



## SECTION 08330

### COILING AND ROLLING DOORS

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#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Rolling service doors.
- B. Rolling counter doors.
- C. Rolling grille doors.
- D. Rolling fire doors.
- E. Rolling counter fire doors.
- F. Rolling traffic doors.
- G. Rolling high-speed doors.
- H. Electric operators.

##### 1.2 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications: Miscellaneous for steel supports.
- B. Section 08710 - Door Hardware: Hardware, locks, access panels.
- C. Section 09900 - Painting: Field painting.
- D. Section 11150 - Parking Control Equipment: Parking control equipment for remote door controls.
- E. Section 16050 - Basic Electrical Materials and Methods: Electrical connections and service for powered door operators.

##### 1.3 REFERENCES

- A. ASTM International (ASTM):
  1. ASTM A 240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strips.
  2. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- 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, spring shafts, 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 installer having demonstrated experience on projects of similar size and complexity, and trained and authorized by the door manufacturer to perform the work of this section.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

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

#### 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 recommended limits.

#### 1.8 WARRANTY

- A. Manufacturer's Warranty for Rolling Service Doors: Provide manufacturer's standard warranty.
  - 1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  - 2. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- B. Manufacturer's Warranty for Rolling Counter Doors: Provide manufacturer's standard warranty.
  - 1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  - 2. Raynor warrants the electrical operator and its component parts for one (1) year against defects in material and workmanship.

3. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- C. Manufacturer's Warranty for Rolling Grille Doors: Provide manufacturer's standard warranty.
1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  2. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- D. Manufacturer's Warranty for Rolling Fire Doors: Provide manufacturer's standard warranty.
1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  2. Raynor warrants the electrical operator and its component parts for one (1) year against defects in material and workmanship.
  3. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- E. Manufacturer's Warranty for Rolling Counter Fire Doors: Provide manufacturer's standard warranty.
1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  2. Raynor warrants the electrical operator and its component parts for one (1) year against defects in material and workmanship.
  3. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- F. Manufacturer's Warranty for Rolling Traffic Doors: Provide manufacturer's standard warranty.
1. Raynor warrants the door and its component parts for one (1) year against defects in material and workmanship.
  2. Raynor warrants the electrical operator and its component parts for two (2) year against defects in material and workmanship.
- G. Manufacturer's Warranty for Rolling High-Speed Doors: Provide manufacturer's standard warranty.
1. Raynor warrants the motor for five (5) years against defects in material and workmanship.
- H. Manufacturer's Warranty for ControlHoist 2.0 Commercial Operators: Provide manufacturer's standard warranty.
1. Raynor warrants the electrical operator and component parts for two (2) years against defects in material and workmanship when purchased as operator only.
- I. Manufacturer's Warranty for ControlHoist 2.0 Commercial Operators Door and Operator Warranty Package: Provide manufacturer's standard warranty.
1. Raynor warrants the 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 commercial sectional or rolling door.

## 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; ASD. Toll Free Tel: 800-4-RAYNOR; Tel: 815-288-1431; Fax: 888-598-4790; Email: [request info \(thegarage@raynor.com\)](mailto:request info (thegarage@raynor.com)); Web: [www.raynor.com](http://www.raynor.com)

- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

## 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. Structural Performance Requirements:
      - 1) Wind Loads: Uniform pressure of: \_\_\_\_\_ psf.
    - c. International Residential Code (IRC) Wind Load Compliance Requirements:
      - 1) Flat Slat Style FF DuraCoil Steel Roll-Up Doors, Impact Resistant.
      - 2) Insulated Flat Slat Style IF DuraCoil Steel Roll-Up Doors, Impact Resistant.
    - d. International Building Code (IBC) Wind Load Compliance Requirements:
      - 1) Flat Slat Style FF DuraCoil Steel Roll-Up Doors, Non-Impact Resistant.
      - 2) Insulated Flat Slat Style IF DuraCoil Steel Roll-Up Doors, Non-Impact Resistant.
    - e. International Energy Conservation Code (IECC) Requirements:
      - 1) Air Infiltration – Maximum air leakage of 1.00 cfm/ft<sup>2</sup> is required. Testing shall be in accordance with DASMA 105 test procedure.
      - 2) Raynor provides an air leakage rating of .47 cmf/ft<sup>2</sup>.
      - 3) Raynor provides a U-Factor rating of 0.901 Btus/Ft<sup>2</sup>-HR-°F on DuraCoil Rolling Steel Model IF (Insulated Flat Slat).
    - f. 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 weatherseal.
  - 2. Curtain: Interlocking roll-formed slats as specified below. Endlocks shall be attached to each of alternate slat to prevent lateral movement.
    - a. Flat Slat Style: FF.
      - 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) Steel: 24 gauge (0.024 inch minimum thickness).
      - 5) Stainless Steel: 20 gauge (0.033 inch minimum thickness).
      - 6) Stainless Steel: 22 gauge (0.027 inch minimum thickness).
      - 7) Aluminum: 16 gauge (0.050 inch minimum thickness).
      - 8) Aluminum: 18 gauge (0.040 inch minimum thickness).
    - b. Large Contour Slat Style: LC.
      - 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).

- c. Small Contour Slat Style: SC.
    - 1) Steel: 20 gauge (0.036 inch minimum thickness).
    - 2) Steel: 22 gauge (0.030 inch minimum thickness).
  - d. Flat Insulated Slat Style: IF. Polyurethane insulation with R-value 8.0 and U-value 0.125.
    - 1) Steel: 18 gauge (0.047 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 2) Steel: 20 gauge (0.036 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 3) Steel: 22 gauge (0.030 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 4) Steel: 24 gauge s (0.023 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 5) Stainless Steel: 20 gauge (0.033 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 6) Stainless Steel: 22 gauge (0.027 inch minimum thickness) with 24 gauge back covers (0.023 inch minimum thickness).
    - 7) Aluminum: 16 gauge a (0.050 inch minimum thickness) with 18 gauge back covers (0.040 inch minimum thickness).
    - 8) Aluminum: 18 gauge (0.040 inch minimum thickness) with 18 gauge back covers (0.040 inch minimum thickness).
  - e. Flat Perforated Slat Style: F.
    - 1) Steel: 20 gauge (0.036 inch minimum thickness) punched with 1/16 inch (1.6mm) diameter holes staggered on 3/32 inch (2.4mm) centers across entire length.
    - 2) Steel: 22 gauge (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.
    - 3) Steel: 16 gauge (0.050 inch minimum thickness) punched with 1/16 inch (1.6mm) diameter holes staggered on 3/32 inch (2.4mm) centers across entire length.
    - 4) Steel: 18 gauge (0.040 inch minimum thickness) punched with 1/16 inch (1.6mm) diameter holes staggered on 3/32 inch (2.4mm) centers across entire length.
  - f. 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.
  - g. 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) plexiglass, thickness as follows:
- a. 1/8 inch (3.2 mm) thick for flat slats.
  - b. 5/8 inch (15.9 mm) thick for insulated slats.
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.
- a. Snap-on dual durometer vinyl seal.
  - b. Brushseal 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 (0.023 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 Weatherseal: Provide a "Z" shape brushseal 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.
  - 13. Operator: Provide Raynor ControlHoist 2.0 Optima as specified.
  - 14. Operator: Provide Raynor ControlHoist 2.0 Standard as specified.
  - 15. Operator: Provide Raynor ControlHoist 2.0 Basic as specified.
- B. DuraCoil LFF 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.
  - 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: Flat slat 24 gauge steel (0.023 inch minimum thickness), commercial quality hot-dipped galvanized (G-60) steel in accordance with ASTM A-653.
    - b. 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.
  - 3. Endlocks: Zinc-plated stamped steel endlocks fastened with two zinc-plated steel rivets.

4. Bottom Bar: Two roll-formed galvanized steel 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.
5. Vision Panels: 4 inches by 1 inch (101.6 mm by 25.4 mm) plexiglass, thickness as follows:
  - a. 1/8 inch (3.2 mm) thick for flat slats.
6. Guide Assemblies: Roll-formed 14 gauge galvanized steel (0.071 inch minimum thickness) fastened to 11 gauge galvanized steel (0.116 inch minimum thickness) wall angle and fitted with removable curtain stops.
7. Guide Weatherseal: Seals to inhibit air infiltration between the guide and the curtain. Provide vinyl with an aluminum retainer attached to the guide assembly.
8. Counterbalance:
  - a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 mm) 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.
    - 2) High \_\_\_\_\_ cycles.
9. Brackets: Plate 10 gauge galvanized steel (0.130 inch minimum thickness), 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.
10. Enclosures:
  - a. Hood Type: 24 gauge steel (0.022 inch minimum thickness) commercial quality hot-dipped galvanized steel in accordance with ASTM A-653.
    - 1) Round Hood.
    - 2) Square Hood.
  - b. Bracket Covers: Covers to enclose door mechanisms, 24 gauge steel (0.022 inch minimum thickness) finish to match curtain.
  - c. 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.
  - d. Hood Baffle: Provide hood baffle with a rubber seal to inhibit air infiltration through hood cavity.
11. Header Weatherseal: Provide a "Z" shape brushseal 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 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 use with push-up, hand chain and hand crank operated doors.
  - e. Cylinder Lock for Motor Operated Doors: Provide interlock switch with cylinder lock.
13. Operator: Provide Raynor ControlHoist 2.0 Optima as specified.
14. Operator: Provide Raynor ControlHoist 2.0 Standard as specified.
15. Operator: Provide Raynor ControlHoist 2.0 Basic as specified.

## 2.3 ROLLING COUNTER DOORS

- 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 (0.027 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) Commercial quality hot-dipped galvanized (G-40) steel in accordance with ASTM A-653.
      - 3) Stainless steel in accordance with ASTM A-240, type 304.
      - 4) 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) Stainless steel #4 finish.
      - 3) Clear anodize finish.
      - 4) Bronze anodize finish.
      - 5) Exterior of slat to be an oak laminate and interior of slat to be painted a dark brown.
      - 6) ArmorBrite Powdercoat finish.
        - a) 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 counter top.
    - 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 polyester paint to match curtain.
  - 2) Stainless steel bottom bar to be #4 finish to match curtain.
  - 3) Aluminum bottom bar to be clear anodize finish to match curtain.
  - 4) Aluminum bottom bar to be bronze anodize 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 polyester paint to match curtain.
    - 2) 13 gauge stainless steel (0.090 inch minimum thickness) to have a #4 finish to match curtain.
    - 3) Extruded aluminum (0.050 inch minimum thickness) to have clear anodize finish to match curtain.
    - 4) Extruded aluminum (0.050 inch minimum thickness) to have bronze anodize finish to match curtain.
    - 5) 13 gauge galvanized steel (0.086 inch minimum thickness) to receive ArmorBrite Powdercoat finish.
      - a) Color: \_\_\_\_\_.
  - b. Wear strips: Wool-pile to be attached to the inside of the 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 mm) 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 be 10 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 (0.023 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) Stainless steel #4 finish.
  - 3) Clear anodize finish.
  - 4) Bronze anodize finish.
  - 5) ArmorBrite Powdercoat finish.
    - a) Color: \_\_\_\_\_.
9. Header Weatherseal: Provide a brushseal 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.
11. Operator: Provide Raynor ControlHoist 2.0 Optima as specified.
12. Operator: Provide Raynor ControlHoist 2.0 Standard as specified.
13. Operator: Provide Raynor ControlHoist 2.0 Basic as specified.

## 2.4 ROLLING 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.
  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 clear anodize finish.
      - 2) Aluminum with a mill finish.
      - 3) Aluminum with a bronze anodize finish.

- c. 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 wool-pile 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 mm) 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.
      - a) 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 (0.023 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.
      - a) 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.
- 8. Operator: Provide Raynor ControlHoist 2.0 Optima as specified.
  - 9. Operator: Provide Raynor ControlHoist 2.0 Standard as specified.
  - 10. Operator: Provide Raynor ControlHoist 2.0 Basic as specified.
  - 11. Operator: Provide Raynor ControlHoist 2.0 LGE as specified.

## 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).
  - 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 slat 18 gauge steel (0.047 inch minimum thickness).
      - 2) Flat slat 20 gauge steel (0.036 inch minimum thickness).
      - 3) Flat slat 22 gauge steel (0.030 inch minimum thickness).
      - 4) Flat slat 20 gauge stainless steel (0.033 inch minimum thickness).
      - 5) Flat slat 22 gauge stainless steel (0.027 inch minimum thickness).
      - 6) Large curved slat 18 gauge steel (0.047 inch minimum thickness).
      - 7) Large curved slat 20 gauge steel (0.036 inch minimum thickness).

- 8) Large curved slat 22 gauge steel (0.030 inch minimum thickness).
- 9) Small curved slat 20 gauge steel (0.036 inch minimum thickness).
- 10) Small curved slat 22 gauge steel (0.030 inch minimum thickness).
- 11) Insulated flat slat 24 gauge steel (0.023 inch minimum thickness) with 24 gauge steel back covers (0.023 inch minimum thickness).
- 12) Insulated flat slat 22 gauge steel (0.030 inch minimum thickness) with 24 gauge steel back covers (0.023 inch minimum thickness).
- 13) Insulated flat slat 20 gauge steel (0.036 inch minimum thickness) with 24 gauge steel back covers (0.023 inch minimum thickness).
- 14) Insulated flat slat 18 gauge steel (0.047 inch minimum thickness) with 24 gauge steel back covers (0.023 inch minimum thickness).
  - a) 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.
- a. Brushseal 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 mm) 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 (0.023 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 brushseal 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.
14. Provide Raynor FireHoist model operator as specified.

## 2.6 ROLLING COUNTER FIRE 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: 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 (0.027 inch



7. Brackets: Mounting brackets shall be 10 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 (0.023 inch minimum thickness) in accordance with ASTM A-240, type 304.
  - d. Color and Finish:
    - 1) Gray polyester paint to match curtain finish.
    - 2) Stainless steel #4 finish.
    - 3) 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 brushseal 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 ROLLING TRAFFIC DOORS

- A. FabriCoil as manufactured by Raynor Garage Doors:
  1. Doors:
    - a. Operation:
      - 1) Provide doors designed for hand chain operation.
      - 2) Provide doors designed for electric motor operation.
  2. Curtain Material: 1-ply PVC fabric with aluminum wind beams spaced as below.
    - a. PVC Color:
      - 1) Color: Orange.
      - 2) Color: Blue.
    - b. Wind beam spacing(s):
      - 1) 2 feet spacing.
      - 2) 4 feet spacing.
    - c. Wind Beams: Aluminum wind beams used to reinforce the curtain under wind conditions or negative pressure in the building.
  3. Bottom Bar: Two angles, minimum 2 inches by 2 inches by 3/16 inch (50.8 mm x 50.8 mm x 4.8 mm) with a yellow wireless electric reversing edge for

- electric motor operation or a rubber single-contact type bottom astragal for hand chain operation.
- a. Breakaway Tabs: Breakaway tabs to be made from a min. 3/16 inch (4.8 mm) thick UHMW polyethylene plastic material attached to the bottom bar to allow the door to be impacted and resettable.
  4. Vision Panels: Clear PVC, 24 inches (610 mm) high, full width of curtain.
  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).
    - 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 steel to receive ArmorBrite Powdercoat finish.
        - a) Color: \_\_\_\_\_.
    - b. Guide Wear Strips: UHMW polyethylene tape inside the guides to reduce wear on the curtain.
  6. Guide Weatherseal: Brushseal with an aluminum retainer to inhibit air infiltration between the guide and the curtain.
  7. Counterbalance:
    - a. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 mm) 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 (hand chain operation only). No springs for electric motor operation.
      - 1) Standard 15,000 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.
    - 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 (0.023 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.
        - a) Color: \_\_\_\_\_.

10. Header Weatherseal: Provide a "Z" shape brushseal to inhibit air infiltration between the header and the curtain.
11. Locks: Furnish door system with the following:
  - a. Locking Bar: For 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.
12. Operator: Provide Raynor ControlHoist 2.0 Optima as specified.

## 2.8 ROLLING HIGH-SPEED DOORS

- A. RapidCoil RC100 high-speed electrically-powered vertical fabric roll-up doors as manufactured by Raynor Garage Doors:
  1. Usage: Interior only.
  2. Pressure Resistance During Operation: 0.82 lbs/sq.ft without the use of wind bars either pressing against the fabric or attached onto the fabric; without the use of a solid bottom beam.
  3. Operating Speed: Opening speed 36 inches (914 mm) per second, closing speed 24 inches (610 mm) per second.
  4. Door Panel Fabric: Minimum weight of 27 oz/sq.yd.
    - a. Color: Brown.
    - b. Color: Yellow.
    - c. Color: Grey.
    - d. Color: Blue.
    - e. Color: Red.
    - f. Color: Green.
    - g. Color: Orange.
    - h. Color: White.
    - i. Color: Black.
  5. Characteristics:
    - a. Safe Panel: Door shall be equipped with a panel free of stiffeners or bars. With disconnected photocells and reversing edge. The panel shall be of such a weight and thickness that it can mold to any object or person it comes in contact with.
    - b. Self-Reinserting: Fabric door panel shall release immediately upon impact from side guides without tearing the fabric. After a collision and upon activation the door panel will automatically re-insert itself into the side guides. Cover for side frames shall remain in place at all times. Doors that require side covers to be unfastened and opened to reset a breakaway feature will not be allowed. Self-reinserting feature must be totally operational in all stages of the door's opening and closing cycle as well as be independent of the driving direction of the vehicle.
    - c. Sealing: Door shall provide a barrier against wind, humidity, noise, dust, light, birds or insects. Sealing on both sides of the door shall be achieved with the panel held by a continuous bead in the side guides. Door shall have on top a flexible flap pushing against a header profile and beneath a flexible bottom flap adapting itself to the irregularities of the floor.
    - d. Low Maintenance: Door shall be free of wearing parts such as stiffeners, traction- or compression springs, cables, straps, spiral cables, motor brakes.
    - e. Motor: Provide electric motor assembly of design, type, size and capacity as determined and furnished by door manufacturer for size, weight, performance function and other characteristics of the door.

Operators using brakes and clutches to stop door are not allowed.  
Operator to be controlled by a variable speed drive.

- f. Electric Control Panel: NEMA 4 rated enclosure, fully assembled and ready for connection. All components and the layout of such components shall be UL listed. Control panel shall contain a rotary disconnect switch, an emergency stop push button and an open/close reset push button.
  - g. Control Box: To contain a solid state electronic controller; circuit board design technology, as well as an absolute encoder receiver.
  - h. Photocell: Reversing infrared photocell with a transmitter and receiver shall be provided and located within the door side frame.
6. Options:
- a. Vision panels transparent PVC, 5/64 inch (2 mm), 24 inches (610 mm) wide by 24 inches (610 mm) high window center line at plus or minus 63 inches (1600 mm) above the floor.
  - b. Vision banner transparent PVC, thickness 5/64 inch (2 mm), door width by 15 inches (381 mm) high; window center line at plus or minus 63 inches (1600 mm) above the floor.
  - c. Supplementary infra-red photocell placed at a pre-determined height from the floor, type transmitter-receiver (a limit switch disables the photocell before the bottom of the door panel arrives at the height of the supplementary photocell).
  - d. Frame cover in stainless steel (AISI 304).
  - e. Motor cover in galvanized steel.
  - f. Motor cover in stainless steel (AISI 304).
  - g. Drum hood in galvanized steel.
  - h. Drum hood in stainless steel (AISI 304).
  - i. Shafts and drum in stainless steel (AISI 304).
  - j. Frame and covers painted in a special color.
  - k. Control box in fiberglass, 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4, with open push button and emergency stop; after unlocking of emergency stop, the operation of the door is reset by pushing the reset button.
  - l. Control box in stainless steel (AISI 304), 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4X, with open push button and emergency stop; after unlocking emergency stop, the operation of the door is reset by pushing the reset button.
  - m. Control box which gives a warning before closing: two orange lights go on when the door opens, after the opening of the door they go off; they go on again plus or minus 2 seconds (adjustable) before the door closes until the door is completely closed.
  - n. Control box which gives a warning before opening: two orange lights go on plus or minus 2 seconds (adjustable) before the door opens, they stay on, without interruption, until the door is completely closed.
  - o. Orange flashing light NEMA 12 which works during the opening and closing of the door.
  - p. Orange flashing light NEMA 4 (waterproof) which works during the opening and closing of the door.
  - q. Airlock function between two new RAYNOR doors. Each door has its own control box and its own opening commands, but opens only when the other door is closed. The control boxes are not the same: one has priority, the other has not. Delivered with an ON/OFF switch, thus isolating the two doors in order to obtain independent function. Specify door which needs this selector.

- r. Traffic lights, 1 pair of lights.
  - s. Automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient power to activate the door; this UPS is placed between the supply and the control box. A relay installed in the control box detects a power failure and immediately opens the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - t. Semi-automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient tension to activate the door; this UPS is placed between the supply and the control box. In case of power failure the door remains closed, a voluntary opening command is necessary to open the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - u. Information on open or closed door.
  - v. Logo up to 1 square yard.
  - w. Fore frame.
- B. RapidCoil RC200 high-speed electrically-powered vertical fabric roll-up doors as manufactured by Raynor Garage Doors:
1. Usage: Interior only.
  2. Pressure Resistance During Operation: 0.82 lbs/sq.ft without the use of wind bars either pressing against the fabric or attached onto the fabric; without the use of a solid bottom beam.
  3. Operating Speed: Opening speed 48 inches (1220 mm) per second, closing speed 24 inches (610 mm) per second.
  4. Door Panel Fabric: Minimum weight of 27 oz/sq.yd.
    - a. Color: Brown.
    - b. Color: Yellow.
    - c. Color: Grey.
    - d. Color: Blue.
    - e. Color: Red.
    - f. Color: Green.
    - g. Color: Orange.
    - h. Color: White.
    - i. Color: Black.
  5. Characteristics:
    - a. Safe Panel: Door shall be equipped with a panel free of stiffeners or bars. With disconnected photocells and reversing edge. The panel shall be of such a weight and thickness that it can mold to any object or person it comes in contact with.
    - b. Self-Reinserting: Fabric door panel shall release immediately upon impact from side guides without tearing the fabric. After a collision and upon activation the door panel will automatically re-insert itself into the side guides. Cover for side frames shall remain in place at all times. Doors that require side covers to be unfastened and opened to reset a breakaway feature will not be allowed. Self-reinserting feature must be totally operational in all stages of the door's opening and closing cycle as well as be independent of the driving direction of the vehicle.
    - c. Sealing: Door shall provide a barrier against wind, humidity, noise, dust, light, birds or insects. Sealing on both sides of the door shall be achieved with the panel held by a continuous bead in the side guides. Door shall have on top a flexible flap pushing against a header profile and beneath a flexible bottom flap adapting itself to the irregularities of the floor.

- d. Low Maintenance: Door shall be free of wearing parts such as stiffeners, traction- or compression springs, cables, straps, spiral cables, motor brakes.
  - e. Motor: Provide electric motor assembly of design, type, size and capacity as determined and furnished by door manufacturer for size, weight, performance function and other characteristics of the door. Operators using brakes and clutches to stop door are not allowed. Operator to be controlled by a variable speed drive.
  - f. Electric Control Panel: NEMA 4 rated enclosure, fully assembled and ready for connection. All components and the layout of such components shall be UL listed. Control panel shall contain a rotary disconnect switch, an emergency stop push button and an open/close reset push button.
  - g. Control Box: To contain a solid state electronic controller; circuit board design technology, as well as an absolute encoder receiver.
  - h. Photocell: Reversing infrared photocell with a transmitter and receiver shall be provided and located within the door side frame.
6. Options:
- a. Vision panels transparent PVC, 5/64 inch (2 mm), 24 inches (610 mm) wide by 24 inches (610 mm) high window center line at plus or minus 63 inches (1600 mm) above the floor.
  - b. Vision banner transparent PVC, thickness 5/64 inch (2 mm), door width by 15 inches (381 mm) high; window center line at plus or minus 63 inches (1600 mm) above the floor.
  - c. Supplementary infra-red photocell placed at a pre-determined height from the floor, type transmitter-receiver (a limit switch disables the photocell before the bottom of the door panel arrives at the height of the supplementary photocell).
  - d. Frame cover in stainless steel (AISI 304).
  - e. Motor cover in galvanized steel.
  - f. Motor cover in stainless steel (AISI 304).
  - g. Drum hood in galvanized steel.
  - h. Drum hood in stainless steel (AISI 304).
  - i. Shafts and drum in stainless steel (AISI 304).
  - j. Frame and covers painted in a special color.
  - k. Control box in fiberglass, 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4, with open push button and emergency stop; after unlocking of emergency stop, the operation of the door is reset by pushing the reset button.
  - l. Control box in stainless steel (AISI 304), 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4X, with open push button and emergency stop; after unlocking emergency stop, the operation of the door is reset by pushing the reset button.
  - m. Control box which gives a warning before closing: two orange lights go on when the door opens, after the opening of the door they go off; they go on again plus or minus 2 seconds (adjustable) before the door closes until the door is completely closed.
  - n. Control box which gives a warning before opening: two orange lights go on plus or minus 2 seconds (adjustable) before the door opens, they stay on, without interruption, until the door is completely closed.
  - o. Orange flashing light NEMA 12 which works during the opening and closing of the door.
  - p. Orange flashing light NEMA 4 (waterproof) which works during the opening and closing of the door.

- q. Airlock function between two new RAYNOR doors. Each door has its own control box and its own opening commands, but opens only when the other door is closed. The control boxes are not the same: one has priority, the other has not. Delivered with an ON/OFF switch, thus isolating the two doors in order to obtain independent function. Specify door which needs this selector.
  - r. Traffic lights, 1 pair of lights.
  - s. Automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient power to activate the door; this UPS is placed between the supply and the control box. A relay installed in the control box detects a power failure and immediately opens the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - t. Semi-automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient tension to activate the door; this UPS is placed between the supply and the control box. In case of power failure the door remains closed, a voluntary opening command is necessary to open the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - u. Information on open or closed door.
  - v. Logo up to 1 square yard.
  - w. Fore frame.
- C. RapidCoil RC300 high-speed electrically-powered vertical fabric roll-up doors as manufactured by Raynor Garage Doors:
1. Usage: Exterior or interior use.
  2. Pressure Resistance During Operation: Comply with wind speed applicable at the project, within manufacturer's range of 23.89 pounds per square foot for doors up to 7 feet wide and wind speeds up to 95 hour, to 9.29 pounds per square foot for doors up to 18 feet wide and wind speeds of 60 mph; without the use of wind bars either pressing against the fabric or attached onto the fabric; without the use of a solid bottom beam.
  3. Operating Speed: Opening speed 48 inches (1220 mm) per second, closing speed 48 inches (1220 mm) per second. Door to be gear driven, with flexible soft bottom design.
  4. Door Panel Fabric: Minimum weight of 27 oz/sq.yd.
    - a. Color: Brown.
    - b. Color: Yellow.
    - c. Color: Grey.
    - d. Color: Blue.
    - e. Color: Red.
    - f. Color: Green.
    - g. Color: Orange.
    - h. Color: White.
    - i. Color: Black.
  5. Characteristics:
    - a. Safe Panel: Door shall be equipped with a panel free of stiffeners or bars. With disconnected photocells and reversing edge. The panel shall be of such a weight and thickness that it can mold to any object or person it comes in contact with.
    - b. Self-Reinserting: Fabric door panel shall release immediately upon impact from side guides without tearing the fabric. After a collision and upon activation the door panel will automatically re-insert itself into the side guides. Cover for side frames shall remain in place at all times.

- Doors that require side covers to be unfastened and opened to reset a breakaway feature will not be allowed. Self-reinserting feature must be totally operational in all stages of the door's opening and closing cycle as well as be independent of the driving direction of the vehicle.
- c. Sealing: Door shall provide a barrier against wind, humidity, noise, dust, light, birds or insects. Sealing on both sides of the door shall be achieved with the panel held by a continuous bead in the side guides. Door shall have on top a flexible flap pushing against a header profile and beneath a flexible bottom flap adapting itself to the irregularities of the floor.
  - d. Low Maintenance: Door shall be free of wearing parts such as stiffeners, traction- or compression springs, cables, straps, spiral cables, motor brakes.
  - e. Motor: Provide electric motor assembly of design, type, size and capacity as determined and furnished by door manufacturer for size, weight, performance function and other characteristics of the door. Operators using brakes and clutches to stop door are not allowed. Operator to be controlled by a variable speed drive.
  - f. Electric Control Panel: NEMA 4 rated enclosure, fully assembled and ready for connection. All components and the layout of such components shall be UL listed. Control panel shall contain a rotary disconnect switch, an emergency stop push button and an open/close reset push button.
  - g. Control Box: To contain a solid state electronic controller; circuit board design technology, as well as an absolute encoder receiver.
  - h. Photocell: Reversing infrared photocell with a transmitter and receiver shall be provided and located within the door side frame.
6. Options:
- a. Vision panels transparent PVC, 1/12 inch (2.1 mm), 24 inches (610 mm) wide by 24 inches (610 mm) high window center line at plus or minus 63 inches (1600 mm) above the floor.
  - b. Vision banner transparent PVC, thickness 1/12 inch (2.1 mm), door width by 18.5 inches (470 mm) high; window center line at plus or minus 63 inches (1600 mm) above the floor.
  - c. Supplementary infra-red photocell placed at a pre-determined height from the floor, type transmitter-receiver (a limit switch disables the photocell before the bottom of the door panel arrives at the height of the supplementary photocell).
  - d. Frame cover in stainless steel (AISI 304).
  - e. Motor cover in galvanized steel.
  - f. Motor cover in stainless steel (AISI 304).
  - g. Drum hood in galvanized steel.
  - h. Drum hood in stainless steel (AISI 304).
  - i. Shafts and drum in stainless steel (AISI 304).
  - j. Frame and covers painted in a special color.
  - k. Control box in fiberglass, 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4, with open push button and emergency stop; after unlocking of emergency stop, the operation of the door is reset by pushing the reset button.
  - l. Control box in stainless steel (AISI 304), 20 inches (508 mm) high by 20 inches (508 mm) wide by 8 inches (203 mm) deep. Degree of protection: NEMA 4X, with open push button and emergency stop; after unlocking emergency stop, the operation of the door is reset by pushing the reset button.
  - m. Control box which gives a warning before closing: two orange lights go

- on when the door opens, after the opening of the door they go off; they go on again plus or minus 2 seconds (adjustable) before the door closes until the door is completely closed.
- n. Control box which gives a warning before opening: two orange lights go on plus or minus 2 seconds (adjustable) before the door opens, they stay on, without interruption, until the door is completely closed.
  - o. Orange flashing light NEMA 12 which works during the opening and closing of the door.
  - p. Orange flashing light NEMA 4 (waterproof) which works during the opening and closing of the door.
  - q. Airlock function between two new RAYNOR doors. Each door has its own control box and its own opening commands, but opens only when the other door is closed. The control boxes are not the same: one has priority, the other has not. Delivered with an ON/OFF switch, thus isolating the two doors in order to obtain independent function. Specify door which needs this selector.
  - r. Traffic lights, 1 pair of lights, 5.9 inch (150 mm) diameter, 120V.
  - s. Automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient power to activate the door; this UPS is placed between the supply and the control box. A relay installed in the control box detects a power failure and immediately opens the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - t. Semi-automatic opening in case of power failure: This option requires the use of a UPS (Uninterruptible Power Supply) containing a battery that supplies sufficient tension to activate the door; this UPS is placed between the supply and the control box. In case of power failure the door remains closed, a voluntary opening command is necessary to open the door, which remains open during the power failure. The power of the UPS depends on the power of the motor of the door.
  - u. High speed opening, 5 ft/s or 8 ft/s, closing 2.6 ft/s or 4 ft/s, according to the type of door.
  - v. Low speed closing, opening 4 ft/s, closing 2 ft/s (incompatible with high speed opening).
  - w. Information on open or closed door.
  - x. Logo up to 1 square yard.
  - y. Fore frame.
- D. RapidCoil RC300HD high-speed electrically-powered vertical fabric roll-up doors as manufactured by Raynor Garage Doors:
- 1. Usage: Exterior use.
  - 2. Pressure Resistance During Operation: Comply with wind speed applicable at the project, within manufacturer's range of 88.78 pounds per square foot for doors up to 7 feet wide and wind speeds up to 185 mph, to 34.52 pounds per square foot for doors up to 18 feet wide and wind speeds of 115 mph; without the use of wind bars either pressing against the fabric or attached onto the fabric; without the use of a solid bottom beam.
  - 3. Operating Speed: Opening speed 48 inches (1220 mm) per second, closing speed 48 inches (1220 mm) per second. Door to be gear driven, without ballast.
  - 4. Door Panel Fabric: Minimum weight of 27 oz/sq.yd.
    - a. Color: Brown.
    - b. Color: Yellow.
    - c. Color: Grey.
    - d. Color: Blue.

- e. Color: Red.
  - f. Color: Green.
  - g. Color: Orange.
  - h. Color: White.
  - i. Color: Black.
5. Characteristics:
- a. Safe Panel: doors shall be equipped with a panel free of stiffeners or bars. With disconnected photocells and safety edge, if any, the doors should provide the highest level of safety. The panel shall be of such a weight and thickness that it can mold to any object or person it comes in contact with. To be documented by the manufacturer.
  - b. Self Reinserting: Fabric door panel must release immediately upon impact from side guides without tearing the fabric. After a collision and upon activation the door panel will automatically reinsert itself into the side guides.
  - c. Cover for side frames shall remain in place at all times. Doors that require side covers to be unfastened and opened to reset a breakaway feature will not be allowed.
  - d. Self-reinserting feature must be totally operational in all stages of the door's opening and closing cycle as well as be independent of the driving direction of the vehicle.
  - e. Sealing: Door has to provide an extremely good barrier against wind, humidity, noise, dust, light, birds or insects. Therefore the sealing on both sides of the door has to be achieved with the panel held in a continuous way in the side guides. The door must have on top a flexible omega-shaped flap pushing against a header profile and beneath a flexible bottom flap adapting itself to the irregularities of the floor.
  - f. Low Maintenance: Door shall be free of wearing parts such as stiffeners, traction- or compression springs, cables, straps, spiral cables, motor brakes
  - g. Provide electric motor assembly of design, type, size and capacity as determined and furnished by door manufacturer for size, weight, performance function and other characteristics of the door. Operators using brakes and clutches to stop door are not allowed. Operator to be controlled by a variable speed drive.
  - h. Electric control panel to be a NEMA 4X rated enclosure, fully assembled and ready for connection. All components and the layout of such components should be UL listed. Control panel should contain a rotary disconnect switch, an emergency stop push button and an open/close reset push button.
  - i. Control box to contain a Solid State electronic controller. Circuit board design technology, as well as an Absolute Encoder receiver.
  - j. Reversing infrared photocell with a transmitter and receiver to be provided and located within the door side frame.
6. Options:
- a. Vision panels transparent PVC, thickness .040", W 24" x H 24": window center line at +/- 5'3" above the floor.
  - b. Vision banner transparent PVC, thickness .040", door width x H 15": window center line at +/- 5'3" above the floor.
  - c. Supplementary infra-red photocell placed at a pre-determined height from the floor, type transmitter-receiver (a limit switch disables the photocell before the bottom of the door panel arrives at the height of the supplementary photocell).
  - d. Side guides in stainless steel (AISI 304).
  - e. Motor cover in galvanized steel.

- f. Motor cover in stainless steel (AISI 304).
- g. Drum hood in galvanized steel.
- h. Drum hood in stainless steel (AISI 304).
- i. Shafts and drum in stainless steel (AISI 304).
- j. Side guides painted in a special color.
- k. Reduced lintel or reduced lateral spacing.
- l. Control Box in polyester, H 14 inches x W 16 inches x D 8 inches. Degree of protection: NEMA 4X, with open push button and emergency stop; after unlocking of emergency stop, the operation of the door is reset by pushing the Reset button.
- m. Control Box in stainless steel (AISI 304), H 22 inches x W 13 inches x D 7 inches. Degree of protection: NEMA 4X, with open push button and emergency stop; after unlocking emergency stop, the operation of the door is reset by pushing the Reset button.
- n. Airlock function: only possible between two new RAYNOR doors. Each door has its own control box and its own opening commands, but opens only when the other door is closed. The control boxes are not the same: one has priority, the other has not. Delivered with an ON/OFF switch, thus isolating the two doors in order to obtain independent function (the door which needs this selector needs to be specified).
- o. Activation: Falcon Radar on both sides or one side of opening. Activation programmable by vehicular or pedestrian movement.
- p. Traffic lights: 1 pair of lights, diameter 5.90 inches, voltage: 24V.
- q. High speed opening: opening 8 ft/s, closing 4ft/s, according to the type of door.
- r. Information on open or closed door.
- s. Fore frame.

## 2.9 ELECTRIC OPERATORS

- A. ControlHoist 2.0 (UL Listed) as manufactured by Raynor Garage Doors:
  - 1. Model:
    - a. Raynor ControlHoist 2.0 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.
        - c) Monitored electric reversing edge on door.

- d) Monitored photo electric eyes mounted on jambs.
- b. Raynor ControlHoist 2.0 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.
    - c) Monitored electric reversing edge on door.
    - d) Monitored photo electric eyes mounted on jambs.
- c. Raynor ControlHoist 2.0 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: 10 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)
    - b) Monitored electric reversing edge on door.
    - c) Monitored photo electric eyes mounted on jambs.
- d. Raynor ControlHoist 2.0 LGE:
  - 1) Type: Jackshaft.
  - 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) Electrical Requirements: 115 volt single phase.
  - 6) Electrical Requirements: 208-230 volt single phase.
  - 7) Electrical Requirements: 208-230 volt three phase.
  - 8) Electrical Requirements: 460 volt three phase.
  - 9) Duty Cycle: 30 cycles/hour or 300 cycles/day.
  - 10) Control Wiring: with provisions for connection of a monitored reversing device.
    - a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
    - b) Monitored electric reversing edge on door.

c) Monitored photo electric eyes mounted on jambs.

B. FireHoist as provided by Raynor Garage Doors:

1. Model:

a. Raynor FSE 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

### 3.1 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.

### 3.2 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.

### 3.3 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, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements.

### 3.4 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.

### 3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: At Owner's request, provide manufacturer's field service consisting of product installation and use recommendations, and periodic site visits to observe and ensure product installation is done in accordance with manufacturer's recommendations.

END OF SECTION