PART 1 GENERAL

1.1 SECTION INCLUDES
A. Commercial sectional doors.

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

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. Performance Standards: Provide test data validating the following:
1. Door Section: Gloss retention, fade resistance, FDA compliance, cold crack performance, load to rebound, dent resistance impact.
2. Drive Train: Spring cycle life, track, hinges, rollers, cable assembly, cable strength.

D. Shop Drawings:
1. Provide drawings indicating track 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).

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

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

G. 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. Provide manufacturer's standard warranty against defects in material and workmanship, as further described with each model in Part 2 of this Section.

B. 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.

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

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SECTIONAL THERMAL SANDWICH DOOR (POLYSTYRENE OR POLYURETHANE INSULATION)

A. TC Series as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
         2) Wood jambs with lag screw fasteners.
         3) Masonry jambs with anchor bolt fasteners.
      c. Structural Performance Requirements:
   2. Sections:
      a. TC200:
         1) Sections shall be pressure bonded to a 1-7/8 inches (48mm) thick expanded polystyrene core with interior and exterior skins separated by a continuous thermal break. Hinge reinforcement plates shall be 16 gauge edge plates and 16 gauge center plates, located within section interior at every hinge location. End stiles to be 18 gauge galvanized steel.
         2) Material: Steel sandwich construction, 2 inches (50.8mm) thick, roll formed from draw quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior and interior skin to be constructed of 26 gauge steel embossed stucco texture.
         3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
            a) Color: White polyester paint.
            b) Color: Almond polyester paint.
            c) Color: BronzeTone polyester paint.
            d) Color: ClayTone polyester paint.
            e) Color: Dark Brown Kynar paint.
            f) Color: Frost White Kynar paint.
            g) Color: Beige Kynar paint.
            h) Color: Sepia Brown Kynar paint.
            i) Color: Desert Tan polyester paint.
            j) ArmorBrite Powdercoat finish, color as selected by Architect.
         4) Insulation: Expanded polystyrene with R-value of 10.25.
      b. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail.
         1) Provide blade seal on top section to prevent airflow above
3. Windows: Locations to comply with door elevation drawings.
   a. 24 inches by 8 inches (610 mm by 203 mm) window in a rectangular two-piece black frame.
   b. 24 inches by 12 inches (610 mm by 305 mm) window in a rectangular two-piece black frame.
   c. 34 inches by 16 inches (864 mm by 406 mm) window in a rectangular two-piece black frame.
   d. Full-view window consisting of aluminum stile and rail construction and color matched to door exterior with powdercoat paint.
   e. 40 inches by 12 inches (1016 mm by 305 mm) full-view (square-edge) window encased in an extruded PVC frame.
   f. 46 inches by 12 inches (1168 mm by 305 mm) full-view (square-edge) window encased in an extruded PVC frame.

4. Glazing: Windows to be provided with insulated glazing units as follows:
   a. Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass.
   b. Glass consisting of two panes of 3/16 inch (4.8 mm) thick glass.
   c. Reinforced glass consisting of one pane of 1/4 inch (6.4 mm) thick wire-reinforced glass (exterior pane) and one pane of 1/8 inch (3.2 mm) DSB glass (interior pane).

5. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

6. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
   b. Configuration Type:
      1) Configuration Type: Normal Headroom.
      2) Configuration Type: Low Headroom.
      3) Configuration Type: Vertical Lift.
      4) Configuration Type: Lift-Clearance.
      5) Configuration Type: Incline.
      6) Configuration Type: Contour.
   c. Track Size:
      1) Size: 2 inches (51 mm).
      2) Size: 3 inches (76 mm).
   d. Mounting:
      1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
      2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
      3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
e. Finish:
   1) Galvanized.
   2) White Powdercoat.

7. Counterbalance:
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ___________ cycles.

8. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.
   e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
   f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

9. TC Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

B. ThermaSeal as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
         2) Wood jambs with lag screw fasteners.
         3) Masonry jambs with anchor bolt fasteners.
      c. Structural Performance Requirements:
      d. International Energy Conservation Code (IECC) Requirements:
         1) Air Infiltration - Maximum air leakage of 0.4 cfm/ft2 is required. Testing shall be in accordance with DASMA 105 test procedure.
         2) Raynor ThermaSeal TM200 and TM220 provide an air leakage rating of 0.12 cfm/ft2 with optional IECC Compliance Package.
         3) Raynor ThermaSeal TM175 provides an air leakage rating of 0.22 cfm/ft2 with optional IECC Compliance Package.
4) Raynor ThermaSeal TM200 and TM220 provide an installed
U-factor of 0.19.
5) Raynor ThermaSeal TM175 provides an installed U-factor of
0.21.

2. Sections:
a. ThermaSeal TM320:
   1) Sections shall be pressure bonded to injected polyurethane foam
      insulated core. Hinge reinforcement strips shall be 20 gauge
      galvanized steel, located within section interior. End stiles to be
      16 gauge galvanized steel.
   2) Material: Steel sandwich construction, 3 inches (76mm) thick, roll
      formed from commercial quality, hot-dipped galvanized (G40
      exterior) steel complying with ASTM A 653. Exterior skin shall be
      constructed of 20 gauge steel with flush, smooth texture and
      interior skin shall be 26 gauge steel with embossed stucco
      texture.
   3) Finish: Exterior skin to have two coats of paint, one primer coat
      and one finish coat.
   4) Color: White polyester paint.
   5) Insulation: Expanded polyurethane with an R-value of 24.54.
b. ThermaSeal TM300:
   1) Sections shall be pressure bonded to injected polyurethane foam
      insulated core. Hinge reinforcement strips shall be 20 gauge
      galvanized steel, located within section interior. End stiles to be
      16 gauge galvanized steel.
   2) Material: Steel sandwich construction, 3 inches (76mm) thick, roll
      formed from commercial quality, hot-dipped galvanized (G40
      exterior) steel complying with ASTM A 653. Exterior skin shall be
      constructed of 26 gauge steel and interior skin shall be 26 gauge
      steel with embossed stucco texture.
   3) Finish: Exterior skin to have two coats of paint, one primer coat
      and one finish coat.
   a) Color: White polyester paint.
   b) Color: PVDF Coated Brown
   c) Color: PVDF Coated Sepia.
   d) Color: PVDF Coated Beige.
   e) Color: PVDF Coated Frost White.
   4) Insulation: Expanded polyurethane with R-value of 24.54.
c. ThermaSeal TM200:
   1) Sections shall be pressure bonded to injected polyurethane foam
      insulated core. Hinge reinforcement strips shall be 20 gauge
      galvanized steel, located within section interior. End stiles to be
      16 gauge galvanized steel.
   2) Material: Steel sandwich construction, 2 inches (51mm) thick, roll
      formed from commercial quality, hot-dipped galvanized (G40
      exterior) steel complying with ASTM A 653. Exterior skin shall be
      constructed of 26 gauge steel and interior skin shall be 26 gauge
      steel with embossed stucco texture.
   3) Finish: Exterior skin to have two coats of paint, one primer coat
      and one finish coat.
   a) Color: White polyester paint.
   b) Color: Kynar Sepia.
   c) Color: Kynar Beige.
   d) Color: Kynar Frost White.
   4) Insulation: Expanded polyurethane with R-value of 18.3.
d. ThermaSeal TM220:
1) Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles to be 16 gauge galvanized steel.

2) Material: Steel sandwich construction, 2 inches (51mm) thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of 20 gauge steel and interior skin shall be 26 gauge steel with embossed stucco texture.

3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
   a) Color: White polyester paint.

4) Insulation: Expanded polyurethane with R-value of 18.3.

e. ThermaSeal TM200C:
   1) Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles to be 20 gauge galvanized steel.
   2) Material: Steel sandwich construction, 2 inches (51mm) thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of 0.013” thick steel and interior skin shall be 0.0127” thick steel with embossed stucco texture.
   3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
      a) Color: Almond.
      b) Color: BronzeTone.
      c) Color: Brown.
      d) Color: Gray.
      e) Color: Desert Tan.
      f) Color: Sandstone.
      g) Color: Black.
   4) Insulation: Expanded polyurethane with R-value of 18.3.

f. ThermaSeal TM175:
   1) Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles to be 16 gauge galvanized steel.
   2) Material: Steel sandwich construction, 1-3/4 inches (44mm) thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of 25 gauge steel and interior skin shall be 26 gauge steel with embossed stucco texture.
   3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
      a) Color: White polyester paint.
      b) Color: Dark Brown Kynar paint.
   4) Insulation: Expanded polyurethane with R-value of 16.4.

g. Seals: Interior and exterior skins to be separated by continuous hot melt to form thermal break and complete weatherseal along section joint. Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional dual-durometer vinyl blade seal on top section to prevent airflow above header.

h. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.
3. Windows: Locations to comply with door elevation drawings.
   a. Size: 24 inches by 8 inches (610 mm by 203 mm) window in a rectangular two-piece black frame.
      1) Glazing: Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass
      2) Glazing: Glass consisting of two panes of 3/16 inch (4.8 mm) thick glass.
      3) Glazing: Reinforced glass consisting of one pane of 1/4 inch (6.4 mm) thick wire-reinforced glass (exterior pane) and one pane of 1/8 inch (3.2 mm) DSB glass (interior pane).
   b. Size: 24 inches by 12 inches (610 mm by 305 mm) window in a rectangular two-piece black frame.
      1) Glazing: Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass
      2) Glazing: Glass consisting of two panes of 3/16 inch (4.8 mm) thick glass.
      3) Glazing: Reinforced glass consisting of one pane of 1/4 inch (6.4 mm) thick wire-reinforced glass (exterior pane) and one pane of 1/8 inch (3.2 mm) DSB glass (interior pane).
   c. Size: 34 inches by 16 inches (864 mm by 406 mm) window in a rectangular two-piece black frame.
      1) Glazing: Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass
      2) Glazing: Glass consisting of two panes of 3/16 inch (4.8 mm) thick glass.
      3) Glazing: Reinforced glass consisting of one pane of 1/4 inch (6.4 mm) thick wire-reinforced glass (exterior pane) and one pane of 1/8 inch (3.2 mm) DSB glass (interior pane).
   d. Size: Full-view window consisting of aluminum stile and rail construction and color matched to door exterior with powdercoat paint. (TM175 only). Provide non-impact rated glazing as follows.
      1) Glazing: 1/8 inch (3.2mm) clear glass consisting of one pane of 1/8 inch (3.2mm) DSB non-insulated glass.
      2) Glazing: 3/16 inch (4.8mm) clear glass consisting of one pane of 3/16 inch (4.8mm) non-insulated glass.
      3) Glazing: 1/4 inch (6.4mm) clear glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
      4) Glazing: 1/8 inch (3.2mm) clear tempered glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
      5) Glazing: 1/4 inch (6.4mm) clear tempered glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
      6) Glazing: 3/16 inch (4.88mm) clear tempered glass consisting of one pane of 3/16 inch (4.88mm) non-insulated glass.
      7) Glazing: 1/4 inch (6.4mm) clear laminated glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
      8) Glazing: 1/4 inch (6.4mm) clear wire glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
      9) Glazing: 1/8 inch (3.2mm) tinted bronze glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
     10) Glazing: 1/4 inch (6.4mm) laminated bronze glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
     11) Glazing: 1/8 inch (3.2mm) tinted bronze tempered glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
     12) Glazing: 1/4 inch (6.4mm) tinted smoke grey laminated glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
     13) Glazing: 1/2 inch (12.69mm) insulated clear glass consisting of
two panes of 1/8 inch (3.2mm) DS insulation.

14) Glazing: 1/2 inch (12.69mm) insulated clear tempered glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.

15) Glazing: 1/2 inch (12.69mm) insulated low E DS glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

16) Glazing: 1/2 inch (12.69mm) insulated low E tempered glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.

17) Glazing: 1/8 inch (3.2mm) clear acrylic consisting of one pane of 1/8 inch (3.2mm) acrylic glazing.

18) Glazing: 1/8 inch (3.2mm) clear lexan consisting of one pane of 1/8 inch (3.2mm) lexan glazing.

19) Glazing: 1/4 inch (6.4mm) clear acrylic consisting of one pane of 1/4 inch (6.4mm) acrylic glazing.

20) Glazing: 1/4 inch (6.4mm) clear lexan consisting of one pane of 1/4 inch (6.4mm) lexan glazing.

21) Glazing: 1/8 inch (3.2mm) satin annealed glass.

22) Glazing: 1/8 inch (3.2mm) satin tempered glass.

23) Glazing: 1/2 inch (12.69mm) insulated satin glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

24) Glazing: 1/4 inch (6.4mm) laminated white glass.

25) Glazing: 1/8 inch (3.2mm) sandblasted annealed glass.

26) Glazing: 1/8 inch (3.2mm) sandblasted tempered glass.

27) Glazing: 1/2 inch (12.69mm) insulated sandblasted glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

28) Glazing: 1/2 inch (12.69mm) insulated sandblasted glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.

29) Glazing: 1/8 inch (3.2mm) smoked gray glass.

30) Glazing: 1/8 inch (3.2mm) smoked gray tempered glass.

31) Glazing: 1/2 inch (12.69mm) insulated smoked gray glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

32) Glazing: 1/2 inch (12.69mm) insulated smoked gray glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.

33) Glazing: 1/8 inch (3.2mm) lexan smoked gray glazing.

34) Glazing: 1/8 inch (3.2mm) raised pattern glass.

35) Glazing: 1/8 inch (3.2mm) raised pattern tempered glass.

36) Glazing: 1/2 inch (12.69mm) insulated raised pattern glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

37) Glazing: 1/8 inch (3.2mm) insulated raised pattern.

38) Glazing: 1/2 inch (12.69mm) insulated tinted bronze glass consisting of two panes of 1/8 inch (3.2mm) DS insulated glass.

39) Glazing: 1/2 inch (12.69mm) insulated tinted bronze glass consisting of two panes of 1/8 inch (3.2mm) tempered insulated glass.

40) Glazing: 1/4 inch (6.4mm) Laminated frosted white glass.

4. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

5. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable
for adequate sealing of door to jamb or weatherseal.

b. Configuration Type:
   1) Configuration Type: Normal Headroom.
   2) Configuration Type: Low Headroom.
   3) Configuration Type: Vertical Lift.
   4) Configuration Type: Lift-Clearance.
   5) Configuration Type: Incline.
   6) Configuration Type: Contour.

c. Track Size:
   1) Size: 2 inches (51 mm).
   2) Size: 3 inches (76 mm).

d. Mounting:
   1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
   2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.

e. Finish:
   1) Galvanized.
   2) White Powdercoat.

6. Counterbalance:
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ___________ cycles.

7. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.
   e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
   f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

8. ThermaSeal Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser.
Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.

C. TH Series as manufactured by Raynor Garage Doors:

1. Doors:
   a. Operation:
      1) Provide doors designed for manual operation.
      2) Provide doors designed for hand chain operation.
      3) Provide doors designed for electric motor operation.
   b. Jamb Construction:
      1) Steel jambs with self-tapping fasteners.
      2) Wood jambs with lag screw fasteners.
      3) Masonry jambs with anchor bolt fasteners.
   c. Structural Performance Requirements:

2. Sections:
   a. TH160:
      1) Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20 gauge galvanized steel, located within section interior. End stiles to be 16 gauge galvanized steel.
      2) Material: Steel sandwich construction, 1-5/8 inches (41mm) thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of .015 thick steel and interior skin shall be 0.015 inch thick with embossed stucco texture.
      3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
         a) Color: White polyester paint.
   b. Seals: Interior and exterior skins to be separated by continuous hot melt to form thermal break and complete weatherseal along section joint. Bottom of door to have flexible U-shaped EPDM rubber seal retained in aluminum rail. Optional dual-durometer vinyl blade seal on top section to prevent airflow above header.
   c. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Locations to comply with door elevation drawings.
   a. 24 inches by 12 inches (610 mm by 305 mm) window in a rectangular two-piece black frame.

4. Glazing: Windows to be provided with insulated glazing units as follows:
   a. Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass.
   b. Glass consisting of two panes of 1/8 inch (3.2 mm) thick acrylic.

5. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

6. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable
for adequate sealing of door to jamb or weatherseal.

b. Configuration Type:
   1) Configuration Type: Normal Headroom.
   2) Configuration Type: Low Headroom.
   3) Configuration Type: Vertical Lift.
   4) Configuration Type: Lift-Clearance.
   5) Configuration Type: Incline.
   6) Configuration Type: Contour.

c. Track Size:
   1) Size: 2 inches (51 mm).
   2) Size: 3 inches (76 mm).

d. Mounting:
   1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
   2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.

e. Finish:
   1) Galvanized.
   2) White Powdercoat.

7. Counterbalance:
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ____________ cycles.

8. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.
   e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
   f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

9. TH Series Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser.
Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.

D. FlexFit Series as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
         2) Wood jambs with lag screw fasteners.
         3) Masonry jambs with anchor bolt fasteners.
      c. Structural Performance Requirements:
   2. Sections:
      a. FF175:
         1) Sections shall contain 1.44 inch expanded polystyrene insulation sandwiched between interior and exterior panels. End stiles to be 12-gauge galvanized steel.
         2) Material: Sandwich construction, 1-3/4 inches (44mm) thick. Exterior skin shall be constructed of 1/8 inch (3 mm) non-conductive, UV stabilized FgR pultruded fiberglass reinforced polymer (FRP) material with additional anti-yellowing UV protective coating. Interior skin shall be constructed of 1/8 inch IDS extruded HDPE and manufactured with materials in compliance with FDA regulation 21 CFR 177.1520. Skins will be bolted together around 1.5 inch (38 mm)x 1/8 inch (3 mm) FgS square tube framing constructed of pultruded fiberglass reinforced polymer (FRP). Bolts shall be carriage style heads on exterior and blind-head style on interior to reduce risk of injury.
            a) Interior and exterior skins shall be one contiguous piece without splices up to 20 feet 2 inches (6146 mm) in length.
            b) Square tube frame rails shall be one contiguous piece without splices up to 20 feet (6096 mm) in length.
         3) Finish: Exterior and interior skins to have smooth finish.
            a) Color: White.
         4) Insulation: Expanded polystyrene with door R-value of 9.68.
      b. Seals: Intermediate sections will incorporate white, J-Flex fabric reinforced section joint seals. Bottom of door to have flexible cloth reinforced U-shaped EPDM rubber seal and 3 inch (76 mm) brush seal. Header shall have dual-durometer vinyl blade seal on top section to prevent airflow above header. Jambs shall have 1 inch (25 mm) brush seals to prevent airflow. Brush seals will be mounted into continuous (no splices) extruded aluminum retainers.
      c. Trussing: Not applicable.
   3. Windows: 12 x 4 inches (305 x 102 mm) window with 1/8 inch (3.1 mm) polycarbonate lite.
   4. Mounting: Sections mounted in door opening using:
      a. Between-Jamb Bracket Mounting: sections mounted between door
jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.

b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

5. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weather seal.
   b. Configuration Type:
      1) Configuration Type: Normal Headroom.
      2) Configuration Type: Vertical Lift.
      3) Configuration Type: Lift-Clearance.
   c. Track Size:
      1) Size: 3 inches (76 mm).
   d. Mounting:
      1) Floor-to-Header Angle-Mount consisting of fully adjustable, no-gap continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
      2) Floor-to-Shaft Angle-Mount consisting of fully adjustable, no-gap continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   e. Finish:
      1) Galvanized.

6. Counterbalance:
      1) Spring Cycle Requirements: Standard high cycle 25,000 cycles.
      2) Spring Cycle Requirements: Extended cycle: __________ cycles.

7. Hardware:
   a. End Stile Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Locks: Door furnished with one spring-loaded interior lock with dead bolt provided with hole to receive padlock provided by Owner.

8. FlexFit Limited Warranty: Raynor warrants the door sections against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.

E. Commercial BuildMark/TradeMark as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
2) Wood jambs with lag screw fasteners.
3) Masonry jambs with anchor bolt fasteners.

c. Structural Performance Requirements:

2. Sections:
   a. Commercial TradeMark:
      1) Section end stiles to be 18 gauge galvanized steel and center
         stiles to be 20 gauge galvanized steel. End stiles to be
         crimp-locked to the section skin. Center stiles to be glued and
         crimp-locked to section skin.
      2) Material: Steel pan construction, 2 inches (51mm) thick, roll
         formed from 24 gauge draw quality, hot-dipped galvanized (G40
         exterior) steel complying with ASTM A 653. Exterior surface of
         sections shall feature embossed Colonial Raised Panels or
         Ranch Raised Panels. Sections shall have tongue-and-groove
         joints for weather-tight closure.
      3) Finish: Exterior skin to have two coats of paint, one primer coat
         and one finish coat.
         a) Color: White polyester paint.
         b) Color: Almond polyester paint.
         c) Color: BronzeTone polyester paint.
         d) Color: Sandstone polyester paint.
         e) Color: Dark brown polyester paint.
      4) Insulation: Expanded polystyrene with R-value of 6.6 with white
         impact-resistant textured covers.
   b. Commercial BuildMark:
      1) Section end stiles to be 18 gauge galvanized steel and center
         stiles to be 20 gauge galvanized steel. End stiles to be
         crimp-locked to the section skin. Center stiles to be glued and
         crimp-locked to section skin.
      2) Material: Steel pan construction, 2 inches (51mm) thick, roll
         formed from 25 gauge draw quality, hot-dipped galvanized (G40
         exterior) steel complying with ASTM A 653. Exterior surface of
         sections shall feature embossed Colonial Raised Panels, Ranch
         Raised Panels, or Flush Woodgrain Surface. Sections shall have
         tongue-and-groove joints for weather-tight closure.
      3) Finish: Exterior skin to have two coats of paint, one primer coat
         and one finish coat.
         a) Color: White polyester paint.
         b) Color: Almond polyester paint.
         c) Color: Sandstone polyester paint.
         d) Color: Desert Tan polyester paint.
         e) Color: Dark brown polyester paint.
      4) Insulation: Expanded polystyrene with R-value of 6.6 with white
         impact-resistant textured covers.
   c. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in
      aluminum rail. Optional blade seal on top section to prevent airflow
      above header.
   d. Trussing: Doors designed to withstand specified windload. Deflection of
      door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Locations to comply with door elevation drawings.
   a. Colonial style 18 inches by 13 inches (457 mm by 330 mm) minimum
      window encased in an injection molded polypropylene frame.
   b. Ranch style 41 inches by 13 inches (1041 mm by 330 mm) window
      minimum encased in an injection molded polypropylene frame.

4. Glazing: Windows to be provided with glazing units as follows:
a. Single glass consisting of one pane of 1/8 inch (3.2 mm) thick DSB glass.

5. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

6. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
   b. Configuration Type:
      1) Configuration Type: Normal Headroom.
      2) Configuration Type: Low Headroom.
      3) Configuration Type: Vertical Lift.
      4) Configuration Type: Lift-Clearance.
      5) Configuration Type: Incline.
      6) Configuration Type: Contour.
   c. Track Size:
      1) Size: 2 inches (51 mm).
      2) Size: 3 inches (76 mm).
   d. Mounting:
      1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
      2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
      3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   e. Finish:
      1) Galvanized.
      2) White Powdercoat.

7. Counterbalance:
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ___________ cycles.

8. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
2) For angle mounted doors provide angle clip-on seal.

e. Furnish door system with locks: Exterior lock with five-pin tumbling cylinder, night latch and steel bar engaging track.

f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

9. Commercial BuildMark, Commercial TradeMark Series Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.

F. ControlHoist 2.0 as manufactured by Raynor Garage Doors:

1. Model:

   a. Raynor ControlHoist 2.0 Optima:

      1) Type: Jackshaft with manual chain hoist.
      2) Type: Trolley.
      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.
     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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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.

   b. Raynor ControlHoist 2.0 Standard:

      1) Type: Jackshaft.
      2) Type: Jackshaft with manual chain hoist.
      3) Type: Trolley.
      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.
     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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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).
constant pressure on close (can be changed to momentary to close).

b) Custom wiring.

c. Raynor ControlHoist 2.0 Basic:
   1) Type: Jackshaft.
   2) Type: Jackshaft with manual chain hoist.
   3) Type: Trolley.
   4) Motor Horsepower Rating: Intermittent 1/2 HP.
   5) Electrical Requirements: 115 volt single phase.
   6) Duty Cycle: 10 cycles/hour.
   7) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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).

2.3 SECTIONAL RIBBED PAN DOOR

A. SteelForm as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
         2) Wood jambs with lag screw fasteners.
         3) Masonry jambs with anchor bolt fasteners.
      c. Structural Performance Requirements:

   2. Sections:
      a. SteelForm S16 (Optima):
         1) Section end stiles to be 13 gauge galvanized steel. Center stiles to be a minimum 16 gauge thickness. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.
         2) Material: Steel pan construction, 2 inches (51mm) thick, roll formed from 16 gauge draw-quality, hot-dipped galvanized (G90) steel complying with ASTM A 653. Exterior of door to have flush face and roll-formed tongue and groove joints for weathertight closure.
         3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
            a) Color: White polyester paint.
      b. SteelForm S20 (Standard):
         1) Section end stiles to be 13 gauge galvanized steel. Center stiles to be a minimum 16 gauge thickness. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.
         2) Material: Steel pan construction, 2 inches (51mm) thick, roll-formed from 20 gauge commercial quality, hot-dipped galvanized (G90) steel complying with ASTM A 653. Exterior of door to have flush face and roll-formed tongue and groove joints for weathertight closure.
3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
   a) Color: White polyester paint.

c. SteelForm S24 (Standard):
   1) Section end stiles and center stiles to be minimum 16 gauge galvanized steel. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.
   2) Material: Steel pan construction, 2 inches (51mm) thick, roll-formed from 24 gauge commercial quality, hot-dipped galvanized (G60) steel complying with ASTM A 653. Exterior of door to have two deep ribs, four pencil grooves, and roll-formed tongue-and-groove joints for weathertight closure.
   3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
      a) Color: White polyester paint.
      b) Color: Dark Brown Kynar paint.
      c) Color: Frost White Kynar paint.
      d) Color: Beige Kynar paint.
      e) Color: Sepia Brown Kynar paint.

d. SteelForm S24C (Basic):
   1) Section end stiles and center stiles to be a minimum 16 gauge galvanized steel. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.
   2) Material: Steel pan construction, 2 inches (51mm) thick, roll-formed from 24 gauge embossed thickness, commercial quality, hot-dipped galvanized (G40) steel complying with ASTM A 653. Exterior of door to have two deep ribs, four pencil grooves, and roll-formed tongue-and-groove joints for weathertight closure.
   3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
      a) Color: White polyester paint.

e. Insulation:
   1) Expanded polystyrene with R-value of 7.70 with white impact-resistant textured covers.
   2) Expanded polystyrene with R-value of 7.70 with 26 gauge hot-dipped galvanized steel covers, stucco embossed and painted gray.
   3) Expanded polystyrene with R-value of 7.70 with 24 gauge hot-dipped galvanized steel covers, painted gray/white.
   4) Expanded polystyrene with R-value of 7.70 with 20 gauge hot-dipped galvanized steel covers, painted gray/white.

f. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional blade seal on top section to prevent airflow above header

g. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Locations to comply with door elevation drawings.
   a. 24 inches by 8 inches (610 mm by 203 mm) rectangular window encased in a two-piece black frame.
   b. Full-view window consisting of aluminum stile and rail construction and color matched to door exterior with powdercoat paint.

4. Glazing: Windows to be provided as follows:
   a. Glass consisting of one pane of 1/8 inch (3.2 mm) thick DSB glass.

5. Glazing: Windows to be provided with insulated glazing units as follows:
6. Glazing: Full View to be provided as follows:
   e. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Clear Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
   f. Non-Impact Rated Glazing: 3/16 inch (4.8mm) Clear Glass consisting of one pane of 3/16 inch (4.8mm) non-insulated glass.
   g. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   h. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Clear Tempered Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
   i. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Tempered Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   j. Non-Impact Rated Glazing: 3/16 inch (4.88mm) Clear Tempered Glass consisting of one pane of 3/16 inch (4.88mm) non-insulated glass.
   k. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Laminated Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   l. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Wire Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   m. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Tinted Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
   n. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Tinted Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   o. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Tinted Tempered Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.
   p. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Tinted Tempered Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.
   q. Non-Impact Rated Glazing: 1/2 inch (12.69mm) Insulated Clear Glass consisting of two panes of 1/8 inch (3.2mm) DSB insulated glass.
   r. Non-Impact Rated Glazing: 1/2 inch (12.69mm) Insulated Clear Tempered Glass consisting of two panes of 1/8 inch (3.2mm) Tempered insulated glass.
   s. Non-Impact Rated Glazing: 1/2 inch (12.69mm) Insulated Low E DSB Glass consisting of two panes of 1/8 inch (3.2mm) DSB insulated glass.
   t. Non-Impact Rated Glazing: 1/2 inch (12.69mm) Insulated Low E Tempered Glass consisting of two panes of 1/8 inch (3.2mm) Tempered insulated glass.
   u. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Clear Acrylic consisting of one pane of 1/8 inch (3.2mm) Acrylic glazing.
   v. Non-Impact Rated Glazing: 1/8 inch (3.2mm) Clear Lexan consisting of one pane of 1/8 inch (3.2mm) Lexan glazing.
   w. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Acrylic consisting of one pane of 1/4 inch (6.4mm) Acrylic glazing.
   x. Non-Impact Rated Glazing: 1/4 inch (6.4mm) Clear Lexan consisting of one pane of 1/4 inch (6.4mm) Lexan glazing.

7. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.
8. Track:
a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
b. Configuration Type:
   1) Configuration Type: Normal Headroom.
   2) Configuration Type: Low Headroom.
   3) Configuration Type: Vertical Lift.
   4) Configuration Type: Lift-Clearance.
   5) Configuration Type: Incline.
   6) Configuration Type: Contour.
c. Track Size:
   1) Size: 2 inches (51 mm).
   2) Size: 3 inches (76 mm).
d. Mounting:
   1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
   2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
e. Finish:
   1) Galvanized.
   2) White Powdercoat.

9. Counterbalance:
   1) Spring Cycle Requirements: Standard 10,000 cycles.
   2) Spring Cycle Requirements: High cycle: ___________ cycles.

10. Hardware:
a. Hinges and Brackets: Fabricated from galvanized steel.
b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
   1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
   2) For angle mounted doors provide angle clip-on seal.
e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

11. SteelForm Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Window
components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

B. ControlHoist 2.0 as manufactured by Raynor Garage Doors:

1. Model:
   a. Raynor ControlHoist 2.0 Optima:
      1) Type: Jackshaft with manual chain hoist.
      2) Type: Trolley.
      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.
      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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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.
   b. Raynor ControlHoist 2.0 Standard:
      1) Type: Jackshaft.
      2) Type: Trolley.
      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) Electrical Requirements: 115 volt single phase.
      7) Electrical Requirements: 230 volt single phase.
      9) Electrical Requirements: 460 volt three phase.
      10) Duty Cycle: 30 cycles/hour or 300 cycles/day.
      11) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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. Raynor ControlHoist 2.0 Basic:
      1) Type: Jackshaft.
      2) Type: Trolley.
      3) Motor Horsepower Rating: Intermittent 1/2 HP.
      4) Electrical Requirements: 115 volt single phase.
6) Duty Cycle: 10 cycles/hour.
7) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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).

2.4 SECTIONAL RAIL AND STYLE ALUMINUM DOORS

A. AlumaView as manufactured by Raynor Garage Doors:
   1. Doors:
      a. Operation:
         1) Provide doors designed for manual operation.
         2) Provide doors designed for hand chain operation.
         3) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Steel jambs with self-tapping fasteners.
         2) Wood jambs with lag screw fasteners.
         3) Masonry jambs with anchor bolt fasteners.
      c. Structural Performance Requirements:
         1) Wind Load (Model AV 300 only): Florida Building Code Product Approval #FL16225 large missile impact.
         2) Wind Load (Model AV 200 only): Florida Building Code Product Approval #FL15212 large missile impact.
         3) Wind Load (Model AV 200 only): Florida Building Code Product Approval #FL114092 non-impact.
         4) Wind Load: Florida Building Code Product Approval ______.
      d. International Energy Conservation Code (IECC) Requirements:
         1) Air Infiltration: Maximum air leakage of 0.4 cfm/ft² is required. Testing shall be performed in accordance with DASMA 105 test procedure.
         2) AV200 with IG Low E Glass has a Tested U-Factor of 0.72.
         3) Raynor AV300 and AV200 provide an air leakage rating of 0.24 cfm/ft² with optional IECC Compliance Package.
   2. Sections:
      a. AlumaView AV300:
         1) Material: 3 inches (76 mm) thick, 6063-T6 aluminum alloy stiles and rails joined together with 5/16 inch (8 mm) diameter screws. Aluminum panels 0.050 inch (1.3 mm) thick or glazing (when specified) fill the spaces between stiles and rails. Combined dimension of two adjoining intermediate meeting rails 5 inches (127 mm). Bottom rail height 6-1/2 inches (165 mm). Top rail height 6-1/2 inches (165 mm). End stiles 3-3/8 inches (86 mm) or 6-1/2 inches (165 mm) wide as determined by overall door width. Center stiles 3-5/8 inches (92 mm) wide.
         2) Finish: Aluminum frame extrusions and filler panels finish coated.
            a) Color: Clear anodized finish.
            b) Color: Champagne anodized finish.
            c) Color: Light Bronze anodized finish.
            d) Color: Medium Bronze anodized finish.
            e) Color: Dark Bronze anodized finish.
            f) Color: Extra Dark Bronze anodized finish.
            g) Color: Black anodized finish.
b. AlumaView AV200:
   1) Material: 2 inches (51mm) thick, 6063-T6 aluminum alloy stiles and rails joined together with 5/16 inch (8 mm) diameter screws. Aluminum panels 0.050 inch (1.3 mm) thick or glazing (when specified) fill the spaces between stiles and rails. Combined dimension of two adjoining intermediate meeting rails 3-13/16 inches (97 mm). Bottom rail height 5-1/4 inches (133 mm). Top rail height 3-1/4 inches (83 mm) or 5-1/4 inches (133 mm) as determined by overall door width. End stiles 3-3/8 inches (86 mm) or 6-1/2 inches (165 mm) wide as determined by overall door width. Center stiles 3-5/8 inches (92 mm) wide.
   2) Finish: Aluminum frame extrusions and filler panels finish coated.
      a) Color: Clear anodized finish.
      b) Color: Champagne anodized finish.
      c) Color: Light Bronze anodized finish.
      d) Color: Medium Bronze anodized finish.
      e) Color: Dark Bronze anodized finish.
      f) Color: Extra Dark Bronze anodized finish.
      g) Color: Black anodized finish.
      h) ArmorBrite Powdercoat finish, color as selected by Architect.

c. AlumaView AV175:
   1) Material: 1-3/4 inches (44mm) thick, 6063-T6 aluminum alloy stiles and rails joined together with 5/16 inch (8 mm) diameter screws. Aluminum panels 0.050 inch (1.3 mm) thick or glazing (when specified) fill the spaces between stiles and rails. Combined dimension of two adjoining intermediate meeting rails 3-1/4 inches (83 mm). Bottom rail and top rail height 5-3/16 inches (132 mm). End stiles 3-3/8 inches (86 mm) or 6-1/2 inches (165 mm) wide as determined by overall door width. Center stiles 1-7/16 inches (36 mm), 2 inches (51 mm), or 3-5/8 inches (92 mm) wide.
   2) Finish: Aluminum frame extrusions and filler panels finish coated.
      a) Color: Clear anodized finish.
      b) Color: Champagne anodized finish.
      c) Color: Light Bronze anodized finish.
      d) Color: Medium Bronze anodized finish.
      e) Color: Dark Bronze anodized finish.
      f) Color: Extra Dark Bronze anodized finish.
      g) Color: Black anodized finish.
      h) ArmorBrite Powdercoat finish, color as selected by Architect.

d. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail.
   1) Bulb-type joint seal between sections.
   2) Blade seal on top section to prevent airflow above header.

e. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Provide door sections with windows in lieu of 0.050 inch (1.3mm) aluminum filler panels. Locations to comply with door elevation drawings.

4. Impact Rated Glazing: Provide as follows.
   a. 11/32 inch (8.7mm) Clear Impact Glass
   b. 11/32 inch (8.7mm) Tinted Bronze Impact Glass
   c. 11/32 inch (8.7mm) Tinted Gray Impact Glass
d. 11/32 inch (8.7mm) Tinted Green Impact Glass  
e. 11/32 inch (8.7mm) White Interlayer Impact Glass  

5. Non-Impact Rated Glazing: Provide as follows:
   a. 1/8 inch (3.2mm) Clear Glass consisting of one pane of 1/8 inch (3.2mm) DSB non-insulated glass.  
b. 3/16 inch (4.8mm) Clear Glass consisting of one pane of 3/16 inch (4.8mm) non-insulated glass.  
c. 1/4 inch (6.4mm) Clear Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
d. 1/8 inch (3.2mm) Clear Tempered Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.  
e. 1/4 inch (6.4mm) Clear Tempered Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
f. 3/16 inch (4.88mm) Clear Tempered Glass consisting of one pane of 3/16 inch (4.88mm) non-insulated glass.  
g. 1/4 inch (6.4mm) Clear Laminated Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
h. 1/4 inch (6.4mm) Clear Wire Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
i. 1/8 inch (3.2mm) Tinted Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.  
j. 1/4 inch (6.4mm) Tinted Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
k. 1/8 inch (3.2mm) Tinted Tempered Glass consisting of one pane of 1/8 inch (3.2mm) non-insulated glass.  
l. 1/4 inch (6.4mm) Tinted Tempered Glass consisting of one pane of 1/4 inch (6.4mm) non-insulated glass.  
m. 1/2 inch (12.69mm) Insulated Clear Glass consisting of two panes of 1/8 inch (3.2mm) DSB insulated glass.  
n. 1/2 inch (12.69mm) Insulated Clear Tempered Glass consisting of two panes of 1/8 inch (3.2mm) Tempered insulated glass.  
o. 1/2 inch (12.69mm) Insulated Low E DSB Glass consisting of two panes of 1/8 inch (3.2mm) DSB insulated glass.  
p. 1/2 inch (12.69mm) Insulated Low E Tempered Glass consisting of two panes of 1/8 inch (3.2mm) Tempered insulated glass.  
q. 1/8 inch (3.2mm) Clear Acrylic consisting of one pane of 1/8 inch (3.2mm) Acrylic glazing.  
r. 1/8 inch (3.2mm) Clear Lexan consisting of one pane of 1/8 inch (3.2mm) Lexan glazing.  
s. 1/4 inch (6.4mm) Clear Acrylic consisting of one pane of 1/4 inch (6.4mm) Acrylic glazing.  
t. 1/4 inch (6.4mm) Clear Lexan consisting of one pane of 1/4 inch (6.4mm) Lexan glazing  

6. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.  
b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.  

7. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.  
b. Configuration Type:
   1) Configuration Type: Normal Headroom.  
   2) Configuration Type: Low Headroom.  
   3) Configuration Type: Vertical Lift.
4) Configuration Type: Lift-Clearance.
5) Configuration Type: Incline.
6) Configuration Type: Contour.

c. Track Size:
1) Size: 2 inches (51 mm).
2) Size: 3 inches (76 mm).

d. Mounting:
1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.

e. Finish:
1) Galvanized.
2) White Powdercoat.

8. Counterbalance:
   1) Spring Cycle Requirements: Standard 10,000 cycles.
   2) Spring Cycle Requirements: High cycle: ___________ cycles.

9. Hardware:
a. Hinges and Brackets: Fabricated from galvanized steel.
b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
   1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
   2) For angle mounted doors provide angle clip-on seal.
e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

10. AlumaView Limited Warranty: Raynor warrants the door sections against defects in material and workmanship for five years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for three years from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.
B. ControlHoist 2.0 as manufactured by Raynor Garage Doors:
   1. Model:
      a. Raynor ControlHoist 2.0 Optima:
         1) Type: Jackshaft with manual chain hoist.
         2) Type: Trolley.
         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.
        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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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.
      b. Raynor ControlHoist 2.0 Standard:
         1) Type: Jackshaft.
         2) Type: Jackshaft with manual chain hoist.
         3) Type: Trolley.
         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.
        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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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. Raynor ControlHoist 2.0 Basic:
         1) Type: Jackshaft.
         2) Type: Jackshaft with manual chain hoist.
         3) Type: Trolley.
         4) Motor Horsepower Rating: Intermittent 1/2 HP.
         5) Electrical Requirements: 115 volt single phase.
         6) Duty Cycle: 10 cycles/hour.
        7) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
            a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to
2.5 COMMERCIAL SECTIONAL RAISED PANEL DOOR

A. Commercial Aspen as manufactured by Raynor Garage Doors:

1. Doors:
   a. Operation:
      1) Provide doors designed for manual operation.
      2) Provide doors designed for hand chain operation.
      3) Provide doors designed for electric motor operation.
   b. Jamb Construction:
      1) Steel jambs with self-tapping fasteners.
      2) Wood jambs with lag screw fasteners.
      3) Masonry jambs with anchor bolt fasteners.
   c. Structural Performance Requirements:

2. Sections:
   a. Commercial Aspen AP200C:
      1) Sections shall be pressure bonded to injected polyurethane foam insulated core with interior and exterior skins separated by continuous thermal break. Hinge reinforcement plates shall be 19 gauge edge plates and 19 gauge center plates, located within section interior at every hinge location. End stiles to be 20 gauge galvanized steel for 18 inch and 21 inch section heights and 16 gauge for 24 inch section heights. Sections shall feature a tongue-and-groove joint for weather-tight closure between sections.
      2) Material: Steel sandwich construction, 2 inches (51 mm) thick, roll formed from hot dipped galvanized (G40) steel complying with ASTM A 653. Exterior skin to be constructed of 26 gauge steel and interior skin to be constructed of 27 gauge steel. Exterior skin shall be woodgrain textured and interior skin shall be stucco textured. Exterior surface of sections shall feature embossed Colonial Raised Panels, Ranch Raised Panels, Recessed Grooved Colonial Panels, Recessed Grooved Ranch Panels, Plank or Flush Woodgrain Surface.
      3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
         a) Color: White polyester paint.
         b) Color: Almond polyester paint.
         c) Color: Brown polyester paint.
         d) Color: Desert Tan polyester paint.
         e) Color: BronzeTone polyester paint.
         f) Color: Black cool technology polyester paint.
         g) Color: Charcoal Kynar paint.
         h) Color: Sandstone polyester paint.
         i) Color: Medium Oak Woodgrain polyester paint.
         j) Color: Walnut Woodgrain polyester paint.
      4) Insulation: Injected polyurethane with R-value of 18.0.
   b. Commercial Aspen AP138C:
      1) Sections shall be pressure bonded to injected polyurethane foam insulated core with interior and exterior skins separated by continuous thermal break. Hinge reinforcement plates shall be 19 gauge edge plates and 19 gauge center plates, located within section interior at every hinge location. End stiles to be 20 gauge galvanized steel for 18 inch and 21 inch section heights and 16
gauge for 24 inch section heights. Sections shall feature a tongue-and-groove joint for weather-tight closure between sections.

2) **Material:** Steel sandwich construction, 1-3/8 inches (35 mm) thick, roll formed from hot dipped galvanized steel complying with ASTM A 653. Exterior and interior skin to be constructed of 26 gauge thickness steel. Exterior skin shall be woodgrain textured and interior skin shall be stucco textured. Exterior surface of sections shall feature embossed Colonial Raised Panels, Ranch Raised Panels, Recessed Grooved Colonial Panels, Recessed Grooved Ranch Panels, Plank or Flush Woodgrain Surface.

3) **Finish:** Exterior skin to have two coats of paint, one primer coat and one finish coat.
   a) Color: White polyester paint.
   b) Color: Almond polyester paint.
   c) Color: Brown polyester paint.
   d) Color: Desert Tan polyester paint.
   e) Color: BronzeTone polyester paint.
   f) Color: Black cool technology polyester paint.
   g) Color: Charcoal Kynar paint.
   h) Color: Sandstone polyester paint.
   i) Color: Medium Oak Woodgrain polyester paint.
   j) Color: Walnut Woodgrain polyester paint.

4) **Insulation:** Injected polyurethane with R-value of 13.0.

   c. **Seals:** Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional blade seal on top section to prevent airflow above header.
   d. **Trussing:** Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. **Windows:** Locations to comply with door elevation drawings.
   a. Colonial style 18 inches by 13 inches (457 mm by 330 mm) minimum window encased in an injection molded polypropylene frame.
   b. Ranch style 41 inches by 13 inches (1041 mm by 330 mm) window minimum encased in an injection molded polypropylene frame.

4. **Glazing:** Windows to be provided with glazing units as follows:
   a. Single glass consisting of one pane of 1/8 inch (3.2 mm) thick DSB glass.
   b. Insulated glass consisting of two panes of 1/8 inch (3.2 mm) thick glass.

5. **Mounting:** Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door jambs, seal against exterior perimeter seal installed along vertical and top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25 mm) on each side of door opening.

6. **Track:**
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
   b. **Configuration Type:**
      1) Configuration Type: Normal Headroom.
      2) Configuration Type: Low Headroom.
      3) Configuration Type: Vertical Lift.
      4) Configuration Type: Lift-Clearance.
      5) Configuration Type: Incline.
      6) Configuration Type: Contour.
c. Track Size:
   1) Size: 2 inches (51 mm).
   2) Size: 3 inches (76 mm).

d. Mounting:
   1) Bracket-Mount using adjustable track brackets for use on 2-inch track with wood jambs.
   2) Floor-to-Header Angle-Mount consisting of continuous angle extending from the floor up to the door header for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   3) Floor-to-Shaft Angle-Mount consisting of continuous angle extending from the floor, past header, completely up to door shaft for use with steel, wood, or masonry jambs. Continuous angle size not less than 2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.

e. Finish:
   1) Galvanized.
   2) White Powdercoat.

7. Counterbalance:
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ____________ cycles.

8. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.
   e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
   f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

9. Commercial Aspen Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer’s full standard limited warranty documentation.
B. StyleForm (Commercial ShowCase) as manufactured by Raynor Garage Doors:

1. Doors:
   a. Operation:
      1) Provide doors designed for manual operation.
      2) Provide doors designed for hand chain operation.
      3) Provide doors designed for electric motor operation.
   b. Jamb Construction:
      1) Steel jambs with self-tapping fasteners.
      2) Wood jambs with lag screw fasteners.
      3) Masonry jambs with anchor bolt fasteners.
   c. Structural Performance Requirements:

2. Sections:
   a. StyleForm Optima (Commercial ShowCase):
      1) Sections shall be pressure bonded to a 1-7/8 inches (48 mm) thick expanded polystyrene foam core with interior and exterior skins separated by continuous thermal break. Hinge reinforcement plates shall be 16 gauge edge plates and 16 gauge center plates, located within section interior at every hinge location. End stiles to be 18 gauge galvanized steel.
      2) Material: Steel sandwich construction, 2 inches (51 mm) thick, roll formed from draw quality, hot dipped galvanized steel complying with ASTM A 653. Exterior and interior skin to be constructed of 26 gauge steel embossed woodgrain texture. Exterior surface of sections shall feature embossed Colonial Raised Panels, Ranch Raised Panels or Flush Woodgrain Surface.
      3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
         a) Color: White polyester paint.
         b) Color: Almond polyester paint.
         c) Color: BronzeTone polyester paint.
         d) Color: ClayTone polyester paint.
         e) Color: Dark Brown Kynar paint.
         f) Color: Frost White Kynar paint.
         g) Color: Beige Kynar paint.
         h) Color: Sepia Brown Kynar paint.
         i) Color: Desert Tan polyester paint.
         j) ArmorBrite Powdercoat finish, color as selected by Architect.
      4) Insulation: Expanded polystyrene with R-value of 10.25
   b. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional blade seal on top section to prevent airflow above header
   c. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Locations to comply with door elevation drawings.
   a. Colonial style 17 inches by 12 inches (432 mm by 305 mm) minimum window encased in an extruded PVC frame.
   b. Ranch style 40 inches by 12 inches (1016 mm by 305 mm) window minimum encased in an extruded PVC frame.

4. Glazing: Windows to be provided with glazing units as follows:
   a. Single glass consisting of one pane of 1/8 inch (3.2 mm) thick DSB glass.
   b. Insulated glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass.
5. Mounting: Sections mounted in door opening using:
   a. Between-Jamb Bracket Mounting: sections mounted between door
      jambs, seal against exterior perimeter seal installed along vertical and
      top horizontal edges of jambs.
   b. Lap Jamb Angle Mounting: section overlap door jambs by 1 inch (25
      mm) on each side of door opening.

6. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable
      for adequate sealing of door to jamb or weatherseal.
   b. Configuration Type:
      1) Configuration Type: Normal Headroom.
      2) Configuration Type: Low Headroom.
      3) Configuration Type: Vertical Lift.
      4) Configuration Type: Lift-Clearance.
      5) Configuration Type: Incline.
      6) Configuration Type: Contour.
   c. Track Size:
      1) Size: 2 inches (51 mm).
      2) Size: 3 inches (76 mm).
   d. Mounting:
      1) Bracket-Mount using adjustable track brackets for use on 2-inch
         track with wood jambs.
      2) Floor-to-Header Angle-Mount consisting of continuous angle
         extending from the floor up to the door header for use with steel,
         wood, or masonry jambs. Continuous angle size not less than
         2-5/16 inches by 4 inches by 3/32 inch (59 by 102 by 2.5 mm) on
         2-inch track and 3-1/2 inches by 5 inches by 1/8 inches (89 by
         127 by 3.2 mm) on 3-inch track.
      3) Floor-to-Shaft Angle-Mount consisting of continuous angle
         extending from the floor, past header, completely up to door
         shaft for use with steel, wood, or masonry jambs. Continuous
         angle size not less than 2-5/16 inches by 4 inches by 3/32 inch
         (59 by 102 by 2.5 mm) on 2-inch track and 3-1/2 inches by 5
         inches by 1/8 inches (89 by 127 by 3.2 mm) on 3-inch track.
   e. Finish:
      1) Galvanized.
      2) White Powdercoat.

7. Counterbalance:
   a. Counterbalance System: Provided with aircraft-type, galvanized steel
      lifting cables with minimum safety factor of 5. Torsion Springs
      consisting of heavy-duty oil-tempered wire torsion springs on a
      continuous ball-bearing cross-header shaft.
      1) Spring Cycle Requirements: Standard 10,000 cycles.
      2) Spring Cycle Requirements: High cycle: ___________ cycles.

8. Hardware:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size,
      with hardened steel ball bearings.
   c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size,
      with hardened steel ball bearings.
   d. Perimeter Seal: Provide complete weather stripping system to reduce
      air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with
         aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.
   e. Furnish door system with locks: Exterior lock with five-pin tumbler
cylinder, night latch and steel bar engaging track.

f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

9. StyleForm (Commercial ShowCase) Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

C. ControlHoist 2.0 as manufactured by Raynor Garage Doors:

1. Model:
   a. Raynor ControlHoist 2.0 Optima:
      1) Type: Jackshaft with manual chain hoist.
      2) Type: Trolley.
      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.
     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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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.
   b. Raynor ControlHoist 2.0 Standard:
      1) Type: Jackshaft.
      2) Type: Jackshaft with manual chain hoist.
      3) Type: Trolley.
      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.
     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 safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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).
constant pressure on close (can be changed to momentary to close).

b) Custom wiring.

c. Raynor ControlHoist 2.0 Basic:
1) Type: Jackshaft.
2) Type: Jackshaft with manual chain hoist.
3) Type: Trolley.
4) Motor Horsepower Rating: Intermittent 1/2 HP.
5) Electrical Requirements: 115 volt single phase.
6) Duty Cycle: 10 cycles/hour.
7) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, 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).

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, track 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.

3.4 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. Lubricate bearings and sliding parts, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements. Protect installed products until completion of project.

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