RAYNOR – Coiling Doors

SECTION 08 33 00 – COILING DOORS

"Specifier Notes" may be hidden or shown by using "Tools"/"Options"/"Display"/"Hidden Text".

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rolling Service Doors.

B. High Performance Rolling Service Doors

C. Rolling Counter Shutters.

D. Rolling Security Grille Doors

E. Rolling Fire Doors.

F. Rolling Counter Fire Shutters.

G. Electric Operators

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications.

B. Section 06 10 00 - Rough Carpentry. Door opening jamb and head members

C. Section 08 71 53 - Security Door Hardware.

D. Section 09 90 00 - Painting and Coating.

E. Section 11 12 00 - Parking Control Equipment.

F. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM) A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. American Society for Testing and Materials (ASTM) B 209 Aluminum and Aluminum-Alloy Sheet and Plate.

C. American Society for Testing and Materials (ASTM) A 240 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, Strips.

D. ANSI/DASMA 105 – American National Standard Institute Test Method for Thermal Transmittance and Air Infiltration of Garage Doors

E. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors And Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.

F. ANSI/DASMA 203 - American National Standards Institute Specifications for non-rated fire rolling doors published by Door & Access Systems Manufacturers Association International.

G. ASTM A 123 – Standard Specification for Zinc (hot-dipped galvanized) coatings on iron and steel products.

H. ASTM A 229 - Steel wire, oil-tempered for mechanical springs.

I. ASTM E 330 - Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.

J. ASTM E 413 - Classification for Rating Sound Insulation

K. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.

L. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

M. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

N. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

O. NFPA-80 – Standard for Fire Doors and Fire Windows

P. UL 10B - Fire Tests of Fire Door Assemblies

Q. NFPA 252 - Fire Tests of Fire Door Assemblies

R. BS 476 - Fire Tests on Building Materials and Structures

S. ISO 3008 - Fire Resistance Tests - Door and Shutter Assemblies

T. CAN4 S-104-M80 - Canadian National Standard for Fire Doors

U. FM 4100 - Factory Mutual Research Corporation - Fire Door Assemblies

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Provide drawings indicating guide details, head and jamb conditions, anchorage, accessories, finish colors, patterns and textures, operator mounts and other related information.
   2. Regulatory Requirements and Approvals: Provide shop drawings in compliance with local Authority Having Jurisdiction (AHJ).

D. Certifications:
   1. Submit manufacturer's certificate that products meet or exceed specified requirements.
   2. Submit installer qualifications.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an authorized installer of door manufacturer who has demonstrated experience on projects of similar size and complexity.

B. Manufacturer Qualifications: Company with a minimum of five-year experience in producing the specified type of doors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.

B. Raynor warrants ControlHoist electrical operator and component parts for two (2) years against defects in material and workmanship when purchased as operator only.

C. Raynor warrants ControlHoist electrical operator and component parts against defects in material and workmanship for three (3) years, on the operator only, when purchased with any model of Raynor rolling service door.

D. Raynor warrants Onyx (OXJ & OXH) electrical operator for five (5) years against defects in material and workmanship.

E. Raynor warrants ArmorBrite™ powder coat finish against cracking or peeling for three (3) years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Raynor, which is located at: 1101 East River Rd. P. O. Box 448 ; Dixon, IL 61021-0448; Toll Free Tel: 800-4-RAYNOR; Tel: 815-288-1431; Fax: 888-598-4790; Email: architectsupport@raynor.com; Web: www.raynor.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 ROLLING SERVICE DOORS

A. DuraCoil as manufactured by Raynor Garage Doors:
1. Doors:
   a. Operation:
      1) Provide doors designed for push-up operation.
      2) Provide doors designed for hand chain operation.
      3) Provide doors designed for electric motor operation.
   b. Mounting: Door guide mounting configuration.
      1) Interior face of wall on each side of door opening.
      2) Exterior face of wall on each side of door opening.
      3) Between jamb of wall opening.
   c. Structural Performance Requirements:
      1) Wind Loads: Uniform pressure of: _____ psf.
   d. International Energy Conservation Code (IECC) Requirements:
      1) Air Infiltration – Maximum air leakage of 1.00 cfm/ft^2 is required. Testing shall be in accordance with DASMA 105 test procedure.
      2) DuraCoil with insulated slats and header seal provides air leakage rating of .47 cfm/ft^2.
   d. Sound Transmission Class (STC) rating
      1) STC rating of 22 required on an insulated door.
      2) STC rating of 23 required on an insulated door with header seal.
2. Curtain: Interlocking roll-formed slats as specified below. Endlocks shall be attached to each of alternate slat to prevent lateral movement.
   a. Slat Type(s):
      1) Flat slats
         a) Steel 18 gauge (0.047 inch minimum thickness).
         b) Steel 20 gauge (0.036 inch minimum thickness).
         c) Steel 22 gauge (0.030 inch minimum thickness).

d) Steel 24 gauge (0.023 inch minimum thickness).
e) Stainless steel 20 gauge (0.036 inch minimum thickness).
f) Stainless steel 22 gauge (0.030 inch minimum thickness).
g) Aluminum 16 gauge (0.050 inch minimum thickness).
h) Aluminum 18 gauge (0.040 inch minimum thickness).
i) Light-duty 24 gauge steel (0.023 inch minimum thickness).

2) Large curved slats
a) Steel 18 gauge (0.047 inch minimum thickness).
b) Steel 20 gauge (0.036 inch minimum thickness).
c) Steel 22 gauge (0.030 inch minimum thickness).

3) Small curved slats
a) Steel 20 gauge (0.036 inch minimum thickness).
b) Steel 22 gauge (0.030 inch minimum thickness).

4) Perforated flat slats punched with 1/16 inch (1.6mm) diameter holes staggered on 3/32 inch (2.4mm) centers across entire length.
a) Steel 20 gauge (0.036 inch minimum thickness).
b) Steel 22 gauge (0.030 inch minimum thickness.
c) Aluminum 16 gauge (0.050 inch minimum thickness).
d) Aluminum 18 gauge (0.040 inch minimum thickness).

5) Insulated flat slats with 24 gauge backer (22 gauge optional). Polyisocyanurate insulation with R-value 6.24.
a) Steel 18 gauge (0.047 inch minimum thickness)
b) Steel 20 gauge (0.036 inch minimum thickness)
c) Steel 22 gauge (0.030 inch minimum thickness)
d) Steel 24 gauge (0.023 inch minimum thickness)
e) Stainless Steel 20 gauge (0.036 inch minimum thickness)
f) Stainless Steel 22 gauge (0.030 inch minimum thickness)
g) Aluminum 16 gauge (0.050 inch minimum thickness)
h) Aluminum 18 gauge (0.040 inch minimum thickness)

b. Material:
1) Commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A-653.
2) Stainless steel in accordance with ASTM A-240, type 304.
3) Aluminum in accordance with ASTM B-209, alloy 5005, temper H34.

c. Color and Finish:
1) One finish coat of gray polyester paint applied over one coat of primer.
2) One finish coat of tan polyester paint applied over one coat of primer.
3) One finish coat of white polyester paint applied over one coat of primer.
4) Galvanized finish.
5) Stainless steel #4 finish.
6) Clear anodize finish.
7) Bronze anodize finish.
8) ArmorBrite Powdercoat finish.
a) Color: _____.

3. Endlocks: Zinc-plated malleable cast iron endlocks fastened with two zinc-plated steel rivets.
4. Bottom Bar: Two angles, minimum 1-1/2 inches by 1-1/2 inches by 1/8 inch (38.1 mm x 38.1 mm x 3.2 mm) with single-contact type bottom astragal.
a. Material:
1) Roll-formed galvanized steel angles.
2) Structural steel angles.
3) Structural aluminum angles.

4) Break-formed stainless steel angles.
5) Structural stainless steel angles.

b. Color and finish:
1) Structural angle bottom bar to receive one coat of black rust-inhibitive primer.
2) Roll-formed steel angles to be galvanize finish.
3) Break-formed stainless steel angles #4 finish.
4) Structural stainless steel angles mill finish.
5) Structural aluminum angles to be clear anodize finish.
6) Structural aluminum angles to be bronze anodize finish.
7) ArmorBrite Powdercoat finish.
a) Color: _____.

5. Vision Panels: 4 inches by 1 inch (101.6 mm by 25.4 mm):
a. 1/8 inch (3.2 mm) thick acrylic glass for flat slats
b. 5/8 inch (15.9 mm) thick acrylic glass for insulated slats
c. Fenestrated (open slots)

6. Guide Assemblies: Three structural angles, minimum 3 inches by 2 inches by 3/16 inch (76 mm by 50.8 mm by 4.8 mm) and fitted with removable curtain stops.
a. Material and Finish:
1) Structural steel to receive one coat of black rust-inhibitive primer.
2) Structural steel to receive one coat of hot-dipped galvanized.
3) Structural stainless steel with a mill finish.
4) Structural steel to receive ArmorBrite Powdercoat finish.
a) Color: _____.

7. Guide Weatherseal: Seals to inhibit air infiltration between the guide and the curtain.
1) Snap-on dual durometer vinyl seal.
2) Brushseal with an aluminum retainer.
3) EDPM rubber with an aluminum retainer

8. Counterbalance:
a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 m) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
b. Counterbalance: Provide counterbalance mechanism with helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.
1) Standard 15,000 cycles.
2) High _____ cycles.

9. Brackets: 3/16 inch (4.8 mm), minimum, steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7 mm) diameter Grade 5 bolts. Inside of drive bracket fitted with sealed ball bearing.
a. Finish:
1) Provide brackets with one coat of rust-inhibitive primer.
2) Provide brackets with one coat of hot-dipped galvanized.
3) Provide brackets with one coat of ArmorBrite Powdercoat finish.
a) Color: _____.

10. Enclosures:
a. Hood Type:
1) Round Hood.
2) Square Hood.
b. Bracket Covers: Covers to enclose door mechanisms.
c. Material:
1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.

2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
3) 18 gauge aluminum (0.040 inch minimum thickness) in accordance with ASTM B-209, alloy 5005, temper H34.

d. Color and Finish:
1) Gray polyester paint to match curtain finish.
2) Tan polyester paint to match curtain finish.
3) White polyester paint to match curtain finish.
4) Galvanized to match curtain finish.
5) Stainless steel #4 finish.
6) Clear anodize finish.
7) ArmorBrite Powdercoat finish.
a) Color: _____.

e. Hood Baffle: Provide hood baffle with a rubber seal to inhibit air infiltration through hood cavity.

11. Header Seal: Provide a "Z" shape aluminum retainer with EDPM rubber to inhibit air infiltration between the header and the curtain.
12. Locks: Furnish door system with the following:
a. Locking Bar: For push-up doors and doors operated with hand chain to receive padlock provided by Owner.
b. Locking Bar for Motor Operated Doors: Provide interlock switch with locking bar.
c. Hand Chain Lock: To receive padlock provided by Owner; for doors operated with hand chain.
d. Cylinder Lock: For use with push-up and hand chain operated doors.
e. Cylinder Lock for Motor Operated Doors: Provide interlock switch with cylinder lock.

2.3 HIGH PERFORMANCE ROLLING SERVICE DOORS

A. DuraCoil HP as manufactured by Raynor Garage Doors:
1. Doors:
a. Operation: Provide doors designed for electric motor operation to achieve a max speed of up to 24 inches per second to open and up to 12 inches per second to close.
b. Mounting: Door guide mounting configuration.
1) Interior face of wall on each side of door opening.
2) Exterior face of wall on each side of door opening.
3) Between jamb of wall opening.
c. Structural Performance Requirements:
1) Wind Loads: Operational wind load 10 PSF
2) Wind Loads: Standard static wind load 20 PSF
3) Wind Loads: Uniform pressure of: _____ psf.
d. International Energy Conservation Code (IECC) Requirements:
1) Air Infiltration – Maximum air leakage of 1.00 cfm/ft^2 is required. Testing shall be in accordance with DASMA 105 test procedure.
2) Raynor provides an air leakage rating of .47 cfm/ft^2.
3) Maximum U-Factor of .90 is required and shall be tested to DASMA 105.
e. Sound Transmission Class (STC) Rating:
1) STC rating of 22 required on an insulated door.
2) STC rating of 23 required on an insulated door with header seal.
2. Curtain: Interlocking roll-formed slats as specified below. Endlocks shall be attached

to each of alternate slat to prevent lateral movement.

a. Slat Type(s):
   1) Flat slats
      a) Steel 18 gauge (0.047 inch minimum thickness).
      b) Steel 20 gauge (0.036 inch minimum thickness).
      c) Steel 22 gauge (0.030 inch minimum thickness).
      d) Steel 24 gauge (0.023 inch minimum thickness).
      e) Stainless steel 20 gauge (0.036 inch minimum thickness).
      f) Stainless steel 22 gauge (0.030 inch minimum thickness).
   2) Insulated flat slats with 24 gauge backer (22 gauge optional) **R-value 8.0**
      a) Steel 18 gauge (0.047 inch minimum thickness)
      b) Steel 20 gauge (0.036 inch minimum thickness)
      c) Steel 22 gauge (0.030 inch minimum thickness)
      d) Steel 24 gauge (0.023 inch minimum thickness)
      e) Stainless Steel 20 gauge (0.036 inch minimum thickness)
      f) Stainless Steel 22 gauge (0.030 inch minimum thickness)

b. Material:
   1) Commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A-653.
   2) Stainless steel in accordance with ASTM A-240, type 304.

c. Color and Finish:

   1) One finish coat of tan polyester paint applied over one coat of primer.
   2) One finish coat of white polyester paint applied over one coat of primer.
   3) Galvanized finish.
   4) Stainless steel #4 finish.
   5) ArmorBrite Powdercoat finish.
      b) Color: _____.

3. Endlocks: Zinc-plated malleable cast iron endlocks fastened with two zinc-plated steel rivets.
4. Bottom Bar: Two angles, minimum 1-1/2 inches by 1-1/2 inches by 1/8 inch (38.1 mm x 38.1 mm x 3.2 mm) with single-contact type bottom astragal. High cycle UHMW anti-wear strips are applied to the ends of the bottom bar.
   a. Material:
      1) Roll-formed galvanized steel angles.
      2) Structural steel angles.
      3) Break-formed stainless steel angles.
      4) Structural stainless steel angles.
   b. Color and Finish:
      1) Structural angle bottom bar to receive one coat of black rust-inhibitive primer.
      2) Roll-formed steel angles to be galvanize finish.
      3) Break-formed stainless steel angles #4 finish.
      4) Structural stainless steel angles mill finish.
      5) ArmorBrite Powdercoat finish.
         a) Color: _____.
5. Guide Assemblies: Three structural angles, minimum 3 inches by 2 inches by 3/16 inch (76 mm by 50.8 mm by 4.8 mm) and fitted with removable curtain stops. High cycle UHMW anti-wear strips are applied inside the front and middle guides.
   a. Material and Finish:

1) Structural steel to receive one coat of black rust-inhibitive primer.
2) Structural steel to receive one coat of hot-dipped galvanized.
3) Structural stainless steel with a mill finish.
4) Structural steel to receive ArmorBrite Powdercoat finish.
b) Color: _____.

6. Weatherseal: Seals to inhibit air infiltration between the guide and the curtain.
   1) Snap-on dual durometer vinyl seal.
   2) Brushseal with an aluminum retainer.
   3) EDPM rubber with an aluminum retainer
7. Brackets: 3/16 inch (4.8 mm), minimum, steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7 mm) diameter Grade 5 bolts. Inside of drive bracket fitted with sealed ball bearing.
   a. Finish:
      1) Provide brackets with one coat of rust-inhibitive primer.
      2) Provide brackets with one coat of hot-dipped galvanized.
      3) Provide brackets with one coat of ArmorBrite Powdercoat finish.
      b) Color: _____.
8. Enclosures:
   a. Hood Type:
      1) Round Hood.
      2) Square Hood.
   b. Bracket Covers: Covers to enclose door mechanisms.
   c. Material:
      1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.
      2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
   d. Color and Finish:
      1) Gray polyester paint to match curtain finish.
      2) Tan polyester paint to match curtain finish.
      3) White polyester paint to match curtain finish.
      4) Galvanized to match curtain finish.
      5) Stainless steel #4 finish.
      6) ArmorBrite Powdercoat finish.
      b) Color: _____.
   e. Hood Baffle: Provide hood baffle with a rubber seal to inhibit air infiltration through hood cavity.
9. Header Seal: Provide a “Z” shape aluminum retainer with EDPM rubber to inhibit air infiltration between the header and the curtain.
10. Locks: Furnish door system with the following:
    a. Locking Bar for Motor Operated Doors: Provide interlock switch with locking bar.
    b. Cylinder Lock for Motor Operated Doors: Provide interlock switch with cylinder lock.

B. ControlHoist CDD by Raynor Garage Doors:
   1. Model: Raynor ControlHoist CDD Operator
      a. Type: High cycle direct drive operator with control panel. Motor operator and control panel are designed for continuous duty cycle with a direct drive motor. Sprocket and roller chain are not accepted.
         1) Motor Horsepower Rating: Per the manufacturer’s recommended size for door.

2) Motor Horsepower Rating: Continuous 1/2 HP.
3) Motor Horsepower Rating: Continuous 2 HP.
4) Motor Horsepower Rating: Continuous 3 HP.
5) Motor Horsepower Rating: Continuous 5 HP.
6) Motor Horsepower Rating: Continuous 7.5 HP.
7) Electrical Requirements: 120-volt single phase.
8) Electrical Requirements: 208-volt single phase.
9) Electrical Requirements: 240-volt single phase.
10) Electrical Requirements: 208-volt three phase.
11) Electrical Requirements: 230-volt three phase.
12) Electrical Requirements: 480-volt three phase.
13) Electrical Requirements: 600-volt three phase.
14) High performance motor brake - Power electronic dynamic braking with timing optimized solenoid mechanical brake
15) Electrically interlocked chain hoist for emergency manual operation
16) Overload protection

2. Model: Raynor ControlHoist CDD Control Panel
   a. Type: PCB & PLC controllers with adjustable variable frequency drives; soft-start & soft-stop on both ends of the limit travel.
      1) Detachable Control Enclosure with one-step error proof connections (“Plug and Play”) to connect:
         a) Motor
         b) Control panel
      2) Over-current and short-circuit protected Class II Control Circuits.
      3) NEMA 4X Wall Mounted Control Panel with an operational 3-button w/ mushroom stop. Initial setup, control adjustments, and error reporting accessible inside the control panel.
      4) Control panel shall include:
         a) Circuit for activation of warning annunciator when closing
         b) Non-resettable Cycle Counter
      5) Over-current and short-circuit protected Class II Control Circuits.
      6) Door position is monitored with mechanical limit switches in the operator.
      7) Control Wiring: Solid state circuitry with provisions for connection of a monitored reversing device, external radio control hook-up and maximum run timer. Provisions for timers to close and mid stop and lock bar sensor capability.
         a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
         b) Custom wiring.
         c) Monitored electric reversing edge on door.
         d) Monitored photo electric eyes mounted on jambs.
3. Control and Drive System Options
      1) Activation devices (motion detector, induction loop, additional photo eyes)
      2) Sensing devices (wireless sensing edges, presence sensor, additional photo eyes)
      3) Annunciators (strobe, Beacon)
      4) Two door interlocks
      5) Long distance wiring
      6) Additional monitoring controls

2.4 ROLLING COUNTER SHUTTERS

A. DuraShutter as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for push-up operation.
         2) Provide doors designed for hand crank operation.
         3) Provide doors designed for tube motor operation.
         4) Provide doors designed for electric motor operation.
      b. Mounting: Door guide mounting configuration.
         1) To face of wall on each side of door opening.
         2) Between jamb of wall opening.
      c. Mounting: Integral frame as follows:
         1) Painted Slip-in Frame: For use with a pre-existing finished opening. Color and finish to match guides and curtain.
         2) Painted Build-in Frame: For use with masonry wall construction. Color and finish to match guides and curtain.
         3) Stainless Steel Slip-in Frame: For use with a pre-existing finished opening. Frame to be #4 finish.
         4) Stainless Steel Build-in Frame: For use with masonry wall construction. Frame to be #4 finish.
   2. Curtain: Interlocking slats as specified below. Endlocks shall be attached to each of alternate slat to prevent lateral movement.
      a. Slat Type(s):
         1) Roll-formed flat slat 22 gauge steel (0.030 inch minimum thickness).
         2) Roll-formed flat slat 22 gauge stainless steel (0.030 inch minimum thickness).
         3) Extruded aluminum flat slat (0.050 inch minimum thickness).
         4) Roll-formed perforated flat slat 22 gauge steel (0.030 inch minimum thickness) punched with 1/16 inch (1.6mm) diameter holes staggered on 3/32 inch (2.4mm) centers across entire length.
      b. Material:
         1) Commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A-653.
         2) Stainless steel in accordance with ASTM A-240, type 304.
         3) Aluminum in accordance with ASTM B-221, alloy 6063, temper T6.
      c. Color and Finish:
         1) One finish coat of gray polyester paint applied over one coat of primer.
         2) One finish coat of tan polyester paint applied over one coat of primer.
         3) One finish coat of white polyester paint applied over one coat of primer.
         4) Stainless steel #4 finish.
         5) Clear anodize finish.
         6) Bronze anodize finish.
         7) ArmorBrite Powdercoat finish.
            c) Color: _____.
   3. Endlocks: Zinc-plated stamped steel endlocks fastened with zinc-plated steel rivets.
   4. Bottom Bar: Tubular type, with 1/4 inch (6.3) thick protective strip to cushion impact of bottom bar on countertop.
      a. Material:
         1) Roll-formed 14 gauge galvanized steel (0.071 inch minimum thickness).
         2) Roll-formed 14 gauge stainless steel (0.075 inch minimum thickness).
         3) Extruded aluminum (0.078 inch minimum thickness).

b. Color and finish:
   1) Steel bottom bar to receive one finish coat of gray paint to match curtain.
   2) Steel bottom bar to receive one finish coat of tan paint to match curtain.
   3) Steel bottom bar to receive one finish coat of white paint to match curtain.
   4) Stainless steel bottom bar to be #4 finish to match curtain.
   5) Aluminum bottom bar to be clear anodize finish to match curtain.
   6) Aluminum bottom bar to be bronze anodize finish to match curtain.
   7) Steel bottom bar to receive ArmorBrite Powdercoat finish.
      a) Color: _____.

5. Guide Assemblies: Guides shall be provided in the same material and finish as the curtain and fitted with removable curtain stops.
   a. Material and Finish:
      1) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of gray paint to match curtain.
      2) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of tan paint to match curtain.
      3) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of white paint to match curtain.
      4) 13 gauge stainless steel (0.090 inch minimum thickness) to have a #4 finish to match curtain.
      5) Extruded aluminum (0.050 inch minimum thickness) to have clear anodize finish to match curtain.
      6) Extruded aluminum (0.050 inch minimum thickness) to have bronze anodize finish to match curtain.
      7) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive ArmorBrite Powdercoat finish
         a) Color: _____.
   b. Wear strips: PVC to be attached to the inside of the aluminum guides to reduce wear and noise.
   c. Guide Weatherseals: Seals to inhibit air infiltration between the guide and the curtain.
      1) Brushseal with an aluminum retainer attached to the guide assembly.
6. Counterbalance:
   a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 m) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
   b. Counterbalance: Provide counterbalance mechanism with helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.
      1) Standard 7,500 cycles.
      2) High _____ cycles.
   c. Eclipse Tube Motor as provided by Raynor Garage Doors:
      1) Tube motor to be 115 volt, single phase with toggle switch for constant pressure open-close operation.
7. Brackets: Mounting brackets shall be10 gauge galvanized steel (0.130 inch minimum thickness) attached to the guide assembly.
8. Enclosures:
   a. Hood Type: Hood to be a square type and to be attached to the brackets.
   b. Bracket Side Covers: Covers to enclose door mechanisms.
   c. Material:
      1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.

2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
3) 18 gauge aluminum (0.040 inch minimum thickness) in accordance with ASTM B-209, alloy 5005, temper H34.

d. Color and Finish:
1) Gray polyester paint to match curtain finish.
2) Tan polyester paint to match curtain finish.
3) White polyester paint to match curtain finish.
4) Stainless steel #4 finish.
5) Clear anodize finish.
6) Bronze anodize finish.
7) ArmorBrite Powdercoat finish.
c) Color: _____.

9. Header Weatherseal: Provide a brush seal to inhibit air infiltration between the header and the curtain.
10. Locks: Furnish door system with the following:
a. Locking Bar: For push-up doors and doors operated with hand crank, locks to be thumb turn cylinders and bars to engage both guides.
b. Cylinder Lock: For push-up doors and doors operated with hand crank, locks to be keyed cylinders and bars to engage both guides.

B. Eclipse Tube Motor as provided by Raynor Garage Doors:
1. Tube motor to be 115 volt, single phase with toggle switch for constant pressure open close operation.
2. Tube motor to be completely concealed inside the barrel assembly.

2.5 ROLLING SECURITY GRILLE DOORS

A. DuraGrille as manufactured by Raynor Garage Doors:
1. Doors:
a. Operation:
1) Provide doors designed for push-up operation.
2) Provide doors designed for hand chain operation.
3) Provide doors designed for hand crank operation.
4) Provide doors designed for electric motor operation.
b. Mounting: Door guide mounting configuration.
1) Interior face of wall on each side of door opening.
2) Exterior face of wall on each side of door opening.
3) Between jamb of wall opening.
2. Curtain: Horizontal diameter rods with vertically interlocking links to form a pattern. Bottom bar extruded aluminum tubular shape.
a. Pattern Type:
1) **Straight Pattern**: Horizontal aluminum rods 5/16 inch (7.9 mm) spaced vertically at 2 inch (50.8 mm) O.C. with vertical link assemblies spaced horizontally at **6 inch** (152.4 mm) O.C. Lateral movement of the vertical link assemblies to be contained by C-clips. Vertical link assemblies to be held together by brass eyelets.
2) **Straight Pattern**: Horizontal aluminum rods 5/16 inch (7.9 mm) spaced vertically at 2 inch (50.8 mm) O.C. with vertical link assemblies spaced horizontally at **9 inch** (228.6 mm) O.C. Lateral movement of the vertical link assemblies to be contained by C-clips. Vertical link assemblies to be

held together by brass eyelets.

3) **Brick Pattern**: Horizontal aluminum rods 5/16 inch (7.9 mm) spaced vertically at 2 inch (50.8 mm) O.C., with links spaced horizontally at **6 inch** (152.4 mm) O.C. to form a brick pattern with aluminum spacers at the top and bottom of each link.

4) **Brick Pattern**: Horizontal aluminum rods 5/16 inch (7.9 mm) spaced vertically at 2 inch (50.8 mm) O.C., with links spaced horizontally at **9 inch** (228.6 mm) O.C. to form a brick pattern with aluminum spacers at the top and bottom of each link.

b. Curtain Material and Finish:
   1) Aluminum with a mill finish.
   2) Aluminum with a clear anodize finish.
   3) Aluminum with a bronze anodize finish.

c. Bottom Bar: Bottom of curtain reinforced with extruded aluminum tubular bottom bar.

d. Bottom Bar Material and finish:
   1) Aluminum with a clear anodize finish.
   2) Aluminum with a bronze anodize finish.

3. Guides: Extruded aluminum shapes with retainer grooves and continuous pvc strips inserts to reduce wear and noise. Guides to be provided with removable curtain stops.
   a. Material and Finish:
      1) Aluminum with a clear anodize finish.
      2) Aluminum with a bronze anodize finish.
   b. Guide Mounting:
      1) Extruded aluminum guides will be attached to structural steel angles.
      2) Extruded aluminum guides will be attached to structural steel support tubes.
      3) Extruded aluminum guides will be attached directly to the jambs.
4. Counterbalance:
   a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 m) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
   b. Counterbalance: Provide counterbalance mechanism with helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.
      1) Standard 15,000 cycles.
      2) High _____ cycles.
5. Brackets: 3/16 inch (4.8 mm), minimum, steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7 mm) diameter Grade 5 bolts. Inside of drive bracket fitted with sealed ball bearing.
   a. Finish:
      1) Provide brackets with one coat of rust-inhibitive primer.
      2) Provide brackets with one coat of hot-dipped galvanized.
      3) Provide brackets with one coat of ArmorBrite Powdercoat finish.
         c) Color: _____.
6. Enclosures:
   a. Hood Type:
      1) Round Hood.
      2) Square Hood.
   b. Bracket Covers: Covers to enclose door mechanisms.
   c. Material:
      1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.

2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
3) 18 gauge aluminum (0.040 inch minimum thickness) in accordance with ASTM B-209, alloy 5005, temper H34.

d. Color and Finish:
1) Gray polyester paint.
2) Tan polyester paint.
3) Galvanized.
4) Stainless steel #4 finish.
5) Clear anodize finish.
6) ArmorBrite Powdercoat finish.
d) Color: _____.

7. Locks: Furnish door system with the following:
a. Hand Chain Lock: To receive padlock provided by Owner; for doors operated with hand chain.
b. Cylinder Lock: For push-up doors and doors operated with hand chain or hand crank, locks to be keyed cylinders and bars to engage both guides.
c. Cylinder Lock for Motor Operated Doors: Provide interlock switch with cylinder lock.
d. Auto-Lock: For doors operated with hand chain, crank, or motor operated.

2.5 ROLLING FIRE DOORS

A. FireCoil as manufactured by Raynor Garage Doors:
1. Doors:
a. Operation:
1) Provide doors designed for push-up operation.
2) Provide doors designed for hand chain operation.
3) Provide doors designed for hand crank operation.
4) Provide doors designed for electric motor operation.
b. Fire Resistance Rating:
1) 3-hour rating, listed by Factory Mutual (FM).
2) 1 1/2-hour rating, listed by Factory Mutual (FM).
3) 3/4-hour rating, listed by Factory Mutual (FM).
4) 4-hour rating, listed by Underwriters Laboratories (UL).
5) 1 1/2-hour rating, listed by Underwriters Laboratories (UL).
6) 3/4-hour rating, listed by Underwriters Laboratories (UL).
7) 4-hour rating, approved by California State Fire Marshal (CSFM).
8) 1 1/2-hour rating, approved by California State Fire Marshal (CSFM).
9) 3/4-hour rating, approved by California State Fire Marshal (CSFM).
10) 4-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
11) 1 1/2-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
12) 3/4-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
13) 4-hour rating, listed by International Standards Organization (ISO 3008).
14) 4-hour rating, listed by British Standards (BS476).
c. Smoke Control Label: Provide door with a type “S” label, air leakage rating not greater than 3.0 CFM per Sq. Ft.
2. Curtain: Interlocking roll-formed slats as specified below. Endlocks shall be attached

to each of alternate slat to prevent lateral movement.

a. Slat Type(s):
   1) Flat slats
      1) Steel 18 gauge (0.047 inch minimum thickness).
      2) Steel 20 gauge (0.036 inch minimum thickness).
      3) Steel 22 gauge (0.030 inch minimum thickness).
      4) Stainless steel 20 gauge (0.036 inch minimum thickness).
      5) Stainless steel 22 gauge (0.030 inch minimum thickness).
      6) Light-duty 24 gauge steel (0.023 inch minimum thickness).
   2) Large curved slats
      a) Steel 18 gauge (0.047 inch minimum thickness).
      b) Steel 20 gauge (0.036 inch minimum thickness).
      c) Steel 22 gauge (0.030 inch minimum thickness).
   3) Small curved slats
      a) Steel 20 gauge (0.036 inch minimum thickness).
      b) Steel 22 gauge (0.030 inch minimum thickness).
   4) Insulated flat slats with 24 gauge backer
      a) Steel 18 gauge (0.047 inch minimum thickness)
      b) Steel 20 gauge (0.036 inch minimum thickness)
      c) Steel 22 gauge (0.030 inch minimum thickness)
      d) Steel 24 gauge (0.023 inch minimum thickness).
      e) Insulation: Mineral wool with R-value 4.0 and U-value 0.250.

b. Material:
   1) Commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A-653.
   2) Stainless steel in accordance with ASTM A-240, type 304.

c. Color and Finish:
   1) One finish coat of gray polyester paint applied over one coat of primer.
   2) One finish coat of tan polyester paint applied over one coat of primer.
   3) One finish coat of white polyester paint applied over one coat of primer.
   4) Galvanized finish.
   5) Stainless steel #4 finish.
   6) ArmorBrite Powdercoat finish.
      a) Color: _____.

3. Endlocks: Zinc-plated malleable cast iron endlocks fastened with two zinc-plated steel rivets.
4. Bottom Bar: Two structural angles, minimum 2 inches by 2 inches by 3/16 inch (50.8 mm x 50.8 mm x 4.8 mm).
   a. Material and finish:
      1) Structural steel angle bottom bar to receive one coat of black rust-inhibitive primer.
      2) Structural stainless steel angles mill finish.
      3) Structural steel angle bottom bar to receive one coat of ArmorBrite Powdercoat finish.
         a) Color: _____.
5. Guide Assemblies: Three structural angles, minimum 3 inches by 2 inches by 3/16 inch (76 mm by 50.8 mm by 4.8 mm) and fitted with removable curtain stops.
   a. Material and Finish:
      1) Structural steel to receive one coat of black rust-inhibitive primer.
      2) Structural steel to receive one coat of hot-dipped galvanized.
      3) Structural stainless steel with a mill finish.
      4) Structural steel to receive ArmorBrite Powdercoat finish.

a) Color: _____.

6. Guide Smoke Seals: Seals to inhibit smoke infiltration between the guide and the curtain.
   1) Brush seal with an aluminum retainer attached to the guide assembly.
7. Counterbalance:
   a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 m) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
   b. Counterbalance: Provide counterbalance mechanism with helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.
      1) Standard 10,000 cycles.
      2) High _____ cycles.
8. Brackets: 3/16 inch (4.8 mm), minimum, steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7 mm) diameter Grade 5 bolts. Inside of drive bracket fitted with sealed ball bearing.
   a. Finish:
      1) Provide brackets with one coat of rust-inhibitive primer.
      2) Provide brackets with one coat of hot-dipped galvanized.
      3) Provide brackets with one coat of ArmorBrite Powdercoat finish.
         a) Color: _____.
9. Enclosures:
   a. Hood Type:
      1) Round Hood.
      2) Square Hood.
   b. Bracket Covers: Covers to enclose door mechanisms as required.
   c. Material:
      1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.
      2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
   d. Color and Finish:
      1) Gray polyester paint to match curtain finish.
      2) Tan polyester paint to match curtain finish.
      3) White polyester paint to match curtain finish.
      4) Galvanized to match curtain finish.
      5) Stainless steel #4 finish.
      6) ArmorBrite Powdercoat finish.
         a) Color: _____.
   e. Flame Baffle: Provide flame baffle to comply with listing agency.
10. Automatic Closing Device: Automatic closing of rolling fire door under a fire condition to be initiated by the following:
    a. Fusible links.
    b. Electro-Thermal-Manual links (ETM) with junction box.
    c. Electro-Thermal-Manual links (ETM) without junction box.
    d. Solid State Release Device Units LM21 Model XP.
    e. Solid State Release Device Units LM21 Model XPBB.
    f. Solid State Release Device Units LM21 Model AFCB.
11. Detection Type: Smoke detector used in conjunction with the automatic closing device type to initiate the automatic closing of a rolling fire door shall be the following:
    a. Photoelectronic with heat sensor detector.
12. Header Smoke seal: Provide a “Z” shape brush seal to inhibit smoke infiltration between the header and the curtain.

13. Locks: Furnish door system with the following:
    a. Locking Bar: For push-up doors and doors operated with hand chain or hand crank, to receive padlock provided by Owner.
    b. Locking Bar for Motor Operated Doors: Provide interlock switch with locking bar.
    c. Hand Chain Lock: To receive padlock provided by Owner; for doors operated with hand chain.
    d. Cylinder Lock: For push-up doors and doors operated with hand chain and hand crank operated doors.
    e. Cylinder Lock for Motor Operated Doors: Provide interlock switch with cylinder lock.

2.6 COILING FIRE SHUTTER DOORS

A. FireCurtain as manufactured by Raynor Garage Doors:
    1. Doors:
        a. Operation:
            1) Provide doors designed for push-up operation.
            2) Provide doors designed for hand crank operation.
            3) Provide doors designed for tube motor operation.
        b. Mounting: Door guide mounting configuration.
            1) To face of wall on each side of door opening.
            2) Between jamb of wall opening.
        c. Mounting: Integral frame as follows:
            1) Painted Slip-in Frame: For use with a pre-existing finished opening. Color and finish to match guides and curtain.
            2) Painted Build-in Frame: For use with masonry wall construction. Color and finish to match guides and curtain.
            3) Stainless Steel Slip-in Frame: For use with a pre-existing finished opening. Frame to be #4 finish.
            4) Stainless Steel Build-in Frame: For use with masonry wall construction. Frame to be #4 finish.
        d. Fire Resistance Rating:
            1) 3-hour rating, listed by Factory Mutual (FM).
            2) 1 1/2-hour rating, listed by Factory Mutual (FM).
            3) 3/4-hour rating, listed by Factory Mutual (FM).
            4) 3-hour rating, listed by Underwriters Laboratories (UL).
            5) 1 1/2-hour rating, listed by Underwriters Laboratories (UL).
            6) 3/4-hour rating, listed by Underwriters Laboratories (UL).
            7) 3-hour rating, approved by California State Fire Marshal (CSFM).
            8) 1 1/2-hour rating, approved by California State Fire Marshal (CSFM).
            9) 3/4-hour rating, approved by California State Fire Marshal (CSFM).
            10) 3-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
            11) 1 1/2-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
            12) 3/4-hour rating, approved by City of New York Material and Equipment Acceptance (MEA).
        e. Smoke Control Label: Provide door with a type “S” label, air leakage rating not greater than 3.0 CFM per Sq. Ft.
    2. Curtain: Interlocking slats as specified below. Endlocks shall be attached to each of

alternate slat to prevent lateral movement.

a. Slat Type(s):
   1) Roll-formed flat slat 22 gauge steel (0.030 inch minimum thickness).
   2) Roll-formed flat slat 22 gauge stainless steel (0.030 inch minimum thickness).

b. Material:
   1) Commercial quality hot-dipped galvanized (G-90) steel in accordance with ASTM A-653.
   2)
   3) Stainless steel in accordance with ASTM A-240, type 304.

c. Color and Finish:
   1) One finish coat of gray polyester paint applied over one coat of primer.
   2) One finish coat of tan polyester paint applied over one coat of primer.
   3) One finish coat of white polyester paint applied over one coat of primer.
   4) Stainless steel #4 finish.
   5) ArmorBrite Powdercoat finish.
      d) Color: _____.

3. Endlocks: Zinc-plated stamped steel endlocks fastened with zinc-plated steel rivets.
4. Bottom Bar: Tubular type, with 1/4 inch (6.3) thick protective strip to cushion impact of bottom bar on countertop.

a. Material:
   1) Roll-formed 14 gauge galvanized steel (0.071 inch minimum thickness).
   2) Roll-formed 14 gauge stainless steel (0.075 inch minimum thickness).

b. Color and finish:
   1) Steel bottom bar to receive one finish coat of gray paint to match curtain.
   2) Steel bottom bar to receive one finish coat of tan paint to match curtain.
   3) Steel bottom bar to receive one finish coat of white paint to match curtain.
   4) Stainless steel bottom bar to be #4 finish to match curtain.
   5) Steel bottom bar to receive ArmorBrite Powdercoat finish.
      a) Color: _____.

5. Guide Assemblies: Guides shall be provided in the same material and finish as the curtain and fitted with removable curtain stops.

a. Material and Finish:
   1) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of gray paint to match curtain.
   2) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of tan paint to match curtain.
   3) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive one finish coat of white paint to match curtain.
   4) 13 gauge stainless steel (0.090 inch minimum thickness) to have a #4 finish to match curtain.
   5) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive ArmorBrite Powdercoat finish.
      c) Color: _____.

b. Guide Smoke Seals: Seals to inhibit smoke infiltration between the guide and the curtain.
   1) Brushseal with an aluminum retainer attached to the guide assembly.

6. Counterbalance:

a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 m) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.

b. Counterbalance: Provide counterbalance mechanism with helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.
   1) Standard 7,500 cycles.
   2) High _____ cycles.
c. FireEclipse Tube Motor as provided by Raynor Garage Doors:
   1) Tube motor to be 115 volt, single phase with toggle switch for constant pressure open-close operation.

7. Brackets: Mounting brackets shall be10 gauge galvanized steel (0.130 inch minimum thickness) attached to the guide assembly.
8. Enclosures:
   a. Hood Type: Hood to be a square type and to be attached to the brackets.
   b. Bracket Side Covers: Covers to enclose door mechanisms.
   c. Material:
      1) 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.
      2) 24 gauge stainless steel (0.024 inch minimum thickness) in accordance with ASTM A-240, type 304.
   d. Color and Finish:
      1) Gray polyester paint to match curtain finish.
      2) Tan polyester paint to match curtain finish.
      3) White polyester paint to match curtain finish.
      4) Stainless steel #4 finish.
      5) ArmorBrite Powdercoat finish.
         a) Color: _____.
9. Automatic Closing Device: Automatic closing of rolling fire shutter door under a fire condition to be initiated by the following:
   a. Fusible links.
   b. Electro-Thermal-Manual links (ETM) with junction box.
   c. Electro-Thermal-Manual links (ETM) without junction box.
   d. FireShield (for use with FireEclipse tube motor only).
   e. Solid State Release Device Units LM21 Model XP.
   f. Solid State Release Device Units LM21 Model XPBB.
10. Detection Type: Smoke detection used in conjunction with the automatic closing device type to initiate the automatic closing of a rolling fire shutter door shall be the following:
   a. Photoelectronic with heat sensor detector.
11. Header Smoke Seal: Provide a brush seal to inhibit smoke infiltration between the header and the curtain.
12. Locks: Furnish door system with the following:
   a. Locking Bar: For push-up doors and doors operated with hand crank, locks to be thumb turn cylinders and bars to engage both guides.
   b. Cylinder Lock: For push-up doors and doors operated with hand crank, locks to be keyed cylinders and bars to engage both guides.

2.7 ELECTRIC OPERATORS

A. ControlHoist (UL Listed) as manufactured by Raynor Garage Doors:
   1. Model:
      a. Raynor ControlHoist Optima:
         1) Type: Jackshaft with manual chain hoist.
         2) Motor Horsepower Rating: Per the manufacturer's recommended size for

door.

3) Motor Horsepower Rating: Continuous 1/2 HP.
4) Motor Horsepower Rating: Continuous 3/4 HP.
5) Motor Horsepower Rating: Continuous 1 HP.
6) Motor Horsepower Rating: Continuous 1-1/2 HP.
7) Motor Horsepower Rating: Continuous 2 HP.
8) Electrical Requirements: 115 volt single phase.
9) Electrical Requirements: 230 volt single phase.
10) Electrical Requirements: 208-230 volt three phase.
11) Electrical Requirements: 460 volt three phase.
12) Duty Cycle: 30 cycles/hour or 300 cycles/day.
13) Control Wiring: Solid state circuitry with provisions for connection of a monitored reversing device, external radio control hook-up and maximum run timer. Provisions for timers to close and mid stop and lock bar sensor capability.
    a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
    b) Custom wiring.
14) Entrapment protection:
    a) Wired Monitored electric reversing edge extending full width of door.
    b) Wireless Monitored electric reversing edge extending full width of door.
    c) NEMA 1 Monitored photo electric eyes mounted on jambs.
    d) NEMA 4X Monitored photo electric eyes mounted on jambs.

b. Raynor ControlHoist Standard:

1) Type: Jackshaft.
2) Type: Jackshaft with manual chain hoist.
3) Motor Horsepower Rating: Per the manufacturer’s recommended size for door.
4) Motor Horsepower Rating: Continuous 1/3 HP.
5) Motor Horsepower Rating: Continuous 1/2 HP.
6) Motor Horsepower Rating: Continuous 3/4 HP.
7) Electrical Requirements: 115 volt single phase.
8) Electrical Requirements: 230 volt single phase.
9) Electrical Requirements: 208-230 volt three phase.
10) Electrical Requirements: 460 volt three phase.
11) Duty Cycle: 30 cycles/hour or 300 cycles/day.
12) Control Wiring: Solid state circuitry with provisions for connection of a monitored reversing device, external radio control hook-up and maximum run timer. Provisions for timers to close and mid stop and lock bar sensor capability.
    a) Provide three button momentary contact "open-stop”, constant pressure on close (can be changed to momentary to close).
    b) Custom wiring.
13) Entrapment protection:
    a) Wired Monitored electric reversing edge extending full width of door.
    b) Wireless Monitored electric reversing edge extending full width of door.
    c) NEMA 1 Monitored photo electric eyes mounted on jambs.
    d) NEMA 4X Monitored photo electric eyes mounted on jambs.

c. Raynor ControlHoist Basic:

1) Type: Jackshaft.
2) Type: Jackshaft with manual chain hoist.
3) Motor Horsepower Rating: Intermittent 1/2 HP.
4) Electrical Requirements: 115 volt single phase.
5) Duty Cycle: 14 cycles/hour.
6) Control Wiring: Solid state circuitry with provisions for connection of a monitored reversing device, external radio control hook-up and maximum run timer. Provisions for timers to close and mid stop and lock bar sensor capability.
   a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
7) Entrapment protection:
   a) Wired Monitored electric reversing edge extending full width of door.
   b) Wireless Monitored electric reversing edge extending full width of door.
   c) NEMA 1 Monitored photo electric eyes mounted on jambs.
   d) NEMA 4X Monitored photo electric eyes mounted on jambs.

B. Raynor ONYX commercial operators:
   1. Type:
      a. Jackshaft without manual chain hoist or chain release.
      b. Jackshaft with manual chain release.
      c. Jackshaft with manual chain hoist.
   2. Rating:
      a. 700 lb. (1/2 hp equivalent)
      b. 1200 lb. (3/4 hp equivalent)
      c. 2200 lb. (1-½ hp equivalent)
   3. Electrical Requirements:
      a. 120 volt single phase.
      b. 240 volt single phase or three phase.
      c. 480 volt three phase.
      d. 208 volt single phase or three phase (via transformer).
      e. 600 volt three phase (via transformer).
   4. Duty Cycle:
      a. 20 cycles per hour / 90 cycles per day.
      b. 30 cycles per hour / 150 cycles per day.
   5. Accessory power: 24 VDC.
   6. Control:
      a. Wall controller: 3 button floor level with LCD display.
      b. Provisions for timer to close.
      c. Mid stop.
      d. Momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
   7. Motor: DC type with soft start and stop.
   8. Brake:
      a. Dynamic braking.
      b. Electromechanical holding brake.
   9. Battery backup:
      a. Two 4.5AH batteries.
      b. Two 7.0AH batteries.

10. Enclosure: NEMA Type 1.
11. Circuit board: solid state logic.
12. Diagnostics: Onboard.
13. Wi-Fi: Built in.
14. Internet connectivity: myQ and myQ Facility.
15. Security: Security+ 2.0.
16. Entrapment protection:
    a. Monitored entrapment protection inputs: Three.
        1) NEMA 1 Monitored photo electric eyes mounted on jambs.
        2) NEMA 4X Monitored photo electric eyes mounted on jambs.
        3) Monitored light curtain.
        4) Wireless Monitored electric reversing edge extending full width of door.
        5) Wired Monitored electric reversing edge extending full width of door.
17. Cable protection monitoring: Input on board to add two
18. Limit system: Electronic Limits.
19. Inputs: Programmable.
20. Remote controls.

C. FireHoist as provided by Raynor Garage Doors:
    1. Model:
        a. Raynor FSEP model:
            1) Type: Jackshaft with automatic closure by fusible link, detector or fire alarm system. Allows automatic closing without loss of door spring tension thus allowing for ease of resetting of door after testing or alarm. Operates as a standard rolling door operator when not in a fire situation.
            2) Motor Horsepower Rating: Per the manufacturer's recommended size for door.
            3) Motor Horsepower Rating: Continuous 1/3 HP.
            4) Motor Horsepower Rating: Continuous 1/2 HP.
            5) Motor Horsepower Rating: Continuous 3/4 HP.
            6) Motor Horsepower Rating: Continuous 1-1/2 HP.
            7) Motor Horsepower Rating: Continuous 2 HP.
            8) Electrical Requirements: 115 volt single phase.
            9) Electrical Requirements: 230 volt single phase.
            10) Electrical Requirements: 208-230 volt three phase.
            11) Electrical Requirements: 460 volt three phase.
            12) Duty Cycle: Restricted duty cycles.
            13) Control Wiring: 24 volt control with provisions for connection of a monitored reversing device.
                a) Provide three button momentary contact "open-stop", constant pressure close, with provisions for momentary pressure to close.
                b) Monitored electric reversing edge on door.
                c) Monitored photo electric eyes mounted on jambs.

        b. Raynor FGH model:
            1) Type: Jackshaft with automatic closure by fusible link. Allows automatic closing without loss of door spring tension thus allowing for "Easy-Reset" of door after testing.
            2) Motor Horsepower Rating: Per the manufacturer's recommended size for door.
            3) Motor Horsepower Rating: Continuous 1/2 HP.
            4) Motor Horsepower Rating: Continuous 1 HP.

5) Motor Horsepower Rating: Continuous 1-1/2 HP.
6) Motor Horsepower Rating: Continuous 2 HP.
7) Motor Horsepower Rating: Continuous 3 HP.
8) Electrical Requirements: 115 volt single phase.
9) Electrical Requirements: 230 volt single phase.
10) Electrical Requirements: 208-230 volt three phase.
11) Electrical Requirements: 460 volt three phase.
12) Electrical Requirements: 575 volt three phase.
13) Duty Cycle: Restricted duty cycles.
14) Control Wiring: 24 volt control with provisions for connection of a monitored reversing device.
    a) Provide three button momentary contact "open-stop", constant pressure close, with provisions for momentary pressure to close.
    b) Monitored electric reversing edge on door.
    c) Monitored photo electric eyes mounted on jambs.

PART 3 EXECUTION

3.7 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Verify that site conditions are acceptable for installation of doors, operators, controls, and accessories. Ensure that openings are square, flush, and plumb.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.8 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.9 INSTALLATION

A. General: Install door, guides and operating equipment complete with all necessary accessories and hardware according to shop drawings, manufacturer's instructions.

B. Lubricate bearings and sliding parts and adjust doors for proper operation, balance, clearance and similar requirements.

3.10 PROTECTION

A. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove and legally dispose of construction debris from project site.

B. Remove temporary coverings and protection of adjacent work areas. Repair or replace installed products damaged prior to or during installation.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION