SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Insulated exterior service doors.
   2. Interior Service doors.
   3. Interior Fire rated service doors.
   4. Integration of electrified hardware, access control systems, and security systems into door and frame assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data including construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   1. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
   2. Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: Submit plans, elevations, sections, and mounting details.
   1. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Include points of attachment and corresponding static and dynamic loads imposed on structure.
   3. Exterior Components: Include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
   4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   5. Include diagrams for power, signal, and control wiring.

C. Samples: Submit for each type of exposed finish in 6 inch (150 mm) lengths:
   1. Curtain slats.
   2. Bottom bar with sensor edge.
   3. Guides.
   4. Brackets.
   5. Hood.
   6. Locking device(s).

7. Include similar Samples of accessories involving color selection.

D. Delegated Design Submittal: Submit for overhead coiling doors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail fabrication and assembly of seismic restraints.
   2. Summary of forces and loads on walls and jambs.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for Installer and testing and inspecting agency.
   1. Fire Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.
   2. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

B. Seismic Qualification Certificates: Submit manufacturer’s certificate for overhead coiling doors**,** accessories, and components.

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

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit data for overhead coiling doors to include in maintenance manuals.

B. Record Documents: Submit documents for fire rated doors including list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum 5 years documented experience who employs installers and supervisors trained and approved by manufacturer for both installation and maintenance of units required.
   1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's location of business to site.

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

C. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling door manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in original packaging, labeled to indicate model and series. Store materials in protected dry location off the ground in accordance with manufacturer's instructions.

1.7 WARRANTY

A. Written warranty signed by manufacturer in which manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design overhead coiling doors, including comprehensive engineering analysis by a qualified professional engineer using performance requirements and design criteria indicated.

B. Structural Performance, Exterior Doors: Capable of withstanding design wind loads, the effects of gravity loads, and loads and stresses within limits and under conditions indicated in accordance with SEI/ASCE 7.
   1. Design Wind Load: Indicated on Drawings.
      a. Basic Wind Speed: indicated on Drawings**.**
      b. Importance Factor: 1.0.
      c. Exposure Category: C.
   2. Testing: In accordance with ASTM E 330/E 330M.
   3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
   1. Component Importance Factor: 1.0.

D. Air Infiltration; provide maximum air infiltration indicated for each unit type:
   1. Exterior Insulated Assembly; Maximum rate of 0.4 cfm/sq. ft. (2.03 L/s per sq. m) at 15 and 25 mph (24.1 and 40.2 km/h) when tested in accordance with ASTM E 283, ASHRAE 90.1 or DASMA 105.
   2. Interior Assemblies: comply with NFPA 105 air leakage requirements and NFPA 80 and UL 1784.

E. STC Rating: provide minimum STC rating indicated for each unit type.

F. Curtain R-Value: provide minimum R-Value indicated for each unit type.

G. Operation Cycles: Door components and operators capable of operating for not less than the indicated number of cycles for each unit type. 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.

1. Include tamperproof cycle counter.

H. Fire Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire protection ratings indicated, based on testing as close to neutral pressure as possible in accordance with NFPA 252 or UL 10B.

1. Smoke Control: For all fire rated units, 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 in accordance with 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.

I. 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.

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

2. Smoke Control: In corridors and smoke barriers], provide doors UL listed and labeled with the letter "S" on the fire rating label for smoke and draft control based on testing in accordance with 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.

J. 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.

K. Sound Control Doors: Assemblies tested in a laboratory for sound transmission loss performance in accordance with ASTM E 90, calculated in accordance with ASTM E 413, and rated for not less than the STC value indicated.

L. Accessibility Requirements: Comply with applicable requirements.

1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).

2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.2 DOOR ASSEMBLY **(TYPE EXT-1)**

A. Insulated Service Door Exterior Applications: Overhead coiling door formed with curtain of interlocking metal slats.

B. Basis of Design: Subject to compliance with requirements, provide Thermiser Max Model ESD30 by the Cookson Company.

1. Subject to compliance with requirements, products by one of the following manufacturers meeting or exceeding the properties of the Basis of Design product may be acceptable:
   a. Clopay Building Products.
   b. Cornell Iron Works, Inc.
   c. McKeon Rolling Steel Door Company, Inc.
   d. Overhead Door Corporation.
   e. Wayne-Dalton Corp.

C. Door Curtain Material: Galvanized steel 20 gauge minimum thickness

D. Door Curtain Slats: Flat profile slats of 2-5/8 inch center to center height, filled with closed cell pressure foamed in place urethane insulation to meet the R-value indicated.
   1. Gasket Seal. Provide continuous gaskets and seals necessary to meet air infiltration, R and STC values.

E. Bottom Bar: Insulated bottom bar composed of two angles, each not less than 1-1/2 inch by 1-1/2 inch by 1/8 inch thick; fabricated from hot dip galvanized steel or stainless steel. Provide full depth insulation and exterior skin slat to match curtain material and finish.

F. Curtain Jamb Guides: Thermal Break required. Provide minimum 3/16 inch structural galvanized steel guides. Provide stainless steel windlock bars of same material when windlocks are required to meet specified wind load.
   1. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.
   2. Top 16-1/2 inches of coil side guide angles shall be removable for ease of curtain installation and as needed for future curtain service.

G. Hood: Match curtain material and finish; Metal cover to protect the coil and operator from exterior weather, debris or to meet OSHA or UL 325 safety requirements.
   1. Shape: Round.
   2. Mounting: Face of wall.

H. 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. Single jamb side locking bars, operable from inside and outside with cylinders.
   1. Lock Cylinders: Provide cylinders specified in Section 08 71 00 "Door Hardware".
   2. Keys: Provide three for each cylinder.
   3. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

I. STC Rating: 26.

J. Curtain R-Value: 8.0 deg F x h x sq. ft./Btu.

K. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and over 90 cycles per day; Basis of Design Model SG by the Cookson Company with functionality indicated.
2. Operator Location: Wall in location indicated or coordinated with Architect during submittals.
3. 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 feet (2.44 m) or lower.
4. Motor Exposure: Exterior, wet, and humid.
   a. Motor shall be high starting torque, industrial type, with overload protection.
5. Emergency Manual Operation: Chain type.
   a. The emergency manual chain hoist assembly is automatically disengaged when motor is energized.
   b. The manual operation chain shall be on the jamb side of the door unit as indicated in the Drawings or as coordinated by the Architect. The chain shall operate away from the door unit and all components including the hood cover.
   c. Provide Chain Lock Keeper as specified.
6. Motor Electrical Characteristics:
   a. Horsepower: as recommended by manufacturer for specified usage classification but no less than 3/4 horsepower (hp).
   b. Voltage: 460-V ac, three phase, 60 Hz.
7. Obstruction Detection Device: Automatic photoelectric sensor AND electric sensor edge on bottom bar.
   a. Sensor Edge Bulb Color: Black.
8. Control Station(s): Interior, surface mounted; “Open / Close / Stop” push buttons NEMA 1. Locate where shown on Drawings or as coordinated with Architect in submittals.
9. Other Equipment: Audible and visual signals, backup power control box and accessories required for door unit to operate on emergency power.

L. Curtain Accessories: Equip door with weatherseals and automatic closing device.

M. Door Finish:
1. Powder Coated Finish: Phosphatized Powder Coating; Color selected by Architect from manufacturer’s full range.
2. Factory Prime Finish: Standard.
3. Interior Curtain Slat Facing: Match finish of exterior curtain slat face Finish selected by Architect.

2.3 FIRE RATED DOOR ASSEMBLY **(TYPE INT-1)**

A. Basis of Design: Subject to compliance with requirements, provide Rollup Fire Door with Smoke Shield Model ERD11 by the Cookson Company.

1. Subject to compliance with requirements, products by one of the following manufacturers meeting or exceeding the properties of the Basis of Design product may be acceptable:
   a. Clopay Building Products.
   b. Cornell Iron Works, Inc.
   c. McKeon Rolling Steel Door Company, Inc.
   d. Overhead Door Corporation.
   e. Wayne-Dalton Corp.

B. Fire Rating: 1 hour with temperature rise limit and with smoke control certification.
   1. Provide enhanced smoke protection to comply with UL1784.

C. Combination Weather/Smoke Seals:
   1. Bottom Bar:
      a. Motor Operated Doors: Combination smoke seal/sensing edge
   2. Guides and Head: Replaceable, UL listed, brush smoke seals sealing against fascia side of curtain

D. Door Curtain Material: Galvanized steel 20 gauge minimum thickness.

E. Door Curtain Slats: Flat profile slats of 2-5/8 inch (67 mm) center to center height center to center height.

F. Bottom Bar:
   1. Configuration: Structural Steel Angles; 2 structural steel angles minimum 2 inch x 2 inch x 1/8 inch.
   2. Finish: Match slats.

G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats; minimum 3/16 inch thickness configured to meet application and all specified operation and function.

H. Hood: Match curtain material and finish.
   1. Shape: Round.
   2. Mounting: Face of wall.

I. 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. Single jamb side locking bars, operable from inside and outside with cylinders.
   1. Lock Cylinders: Provide cylinders specified in Section 08 71 00 "Door Hardware".
   2. Keys: Provide three for each cylinder.
   3. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

J. STC Rating: 26

K. Electric Door Operator:

1. UL, cUL listed NEMA 1 enclosure. Provide a totally enclosed non ventilated motor, removable without affecting the setting of limit switches; thermal overload protection, planetary gear reduction, adjustable rotary limit switch mechanism and a transformer with 24v secondary output. All internal electrical components are to be prewired to terminal blocks.
    a. Provide a failsafe motor operated door assembly requiring no ancillary or externally mounted release devices, cables, chains, pulleys, reset handles or mechanisms.
    b. Provide an internal electrical failsafe release device that requires no additional wiring, external cables or mounting locations.
    c. Provide an internal solenoid brake mechanism to hold the door at any position during normal door operation.
    d. Provide logic for fully monitored safety reversing devices such that the failure of any single monitored device will cause the motor operator to automatically revert to constant pressure to close.
    e. Electrically activate door system automatic closure by notification from central fire alarm system and as required by the Local Authority. Unit shall be fully integrated with the fire alarm system to provide auto closure when alarm is activated.
    f. Provide all optional devices required that allows tie in to building alarm system and closes a Simple-Test fire door upon alarm activation, rather than by melting its fusible link.
    g. Provide an automatic alarm closure selectable time delay of zero or ten seconds.
    h. Control automatic closure speed with an internal, totally enclosed, variable rate centrifugal governor without the use of electrical pulsation, constant rate viscosity, oscillation type or other exposed governing devices.
    i. Maintain automatic closure speed at not more than 9” (229 mm) per second.
    j. Enable safety edge function during alarm closing while power is present for 3 cycles. Enable door to rest upon obstruction following this sequence.
    k. Electrically reset internal failsafe release device and door operating system upon restoration of electrical power and upon clearing of the alarm signal without requiring human interaction.
    l. Provide selectable ability for the door system to automatically self-cycle to the fully open position following automatic reset without requiring human interaction.
    m. Provide an integral, non-resettable cycle counter.
    n. Ensure that manual resetting of spring tension, release devices, linkages or mechanical dropouts will not be required.
    o. Provide minimum #50 roller chain for drive connection from motor drive assembly to the door drive shaft.
    p. Install system only with manufacturer supplied or specified fasteners.
    q. Notify electrical contractor to mount control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the door system wiring instructions.
    r. Drop test and reset door system twice by all means of activation and comply fully with NFPA 80 Section 5.
2. Usage Classification: Heavy Duty Industrial.

3. Operator Location: Top of hood.
4. Safety: Listed in accordance with 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 feet (2.44 m) or lower.
5. Motor Exposure: Interior.
6. Motor Electrical Characteristics:
   a. Horsepower: as recommended by manufacturer for application but no less than 3/4 hp.
   b. Voltage: 460-V ac, three phase, 60 Hz.
7. Emergency Manual Operation: Chain type.
   a. The emergency manual chain hoist assembly is automatically disengaged when motor is energized.
   b. The manual operation chain shall be on the jamb side of the door unit as indicated in the Drawings or as coordinated by the Architect. The chain shall operate away from the door unit and all components including the hood cover.
   c. Provide Chain Lock Keeper as specified.
8. Obstruction Detection Device: Automatic photoelectric sensor AND electric sensor edge on bottom bar.
   a. Sensor Edge Bulb Color: Black.
9. Control Station(s): Interior, surface mounted; “Open / Close / Stop” push buttons NEMA 1. Locate where shown on Drawings or as coordinated with Architect in submittals.
10. Other Equipment: Audible and visual signals, backup power control box and accessories required for door unit to operate on emergency power.

L. Curtain Accessories: Equip door with smoke seals, automatic closing device.

M. Door Finish:
1. Baked Enamel or Powder Coated Finish: Color selected by Architect from manufacturer’s full range.
2. Factory Prime Finish: Standard color.
3. Interior Curtain Slat Facing: Baked Enamel or Powder Coated Finish: Color selected by Architect from manufacturer’s full range.

2.4 SERVICE DOOR ASSEMBLY **(TYPE INT-2)**

A. Basis of Design: Subject to compliance with requirements, provide Rollup Door with Smoke Shield Model ESD10 by the Cookson Company.
1. Subject to compliance with requirements, products by one of the following manufacturers meeting or exceeding the properties of the Basis of Design product may be acceptable:
   a. Clopay Building Products.
   b. Cornell Iron Works, Inc.
   c. McKeon Rolling Steel Door Company, Inc.

d. Overhead Door Corporation.
e. Wayne-Dalton Corp.

B. Fire Rating: Non-Rated

C. Seals:
1. Guides: Vinyl strip sealing against fascia side of curtain
2. Hood: Neoprene/rayon baffle to impede air flow above coil
3. Lintel Seal: Nylon brush seal fitted at door header to impede air flow

D. Door Curtain Material: Galvanized steel; 24 gauge minimum thickness.

E. Door Curtain Slats: Flat profile slats of 2-5/8 inch (67 mm) center to center height center to center height.

F. Bottom Bar:
1. Configuration: Structural Steel Angles; 2 structural steel angles minimum 2 inch x 2 inch x 1/8 inch.
2. Finish: Match slats

G. Curtain Jamb Guides: Galvanized steel minimum 3/16 inch thickness with exposed finish matching curtain slats.

H. Hood: Match curtain material and finish.
1. Shape: Round.
2. Mounting: Face of wall.

I. 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. Single jamb side locking bars, operable from inside and outside with cylinders.
1. Lock Cylinders: Provide cylinders specified in Section 08 71 00 "Door Hardware".
2. Keys: Provide three for each cylinder.
3. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

J. Locking Devices: Equip door with slide bolt for padlock and chain lock keeper.
1. Locking Device Assembly: Single jamb side locking bars, operable from inside as coordinated in submittals.

K. Electric Door Operator:
1. Usage Classification: Medium duty, up to 10 cycles per hour.
2. Operator Location: Top of hood.
3. Safety: Listed in accordance with 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 feet (2.44 m) or lower.
4. Motor Exposure: Interior.

5. Motor Electrical Characteristics:
   a. Horsepower: as recommended by manufacturer for application but no less than 1/2 hp.
   b. Voltage: 460-V ac, three phase, 60 Hz
6. Emergency Manual Operation: Chain type.
   a. The emergency manual chain hoist assembly is automatically disengaged when motor is energized.
   b. The manual operation chain shall be on the jamb side of the door unit as indicated in the Drawings or as coordinated by the Architect. The chain shall operate away from the door unit and all components including the hood cover.
   c. Provide Chain Lock Keeper as specified.
7. Obstruction Detection Device: Automatic electric sensor edge on bottom bar.
   a. Sensor Edge Bulb Color: Black.
8. Control Station(s): Interior, surface mounted; “Open / Close / Stop” push buttons NEMA 1. Locate where shown on Drawings or as coordinated with Architect in submittals.
9. Other Equipment: Audible and visual signals, backup power control box and accessories required for door unit to operate on emergency power.

L. Curtain Accessories: Equip door with smoke seals, automatic closing device.

M. Door Finish:
1. Baked Enamel or Powder Coated Finish: Color selected by Architect from manufacturer’s full range.
2. Factory Prime Finish: Standard color.
3. Interior Curtain Slat Facing: Finish selected by Architect.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. 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:
1. Steel Door Curtain Slats: Zinc coated (galvanized), cold rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 0.028 inch (0.71 mm); and as required.
2. Insulation: Fill slats for insulated doors with thermal insulation complying with maximum flame spread and smoke developed indexes of 75 and 450, respectively, in accordance with ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
3. Metal Interior Curtain Slat Facing: Match metal of exterior curtain slat face, with minimum steel thickness of 24 gauge unless otherwise noted in unit description.

2.6 HOODS

A. 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.

1. Galvanized Steel: Material as indicated in individual assembly descriptions; Minimal Nominal thickness of 0.028 inch (0.71 mm) thick, hot dip galvanized steel sheet with G90 (Z275) zinc coating, complying with ASTM A 653/A 653M.

B. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling unless otherwise indicated.

2.7 LOCKING DEVICES

A. 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.

B. Emergency Manual Operation for all units: Chain type.

1. The manual operation chain shall be on the jamb side of the door unit as indicated in the Drawings or as coordinated by the Architect. The chain shall operate away from the door unit and all components including the hood cover.
2. Provide Chain Lock Keeper as specified.

C. 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.

1. Lock Cylinders: Refer to Section 08 71 00.
2. Keys: Three for each cylinder.

D. Chain Lock Keeper: Suitable for padlock; provide for all units.

E. Safety Interlock Switch: Equip all power operated doors with safety interlock switch to disengage power supply when door is locked.

F. Integration for Fire Protection: Fire rated units shall be integrated with fire alarm as indicated in their description. Make provisions for installation of electrical items; provide cutouts so wiring can be readily removed and replaced.

1. Provide cutouts and reinforcements required for coiling doors to accept fire protection components.

2.8 CURTAIN ACCESSORIES

A. 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.

B. 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.

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

C. 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.

D. Pull Down Strap: Provide pull down straps for doors more than 84 inches (2130 mm) high.

E. 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. Release mechanism for motor operated doors shall allow testing without mechanical release of the door or replacement of fusable links or other components. Automatic closing device shall be designed for activation by the following:

1. Replaceable fusible links with temperature rise and melting point of 165 degrees F (74 degrees C)] interconnected and mounted on both sides of door opening.
2. UL labeled smoke detector and door holder release devices.
3. UL labeled heat detector and door holder release devices.
4. Building fire detection, smoke detection, and alarm systems.

2.9 COUNTERBALANCE MECHANISM

A. Counterbalance doors by means of a standard mechanism with 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.

B. Counterbalance Barrel: Fabricate spring barrel of 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.

C. 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.

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

D. Torsion Rod for Counterbalance Shaft: Fabricate of cold rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Mounting brackets of either cast iron or cold rolled steel plate.

2.10 ELECTRIC DOOR OPERATORS

A. 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.

1. Comply with NFPA 70.
2. 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.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

1. Top of Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door hood assembly and connected to the door drive shaft with drive chain and sprockets. Allow for required headroom for mounting.

D. Motors: Reversible type motor with controller (disconnect switch) for motor exposure indicated for each door assembly. Interconnect All fire rated units with the fire alarm as required for auto-closure upon activation of the alarm.

1. 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.
2. Coordinate wiring requirements and electrical characteristics of motors and electrical devices with building electrical system and each location where installed.

E. 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.

F. Obstruction Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For nonfire rated doors, activation of device immediately stops and reverses downward door travel. For fire rated doors, activation delays closing.

1. Photoelectric Sensor: System designed to detect an obstruction in door opening without contact between door and obstruction.
    a. Self Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self monitoring feature is activated, door closes only with sustained or constant pressure on close button.
2. 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 take up reel or self coiling cable.

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

G. 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."

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

2. Exterior Doors; Mounted Units: Full guarded, standard duty, surface mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated unless exceeded herein.

H. 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).

I. 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.

J. Motor Removal: Design operator so motor may be removed without disturbing limit switch adjustment and without affecting emergency manual operation.

K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

L. Fire Protection Requirements: Coordinate provisions with installation of electrical items including electronic hardware, security system components, and similar items having electrical requirements; arrange so wiring can be readily removed and replaced.

1. Provide cutouts and reinforcements required for coiling doors to accept fire protection system components.

2.11 FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. 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.

C. Aluminum Finishes:

1. Mill Finish: Standard.

2. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

3. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

4. Baked Enamel or Powder Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

D. Steel and Galvanized Steel Finishes:
1. Factory Prime Finish: 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: 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions for compliance with requirements for substrate construction and other conditions affecting performance of the work.

B. Examine locations of electrical connections.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Fire Rated Doors: Install in accordance with NFPA 80.

E. Smoke Control Doors: Install in accordance with NFPA 80 and NFPA 105.

F. Power Operated Doors: Install in accordance with UL 325.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to furnish reports to Architect.

B. Perform the following tests and inspections with the assistance of a factory authorized service representative:

1. 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.
2. Fire Rated Door Inspections: Inspect each fire rated door in accordance with NFPA 80, section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 STARTUP SERVICE

A. Engage a factory authorized service representative to perform startup service.
1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
3. Test door closing when activated by detector or alarm connected automatic closing system. Reset door closing mechanism after successful test.

3.5 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so doors operate easily, free of warp, twist, or distortion.
1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include 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.
1. Perform maintenance, including emergency callback service, during normal working hours.

3.7 DEMONSTRATION

A. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION