**].

Retain "Motor Electrical Characteristics" Subparagraphsubparagraph below if characteristics are not indicated on Drawings. Coordinate with Electrical Engineer and Drawings. Current selections are typical.

Motor Electrical Characteristics:

Horsepower: 1/2 [**1**] [**2**] [**3**] hp.

Retain one option in "Voltage" Subparagraphsubparagraph below for ac systems.

Voltage: 115 V ac, single phase, 60 Hz [**208 V ac, single phase, 60 Hz**] [**230 V ac, single phase, 60 Hz**] [**208 V ac, three phase, 60 Hz**] [**230 V ac, three phase, 60 Hz**] [**460 V ac, three phase, 60 Hz**].

Emergency Manual Operation: Chain type.

Obstruction-Detection Device: Automatic electric sensor edge on bottom bar or pneumatic sensor edge on bottom bar[**; self-monitoring type**] .

Sensor Edge Bulb Color: Black.

Control Station(s): [**Interior mounted**] [**Exterior mounted**].

Other Equipment: [**Audible and visual signals**] [**Portable radio-control system**] <**Insert device**>.

See "Curtain Accessories" Article for where each option in "Curtain Accessories" Paragraphparagraph below is used.

* + - * 1. Curtain Accessories: Equip door with [**smoke seals**] [**weatherseals**] [**astragal**] [**push/pull handles**] [**pull-down strap**] [**poll hook**] [**and**] [**automatic-closing device**] <**Insert item**>.
				2. Door Finish:

Retain one of first four subparagraphs below. These include advertised materials and finishes; available materials and finishes vary with each manufacturer. If retaining more than one, indicate location of each on Drawings or by inserts.

Second option in "Aluminum Finish" Subparagraphsubparagraph below is standard; verify availability of other aluminum finishes with manufacturer.

Aluminum Finish: [**Mill**] [**Clear anodized**] [**Light bronze anodized**] [**Medium bronze anodized**] [**Dark bronze anodized**] [**Black anodized**] [**Anodized color matching Architect's sSample**] [**Anodized color as selected by Architect from full range of industry colors and color densities**] <**Insert color**>.

Baked-Enamel or Powder-Coated Finish: [**Color as indicated by manufacturer's designations**] [**Color matching Architect's sSample**] [**Color as selected by Architect from manufacturer's full range**] <**Insert color**>.

Factory Prime Finish: Manufacturer's standard color.

Second option in "Stainless Steel Finish" Subparagraphsubparagraph below is standard; verify availability of other stainless steel finishes with manufacturer.

Stainless Steel Finish: [**ASTM A480/A480M No. 2B (bright, cold rolled)**] [**ASTM A480/A480M No. 4 (polished directional satin)**] <**Insert finish**>.

Retain "Interior Curtain-Slat Facing" Subparagraphsubparagraph below for insulated door curtains.

Interior Curtain-Slat Facing: [**Match finish of exterior curtain-slat face**] [**Finish as indicated by manufacturer's designations**] [**Finish matching Architect's sSample**] [**Finish as selected by Architect from manufacturer's full range**] <**Insert finish**>.

* + - 1. FIRE-RATED DOOR ASSEMBLY <**Insert drawing designation**>

Copy this article and re-edit for each fire-rated coiling-door unit. This article is intended as a guide if Project requires several units of varying sizes, characteristics, and capacities. For each door assembly, retain required options in this article and their related requirements in other Part 2 articles. Consult manufacturers for recommendations and availability.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Fire-Rated [**Service**] [**Insulated Service**] Door: Overhead fire-rated coiling door formed with curtain of interlocking metal slats.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=7628) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[C.H.I. Overhead Doors, Inc](http://www.specagent.com/Lookup?uid=123457176343).

[Clopay Building Products](http://www.specagent.com/Lookup?uid=123457176345).

[Cookson; a CornellCookson company](http://www.specagent.com/Lookup?uid=123457176346).

[Wayne-Dalton Corp](http://www.specagent.com/Lookup?uid=123457176352).

Or equal.

Retain one of five options in "Operation Cycles" Paragraphparagraph below. The two options are for high-cycle operation, corrosive environments, and severe or abusive use. Consult manufacturer for recommendations.

* + - * 1. Operation Cycles: Door components and operators capable of operating for not less than [**50,000**] [**100,000**]. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

Retain subparagraph below if high-cycle doors are specified.

Include tamperproof cycle counter.

Verify availability of temperature-rise limit option in "Fire Rating" Paragraphparagraph below before retaining. This temperature-rise limit is required by codes for some locations.

* + - * 1. Fire Rating: [**3/4 hour**] [**1 hour**] [**1-1/2 hours**] [**3 hours**] [**4 hours**] [**with temperature-rise limit**] [**and**] [**with smoke control**].

Retain "Air Infiltration" Paragraphparagraph below if required for exterior doors. Rates in the first two options are examples only. The first option is for "garage doors" and the second is for "rolling doors" according to the ECCNYS. Coiling-door manufacturers typically comply with the second option. Retain "DASMA 105" option for garage doors. According to DASMA 105, air-infiltration testing is based on ASTM E283 but is performed at wind velocities of 15 and 25 mph (24.1 and 40.2 km/h) across the specimen, not at specified pressure differences as required by ASTM E283. Manufacturers generally do not publish air-infiltration testing or values according to ASTM E283 or DASMA 105. Verify availability of tested assemblies and tested values with manufacturer.

* + - * 1. Air Infiltration: Maximum rate of [**0.4 cfm/sq. ft. (2.03 L/s per sq. m)**] [**1.0 cfm/sq. ft. (5.1 L/s per sq. m)**] <**Insert rate**> at 15 and 25 mph (24.1 and 40.2 km/h) when tested according to [**ASTM E283**] [**or**] [**DASMA 105**].

Retain "STC Rating" Paragraphparagraph below for acoustically insulated fire-rated doors. Verify STC rating availability with manufacturers.

* + - * 1. STC Rating: [**27**] <**Insert value**>.

Retain "Insulated Door Curtain R-Value" Paragraphparagraph below for thermally insulated doors.

* + - * 1. Insulated Door Curtain R-Value: [**4.5 deg F x h x sq. ft./Btu (0.792 K x sq. m/W)**] <**Insert value**>.
				2. Insulated Door Assembly U-Factor: [**0.90 Btu/deg F x h x sq. ft. (5.1 W/K x sq. m)**] <**Insert value**>.
				3. Door Curtain Material: [**Galvanized**] [**Stainless**] steel.

Slat profile and sizes in "Door Curtain Slats" Paragraphparagraph below vary among manufacturers. Revise size to a range if exact size is not important. Curved slats are not insulated.

* + - * 1. Door Curtain Slats: Flat profile slats of [**2-5/8-inch (67-mm)**] [**3-1/4-inch (83-mm)**] <**Insert dimension**> center-to-center height.

Features in "Vision Panels" and "Insulated-Slat Interior Facing" subparagraphs below are available for service doors, from some manufacturers, for specific slat materials and profiles. Verify availability and size with manufacturer; revise to suit Project.

Retain opening size and spacing in "Vision Panels" Subparagraphsubparagraph below or revise to suit Project.

Vision Panels: Approximately 10- by 1-5/8-inch (254- by 41-mm) openings spaced approximately 2 inches (51 mm) apart and beginning 12 inches (305 mm) from end guides; in [**two**] [**three**] <**Insert number**> rows of slats at height indicated on Drawings; installed with fire-rated vision-panel glazing.

Insulated-Slat Interior Facing: Metal.

* + - * 1. Curtain Jamb Guides: [**Galvanized**] [**Stainless**] steel with exposed finish matching curtain slats.

If used for emergency egress, pass doors must comply with the egress door requirements of the local code.

* + - * 1. Pass Door(s): [**Hinged**] [**Rigid**] frame with [**lockset**] [**exit hardware**].
				2. Hood: [**Galvanized steel**] [**Stainless steel**].

First option in "Shape" Subparagraphsubparagraph below is standard. Verify availability of second option with manufacturer.

Shape: [**Round**] [**Square**] [**As indicated on Drawings**] <**Insert shape**>.

Mounting: [**Face of wall**] [**Between jambs**] [**As indicated on Drawings**].

Use slide bolts on push-up doors, chain locking keeper on chain operated doors, and locking device assembly on crank operated doors. Retain last option for chain-hoist-operated doors or emergency chain-hoist operation. The industry generally discourages using locks on motor-operated coiling doors; see the Evaluations.

* + - * 1. Locking Devices: Equip door with [**slide bolt for padlock**] [**locking device assembly**] [**and**] [**chain lock keeper**].

Retain "Locking Device Assembly" Subparagraphsubparagraph below if retaining "locking device assembly" option in "Locking Devices" Paragraphparagraph above.

Locking Device Assembly: [**Single-jamb side**] [**Cremone-type, both jamb sides**] locking bars, operable from [**inside with thumbturn**] [**outside with cylinder**] [**outside only, with cylinder**] [**inside and outside with cylinders**] <**Insert requirement**>.

Retain "Manual Door Operator" or "Electric Door Operator" Paragraphparagraph below.

* + - * 1. Manual Door Operator: [**Push-up operation**] [**Chain-hoist operator**] [**Wall-crank operator**].

Retain first subparagraph below for chain or crank operator if located on other side of wall from door curtain.

Provide operator with through-wall shaft operation.

Retain subparagraph below for crank operators if required.

Provide operator with manufacturer's standard removable operating arm.

* + - * 1. Electric Door Operator:

Retain one of four options in "Usage Classification" Subparagraphsubparagraph below or revise to suit Project. Usage classification varies among manufacturers and for each operator design; it is a durability requirement separate from whole-door "operation cycles." Consult manufacturer for specific recommendations.

Usage Classification: [**Heavy duty, 25 or more cycles per hour and more than 90 cycles per day**] [**Standard duty, up to 25 cycles per hour and up to 90 cycles per day**] [**Medium duty, up to 12 cycles per hour and up to 50 cycles per day**] [**Light duty, up to 10 cycles per hour**] <**Insert classification**>.

Operator Location: Wall [**Through wall**].

Retain "Safety" Subparagraphsubparagraph below if door is used as an automatic garage door; consider retaining for all power-operated doors. Option is requirement of UL 325; revise to suit Project. The IBC requires listing for automatic garage door openers.

Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use[**; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. (2.44 m) or lower**].

Retain one of two options in "Motor Exposure" Subparagraphsubparagraph below or revise to suit Project. The operating environment, including hazardous conditions, may require other motor types and enclosure modifications.

Motor Exposure: [**Interior**] [**Exterior, wet, and humid**].

Retain "Motor Electrical Characteristics" Subparagraphsubparagraph below if characteristics are not indicated on Drawings. Coordinate with Electrical Engineer and Drawings. Current selections are typical.

Motor Electrical Characteristics:

Horsepower: 1/2 [**1**] [**2**] [**3**] hp.

Retain one option in "Voltage" Subparagraphsubparagraph below for ac systems.

Voltage: 115 V ac, single phase, 60 Hz [**208 V ac, single phase, 60 Hz**] [**230 V ac, single phase, 60 Hz**] [**208 V ac, three phase, 60 Hz**] [**230 V ac, three phase, 60 Hz**] [**460 V ac, three phase, 60 Hz**].

Emergency Manual Operation: Chain type.

Obstruction-Detection Device: Automatic electric sensor edge on bottom bar or pneumatic sensor edge on bottom bar [**; self-monitoring type**] .

Sensor Edge Bulb Color: Black.

Control Station(s): [**Interior mounted**] [**Exterior mounted**].

Other Equipment: Audible and visual signals.

See "Curtain Accessories" Article for where each option in "Curtain Accessories" Paragraphparagraph below is used.

* + - * 1. Curtain Accessories: Equip door with smoke seals, automatic-closing device, [**astragal**] [**push/pull handles**] [**pull-down strap**] [**poll hook**] [**and**] <**Insert item**>.
				2. Door Finish:

Retain one of first three subparagraphs below. These include advertised materials and finishes; available materials and finishes vary with each manufacturer. If retaining more than one, indicate location of each on Drawings or by inserts.

Baked-Enamel or Powder-Coated Finish: [**Color as indicated by manufacturer's designations**] [**Color matching Architect's sSample**] [**Color as selected by Architect from manufacturer's full range**] <**Insert color**>.

Factory Prime Finish: Manufacturer's standard color.

Second option in "Stainless Steel Finish" Subparagraphsubparagraph below is standard; verify availability of other stainless steel finishes with manufacturer.

Stainless Steel Finish: [**ASTM A480/A480M No. 2B (bright, cold rolled)**] [**ASTM A480/A480M No. 4 (polished directional satin)**] <**Insert finish**>.

Retain "Interior Curtain-Slat Facing" Subparagraphsubparagraph below for insulated door curtains.

Interior Curtain-Slat Facing: [**Match finish of exterior curtain-slat face**] [**Finish as indicated by manufacturer's designations**] [**Finish matching Architect's sSample**] [**Finish as selected by Architect from manufacturer's full range**] <**Insert finish**>.

* + - 1. MATERIALS, GENERAL

Retain this article for motorized operator.

* + - * 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
			1. DOOR CURTAIN MATERIALS AND CONSTRUCTION

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

* + - * 1. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

Retain one or more of "Steel Door Curtain Slats," "Stainless Steel Door Curtain Slats," and "Aluminum Door Curtain Slats" subparagraphs below for required slat materials. Consult manufacturers' data and revise subparagraphs to specify other materials if needed. Verify sheet thicknesses with manufacturer.

Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 0.028 inch (0.71 mm); and as required.

Stainless Steel Door Curtain Slats: ASTM A240/A240M or ASTM A666, Type 304; sheet thickness of 0.025 inch (0.64 mm); and as required.

Aluminum is not applicable to fire-rated assemblies.

Aluminum Door Curtain Slats: ASTM B209 (ASTM B209M) sheet or ASTM B221 (ASTM B221M) extrusions, alloy, and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch (1.27 mm); and as required.

Retain "Vision-Panel Glazing" Subparagraphsubparagraph below if vision panels are required for curtain slats. Vision-panel availability may be limited to some manufacturers and according to type of slat. Verify availability with manufacturer.

Vision-Panel Glazing: Manufacturer's standard clear glazing, fabricated from transparent acrylic sheet or fire-protection-rated glass as required for type of door; set in glazing channel secured to curtain slats.

Retain "Insulation," "Metal Interior Curtain-Slat Facing," and "Plastic Interior Curtain-Slat Facing" subparagraphs below as required for thermally or acoustically insulated doors; revise to suit Project.

Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.

"Metal Interior Curtain-Slat Facing" and "Plastic Interior Curtain-Slat Facing" subparagraphs below describe different interior facings for insulated slats; facing in first subparagraph is most common. For garage doors, the IBC requires a minimum thickness of aluminum, steel, or wood as a thermal barrier over foam-plastic insulation (polystyrene or polyurethane foam or board) or testing according to DASMA 107. Aluminum is not applicable to fire-rated assemblies. See the Evaluations.

Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with [**minimum steel thickness of 0.010 inch (0.25 mm)**] [**and**] [**minimum aluminum thickness of 0.032 inch (0.80 mm)**].

Option below is not applicable for fire-rated assemblies.

* + - * 1. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain[**, and a continuous bar for holding windlocks**].

Retain "Pass Door(s)" Paragraphparagraph below if pass doors are required.

* + - * 1. Pass Door(s): Swinging-door and frame assembly constructed integrally with the coiling-door assembly[**and bearing the same fire rating**]. Comply with the accessibility standard of authorities having jurisdiction.

Door Frame and Integral Jamb Guide: Fabricate of angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading.

Frame in "Hinged Frame" Subparagraphsubparagraph below is available from many manufacturers. See the Evaluations.

Hinged Frame: Hinged pass door and frame that swings out of the way, as a unit, to allow use of the full coiling-door opening width. One jamb of the pass-door frame is hinged and the other jamb includes a guide for the lower, narrower part of the coiling-door curtain.

Retain "Rigid Frame" Subparagraphsubparagraph below only if there is sufficient headroom above door to accommodate rigid lower part of coiling door that contains the pass door. This type is available from McKeon; verify availability with other manufacturers.

Rigid Frame: Rigid pass door and frame that are built into the rigid, lower part of the door curtain and that raise with the curtain.

Locking Hardware:

Consult manufacturer on hardware that can be installed in pass doors.

[**Lockset**] [**Exit Hardware**]: [**As specified in Section 087100 "Door Hardware."**] [**As specified in Section 087111 "Door Hardware (Descriptive Specification)."**] [**As selected by Architect from manufacturer's full range.**] <**Insert requirement.**>

Retain one of first three options in "Lock Cylinders" Subparagraphsubparagraph below.

Lock Cylinders: As [**specified in Section 087100 "Door Hardware"**] [**specified in Section 087111 "Door Hardware (Descriptive Specification)"**] [**standard with manufacturer**] [**and keyed to building keying system**].

Retain "Keys" Subparagraphsubparagraph below if cylinders are provided by door manufacturer.

Keys: [**Two**] [**Three**] <**Insert number**> for each cylinder.

Revise "Thresholds" Subparagraphsubparagraph below to suit Project.

Thresholds: Equip pass doors with integral thresholds that comply with the accessibility standard of authorities having jurisdiction.

* + - 1. HOODS

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

Retain "General" Paragraphparagraph below if coiled curtain and operating mechanism are exposed (not concealed in ceiling or soffit); consider retaining a hood even if coiled door is above ceiling.

* + - * 1. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

Retain required material(s) in "Galvanized Steel," "Stainless Steel," and "Aluminum" subparagraphs below. Thicker steel sheet is available from some manufacturers; verify availability.

Galvanized Steel: Nominal 0.028-inch- (0.71-mm-) thick, hot-dip galvanized-steel sheet with G90 (Z275) zinc coating, complying with ASTM A653/A653M.

Stainless Steel: 0.025-inch- (0.64-mm-) thick, stainless steel sheet, Type 304, complying with ASTM A240/A240M or ASTM A666.

"Aluminum" Subparagraphsubparagraph below is for non-fire-rated doors only. Clear- and color-anodized finishes are available.

Aluminum: 0.040-inch- (1.02-mm-) thick aluminum sheet complying with ASTM B209 (ASTM B209M), of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

Retain first subparagraph below for fire-rated assemblies.

Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

Retain "Exterior-Mounted Doors" Subparagraphsubparagraph below for exterior-mounted doors.

Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

Retain "Removable Metal Soffit" Paragraphparagraph below for concealed installations only. Metal soffit is not often used. Indicate location, details, and size on Drawings.

* + - * 1. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling unless otherwise indicated.
			1. LOCKING DEVICES

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

Retain one of or both "Slide Bolt" and "Locking Device Assembly" paragraphs below for required locking device(s); revise to suit Project. First paragraph is standard for push-up doors; revise if no padlock is required or if manufacturer's standard is a bolt on one side. Second paragraph describes a locking device with choice of locations and operation as retained in door assembly articles in Part 2.

* + - * 1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
				2. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

Retain one of first three options in "Lock Cylinders" Subparagraphsubparagraph below.

Lock Cylinders: As [**specified in Section 087100 "Door Hardware"**] [**specified in Section 087111 "Door Hardware (Descriptive Specification)"**] [**standard with manufacturer**] [**and keyed to building keying system**].

Retain "Keys" Subparagraphsubparagraph below if cylinders are provided by door manufacturer.

Keys: [**Two**] [**Three**] <**Insert number**> for each cylinder.

Retain "Chain Lock Keeper" Paragraphparagraph below for chain-hoist-operated doors or emergency chain-hoist operation.

* + - * 1. Chain Lock Keeper: Suitable for padlock.

Retain "Safety Interlock Switch" Paragraphparagraph below for power-operated doors.

* + - * 1. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
			1. CURTAIN ACCESSORIES

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

Retain "Smoke Seals" Paragraphparagraph below for fire-rated doors.

* + - * 1. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

Retain "Weatherseals for Exterior Doors" Paragraphparagraph below if required.

* + - * 1. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

At door head, use 1/8-inch- (3-mm-) thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.

At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- - (3-mm-) thick seals of flexible vinyl, rubber, or neoprene.

Retain "Astragal for Interior Doors" Paragraphparagraph below for interior doors.

* + - * 1. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

Retain "Push/Pull Handles" Paragraphparagraph below for push-up-operated doors or emergency push-up operation.

* + - * 1. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

Retain "Pull-Down Strap" or "Poll Hooks" Paragraphparagraph below if required. Consult manufacturer for recommendations.

* + - * 1. Pull-Down Strap: Provide pull-down straps for doors more than 84 inches (2130 mm) high.
				2. Poll Hooks: Provide pole hooks and poles for doors more than 84 inches (2130 mm) high.

Retain "Automatic-Closing Device" Paragraphparagraph below for fire-rated doors.

* + - * 1. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism.[**Testing for manually operated doors shall allow resetting by opening the door without retensioning the counterbalance mechanism**][**Release mechanism for motor-operated doors shall allow testing without mechanical release of the door.**] Automatic-closing device shall be designed for activation by the following:

Retain one or more of four subparagraphs below and insert others if required to suit Project. If more than one type of activation (or combination) is required, identify primary and secondary closing devices. Verify requirements of authorities having jurisdiction. See the Evaluations.

Retain first subparagraph below to comply with NFPA 80 requirement for fusible links on both sides of door opening. Revise if not required on both sides of door opening or to add fusible-link ceiling unit for use with suspended ceilings.

Replaceable fusible links with temperature rise and melting point of 165 deg F (74) deg C) interconnected and mounted on both sides of door opening.

Manufacturer's standard UL-labeled smoke detector and door-holder-release devices.

Manufacturer's standard UL-labeled heat detector and door-holder-release devices.

Building fire-detection, smoke-detection, and -alarm systems.

Insert other accessories to suit Project.

* + - 1. COUNTERBALANCE MECHANISM

Retain this article for all doors.

* + - * 1. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

In "Counterbalance Barrel" Paragraphparagraph below, retain "seamless" option for greatest durability and "welded" option for lower cost and smaller doors. Consult manufacturer for recommendations.

* + - * 1. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, [**seamless**] [**or**] [**welded**] carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.
				2. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.

* + - * 1. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
				2. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.
			1. MANUAL DOOR OPERATORS

Retain this article for manually operated doors, not including emergency manual operation for electric door operators.

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

* + - * 1. General: Equip door with manual door operator by door manufacturer.

Requirement in "Push-up Door Operation" Paragraphparagraph below is common for service doors with area of not more than 80 sq. ft. (7.4 sq. m). Standard operation force as high as 35 lbf (156 N) is offered by manufacturers.

* + - * 1. Push-up Door Operation: Lift handles and pull rope for raising and lowering doors, with counterbalance mechanism designed so that required lift or pull for door operation does not exceed 25 lbf (111 N).

Items in "Chain-Hoist Operator" and "Crank Operator" paragraphs below are common for manually operated doors with area of more than 80 sq. ft. (7.4 sq. m).

* + - * 1. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf (111-N) force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.
				2. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of type indicated. Size gears to require not more than 25-lbf (111-N) force to turn crank. Fabricate gearbox to be oiltight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.
			1. ELECTRIC DOOR OPERATORS

Retain this article for electric door operators, including emergency manual operation, and for larger units and remotely controlled or frequently operated doors. Coordinate with Project's electrical engineer for interface of electric door operators and equipment with fire-protection system.

Retain requirements in this article to suit Project. If retaining multiple requirements for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

* + - * 1. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

Consider naming a door-operator model or manufacturer or basis-of-design door-operator model or manufacturer only if known and available from coiling-door manufacturer and other operators are unacceptable. Specific operators may not be available from all door manufacturers; operator features may not be common to all operator manufacturers. Consult door manufacturers for recommendations.

Comply with NFPA 70.

Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

Durability requirement in "Usage Classification" Paragraphparagraph below is separate from "operation cycles," which apply to the whole door system and are specified in door assembly articles.

* + - * 1. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
				2. Door Operator Location(s): Operator location indicated for each door.

Retain second subparagraph below if required for the Project. Delete all subparagraphs if operator location(s) is indicated on Drawings.

Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.

Through-Wall Mounted: Operator is mounted on other side of wall from coil side of door.

Retain option in "Motors" Paragraphparagraph below unless external controller (disconnect switch) is indicated on Drawings. Coordinate with Project's electrical engineer.

* + - * 1. Motors: Reversible-type motor[**with controller (disconnect switch)**] for motor exposure indicated for each door assembly.

Speed in "Electrical Characteristics" Subparagraphsubparagraph below is for standard-speed doors. Consult manufacturer and revise for higher-speed operation.

Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.

Revise "Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring" Subparagraphsubparagraph below if required; coordinate requirements with Project's electrical engineer. Verify which electrical devices, connections, and wiring, if any, are furnished or installed by other than coiling-door manufacturer; these devices must comply with requirements for electrical devices and connections specified elsewhere.

Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

* + - * 1. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

Retain "Obstruction-Detection Devices" Paragraphparagraph below if required; revise if required for fire-rated door applications according to requirements of authorities having jurisdiction.

* + - * 1. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. [**For fire-rated doors, activation delays closing.**]

Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

Retain "Self-Monitoring Type" Subparagraphsubparagraph below if a self-monitoring system to detect failure of sensing device is required.

Self-Monitoring Type: Four-wire-configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

Device in "Pneumatic Sensor Edge" Subparagraphsubparagraph below may be limited to a width of 18 ft. (5.5 m); verify availability with manufacturer.

Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.

Retain "Control Station" Paragraphparagraph for control stations in fixed locations. A sustained- or constant-pressure (in lieu of a momentary-contact) switch is required for closing according to UL 325 for commercial doors and may also be required for opening cycles according to authorities having jurisdiction; revise requirements and door assembly articles retained in Part 2 as needed.

* + - * 1. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

Retain "Interior-Mounted Units" Subparagraphsubparagraph below for interior, clean, and dry installations. Revise to suit Project.

Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

Retain "Exterior-Mounted Units" Subparagraphsubparagraph below for exterior, dusty, wet, or humid installations. Revise to suit Project.

Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

* + - * 1. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf (111 N).
				2. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
				3. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

Insert additional equipment for door operation if required; verify availability with manufacturer. Remaining paragraphs are examples only; retain or revise to suit Project.

* + - * 1. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.
			1. GENERAL FINISH REQUIREMENTS
				1. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
				2. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
			2. ALUMINUM FINISHES

Retain finishes in this article to suit Project. If retaining more than one for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2. Revise finish designation if custom anodized finish is required and availability is verified.

* + - * 1. Mill Finish: Manufacturer's standard.

Retain one of two options in "Clear Anodic Finish" Paragraphparagraph below. Class II finish is standard with many manufacturers; Class I finish is heavy anodized. Verify availability with manufacturer.

* + - * 1. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.

Retain one of two options in "Color Anodic Finish" Paragraphparagraph below. Verify availability with manufacturer.

* + - * 1. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

"Baked-Enamel or Powder-Coat Finish" Paragraphparagraph below references AAMA standard for pigmented organic coating on extrusions and panels.

* + - * 1. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
			1. STEEL AND GALVANIZED-STEEL FINISHES

Revise article title if galvanized surfaces are not finish painted.

Retain "Factory Prime Finish" or "Baked-Enamel or Powder-Coat Finish" Paragraphparagraph below, or both. If retaining both paragraphs for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

* + - * 1. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
				2. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

For exact finish, insert names of coating manufacturers and products.

* + - 1. STAINLESS STEEL FINISHES
				1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

Retain "Polished Finishes" or "Bright, Cold-Rolled, Unpolished Finish" Paragraphparagraph below, or both. Directional satin finish is the standard stainless steel finish for all manufacturers. Verify availability of other finishes with manufacturer. If retaining more than one for different doors and to identify optional requirements for a single door, revise requirements below and insert text as needed in door assembly articles retained in Part 2.

* + - * 1. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

Retain first subparagraph below for directional finishes.

Run grain of directional finishes with long dimension of each piece.

When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

Directional Satin Finish: ASTM A480/A480M No. 4.

Retain "Bright, Cold-Rolled, Unpolished Finish" Paragraphparagraph below for nondirectional finish.

* + - * 1. Bright, Cold-Rolled, Unpolished Finish: ASTM A480/A480M No. 2B.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
				2. Examine locations of electrical connections.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION, GENERAL
				1. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
				2. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
				3. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

Retain "Fire-Rated Doors," "Smoke-Control Doors," and "Power-Operated Doors" paragraphs below if required.

* + - * 1. Fire-Rated Doors: Install according to NFPA 80.
				2. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

Option in "Power-Operated Doors" Paragraphparagraph below is according to minimum IBC requirement for "automatic garage door openers." Delete option to include all power-operated doors.

* + - * 1. Power-Operated Doors: Install[**automatic garage doors openers**] according to UL 325.
			1. FIELD QUALITY CONTROL

Retain "Testing Agency" Paragraphparagraph below to identify who shall perform tests and inspections. If retaining second option below, retain "Field quality-control reports" Paragraphparagraph in "Informational Submittals" Article.

* + - * 1. Testing Agency: [**Director’s Representative Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections and to furnish reports to Architect.
				2. Perform the following tests and inspections[**with the assistance of a Company Service Advisorfactory-authorized service representative**]:

Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.

Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

* + - * 1. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
				2. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
				3. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in [**NFPA 80**] [**and**] [**NFPA 101**].
			1. STARTUP SERVICE
				1. Engage a Company Service Advisorfactory-authorized service representative to perform startup service.

Complete installation and startup checks according to manufacturer's written instructions.

After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.

Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

* + - 1. ADJUSTING
				1. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

Retain subparagraph below for exterior doors.

Adjust exterior doors and components to be weather resistant.

* + - * 1. Lubricate bearings and sliding parts as recommended by manufacturer.

Retain paragraph below if weather-resistant installation or smoke-control doors are required.

* + - * 1. Adjust seals to provide tight fit around entire perimeter.
			1. MAINTENANCE SERVICE

Verify with Owner Directory’s Representative that maintenance service is required for Project.

* + - * 1. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include [**three**] [**six**] [**nine**] [**12**] months' full maintenance by skilled employees of coiling-door Installer. Include [**monthly**] [**quarterly**] preventive maintenance, repair, or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

Retain one of two subparagraphs below. Generally, retain second subparagraph, which adds appreciable cost, only for critical locations.

Perform maintenance, including emergency callback service, during normal working hours.

Include 24-hour-per-day, seven-day-per-week, emergency callback service.

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

END OF SECTION 083323