SECTION 08 11 00

METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Door Hardware: As specified in Section 08 71 00, Door Hardware and as indicated in Door Hardware Schedule.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. Specifications for Commercial Steel Doors and Frames published by the Canadian Steel Door and Frame Manufacturers Association (CSDMA).
   2. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   3. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   4. ASTM A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   5. CAN/CGSB 1.181 Ready-Mixed Organic Zinc-Rich Coating.
   6. CAN/CSA G164-M Hot Dip Galvanizing of Irregularly Shaped Articles.
   7. CSA W59 Welded Steel Construction (Metal Arc Welding).
   8. NFPA 252 Fire Tests of Door Assemblies.
   9. ULC/CAN4-S104 Standard Method for Fire Tests of Door Assemblies.

1.3 SUBMITTALS

A. Submit Shop Drawings showing type of door, type of frame, material being supplied, thickness of materials, cutouts and reinforcements, anchors and location of fastenings, door hand, location of hardware and door edge detail.

B. Submit information on standard Shop Drawing sheets approved by the Canadian Steel Door and Frame Manufacturers Association.

C. Submit certificate to substantiate design and construction of fire rated assemblies, if requested.

1.4 WARRANTY

A. Submit a three-year warranty for work of this Section against defects in materials and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. S.W. Fleming Ltd.

B. Baron Metal Industries Inc.

C. Metal Door Ltd.

2.2 MATERIALS

A. Steel sheet: ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum.

B. Galvanized steel: CSA G164 unless otherwise specified hot-dip zinc coating.

C. Stainless steel: ASTM A167 Type 316 stainless steel.

D. Thermal Insulation: Glass fibre insulation minimum density 24 kg/m³.

E. Primer: CGSB 1.181, zinc rich primer.

2.3 FABRICATION - GENERAL

A. Fabricate units to comply with CSDMA Specifications and additional requirements specified, welded construction.

B. Thickness of members:
   1. Door facings, rails and stiles: 1.6 mm thick steel sheet.
   2. Vertical steel stiffeners: 0.9 mm thick, steel sheet.
   3. Frame members: 1.6 mm thick steel sheet.
   4. Hinge reinforcements: 3.4 mm thick galvanized steel high frequency reinforcement.
   5. Other reinforcements: 2.7 mm thick galvanized steel.
   6. Glazing stops: 0.9 mm thick galvanized steel with square profile.
   7. Frame anchors: Galvanized steel.
      a. Anchors for frame to be grouted in: Wire type, 4.0 mm thick.
      b. Anchors for frame in masonry walls: Type "T" strap anchor 1.6 mm thick.
      c. Anchors for frame in concrete wall, existing wall or at structural steel member: Countersunk head, stainless steel screws of size to effect sufficient embedment in jamb 1.6 mm thick.
      d. Anchors for frame in metal stud partition: Door manufacturer's standard, 0.9 mm thick minimum.
   8. Guard boxes: 0.8 mm thick minimum.
   9. Jamb spreaders: 1.2 mm thick minimum.

C. Form profiles accurately to details indicated.

D. Weld hinge reinforcement in place, with not less than 8 welds per reinforcement

E. Sand welded joints to smooth uniform finish and touch-up with primer.

F. Blank, reinforce, drill and tap units to receive hardware.

G. Protect strike reinforcements and guard box welded to frames.

H. Fasten glazing stops with countersunk screws at 150 mm o.c.

I. Perform welding to CSA W59.

J. Factory apply primer to areas where zinc coating has been damaged during fabrication.

K. Fabricate cut-outs and concealed reinforcement in door and frame as required for installation of security alarm system. Weld standard electrical junction box frame, centred over cut out.

2.4 FABRICATION - DOOR AND TRANSOM PANEL

A. Doors: Hollow, welded stiffener construction. Laminated or honeycomb core construction is not acceptable.

B. Assemble components of door by means of spot welding with vertical stiffeners spaced 150 mm maximum o.c. and welded at 150 mm o.c.

C. Continuously weld door edge seams, body fill, and grind smooth. Face seams in finished product are not acceptable.

D. Fabricate steel flush closed ends on edges, top and bottom of doors.

E. Door Thickness: 45 mm and 50 mm as required for oversized doors.

F. For pair of doors scheduled to be weatherstripped tack weld to each leaf 38 by 3 mm steel astragal full height of door with 3 mm thick continuous spacer. Continuously weld between door and astragal. Body fill, grind smooth and touch-up with primer.

G. Transom Panel: Of same materials, construction and thickness as door.

H. Transom Panel in Labeled Door Assembly: Of same materials and construction as door.

I. Thermal Insulation: Full thickness of door. Fill all voids in door including stiffeners. Insulate all exterior doors.

2.5 FABRICATION - FRAMES

A. Mitre frame accurately and weld continuously on inside of frame profile.

B. Prepare frame for rubber silencers. Use three silencers per standard height door. For doors higher than 2250 mm add one silencer for every additional 750 mm of height or part thereof.

C. Use a minimum of two welded channel or angle spreaders per frame to ensure alignment.

D. Terminate frame at top of concrete slab or topping. Weld floor plates to frame for anchorage to slab. Verify depth of extension of finished floor to concrete slab.

E. For frames up to 2250 mm in height secure on each jamb 3 adjustable anchors for masonry wall, 4 welded or wedged anchors for stud partition, 3 pre-drilled holes with shallow dimples and with welded spacers behind for concrete wall, existing wall and structural steel member. Fabricate an additional anchor for each additional 750 mm of height or part thereof.

F. Fabricate frames with sidelights/transoms as indicated.

G. Fabricate interior screen frames as indicated.

H. Fabricate frames scheduled for installation in existing openings or cast-in-place concrete walls with spacers and recessed anchors. Site measure existing openings before fabrication.

I. Factory install transom panel in frame.

J. Form continuous drip to exterior frame head as detailed.

2.6 FABRICATION - RATED ASSEMBLIES

A. Fabricate ULC or WHI labelled doors, transom panels and frames of rating indicated in Door and Hardware Schedule.

B. Fabricate fire labelled products tested in conformance with ULC/CAN4-S104 or NFPA 252 and listed by a nationally recognized agency having factory inspection service and constructed as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers. Meet fire rating shown and provide fire protection rating and time/temperature rise label as required by the authorities having jurisdiction. Door core as per tested assembly.

C. Continuously weld 38 by 3 mm steel astragal to inactive leaf of pair of doors scheduled for fire resistance rating.

D. Affix appropriate labels on doors and frames, at concealed locations.

2.7 FINISH

A. Refer to Section, 09 90 00, Painting.

B. Materials:
   1. PRIME: Devguard 203, Waterborne Epoxy Primer. FINISH: Truglaze 4428, High Build Epoxy Coating.
   2. Surface preparation: SP-6 per standards of surface preparation for steel surfaces.
   3. Minimum D.F.T. per Coating in Microns: 50-60 for prime and 50 for finish coat.

2.8 GLAZING

A. Refer to Section 08 80 00, Glazing.

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 08 13 10

ROLLING METAL DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements and Division 26, Electrical.

B. Supply of Power and Local Disconnect Switch: Division 26, Electrical.

1.2 RELATED SECTIONS

A. Section 09 90 00, Painting and Coating

B. Section 26 05 21 Wire and Cables (0-1000V)

C. Section 26 05 32 Outlet Boxes, Conduit Boxes and Fittings

D. Section 26 05 34 Conduit, Conduit Fasteners, and Conduit Fittings

1.3 DESIGN REQUIREMENTS

A. Design members and their connections to withstand within acceptable deflection limitations their own weight, the weight of their glass, loads imposed by the motion of operable elements and the minimum design loads, and combinations of loads, due to the pressure and suction of wind as calculated in accordance with the National Building Code of Canada (NBC) for the locality.

B. Design work of this Section, which will support other items or will be required to support structural loads of any nature, by a professional engineer licensed in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

C. Operating Speed (open/close): 300 mm/sec.

D. Coordinate the work of this Section with the work of Section 11 13 00, Loading Dock Equipment.

1.4 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings with the following:
   1. Include large-scale details of members and materials, anchorage devices where required, dimensions, thicknesses, description of materials, metal finishing specifications and other pertinent information.
   2. Include interior view of doorframe.
   3. Include control schematics, wiring diagrams, control panel layout and construction details.

4. Electrical Bill of Material.

B. At time of Shop Drawing submittals, submit written certification from professional engineer licensed in the Province of Manitoba, stating that support system, anchorage and equipment have been designed according to requirements of the NBC, Division B, Part 4, article 4.1.8.17 for post-disaster structures.

C. Manufacturer's operating and maintenance instructions: Submit three copies including recommended maintenance practice and project record documents.

D. Fire Rolling Shutters
   1. Certifications: Submit manufacturer’s Underwriters Laboratories (ULC), Underwriters Laboratories (UL), Warnock Hersey (WH) or Factory Mutual Research (FM) laboratory test report verifying product compliance in accordance with the required fire and smoke ratings.
   2. Provide manufacturer’s Evaluation Service report confirming compliance of the fire door assembly in accordance with the requirements of the National Building Code of Canada, with Manitoba Amendments (NBC).

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: Complete, interior face-mounted insulated weather sealed, rolling service door assemblies.

B. Rolling Insulated Door:
   1. Manufacturers and Products:
      a. The Cookson Co.; FMWI.
      b. Cornell Iron Works; MFW6F.
      c. Overhead Door Corp.; 625.
      d. Superior Door and Gate Systems
   2. Curtain: Interlocking flat insulated aluminum slats with minimum 19 mm thick, foamed in place, polyurethane insulation. Face slat minimum 1.0 mm thick aluminum; back slat minimum 0.61 mm thick aluminum.
   3. Hood: Galvanized steel.
   4. Slide Guides: ASTM A36 steel, shapes as appropriate for conditions.
   5. Brackets, Gears, and Barrel: Manufacturer’s standard items.
   6. Bottom Bar: Steel bottom bar with flexible weatherstripping astragal on all exterior doors. Provide limit switch and AUTOMATIC stop and reversing feature in astragal.
   7. End Locks and Wind Locks: End locks at ends of each slat, of material compatible with curtain. Provide wind locks at ends of every other slat minimum on exterior doors.
   8. Weather Seals:
      a. Rubber, neoprene, or vinyl water seal at hood to prevent airflow around coil on exterior doors.
      b. Weather seal sealing strip on guide to close space between guide and curtain on exterior doors.

9. Finish:
    a. Face slat: PPG Duranar 2 coat system, 30 plus or minus 5 microns dry film thickness, colour to later selection.
    b. Back slat: Anodized, AA-M12C22A41, Clear class I.
    c. Bottom Bar, and Hood: Galvanized and prime painted.
    d. Other Steel Surfaces: Corrosion-inhibiting prime paint, compatible with finish paint specified in Section 09 90 00, Painting and Coating.
10. Provide rough in, in door frame for concealed door contact.
11. Electrical Operation:
    a. Operator: Motor, 575 volts, three-phase, EEMAC 4 enclosure and endless chain or crankshaft for emergency operation. Motor Controls: Reversing starter, 120 V controls, control transformer as required, auxiliary relays and interlocks as required, in accordance with Division 26, Electrical.
    b. Motor and all components to confirm to requirements for Class 1 Div. 1 areas.
    c. Safety Edge: Electro-mechanical combination safety bar and weatherstripping for electrically operated doors.
    d. Door Operations: Open/close/hold open button inside one per door.
    e. Operator Control: Pushbutton type, OPEN-CLOSE-STOP functions, momentary contacts, surface mounted in door of local motor control enclosure and separate locally mounted EEMAC12 pushbutton station.
    f. Field Conduit & Wiring: Comply with Division 16. Provide all wiring and conduit between door operator motor(s), door safety and operational devices, door motor control panel, operator pushbuttons and local disconnect switch (load side terminals).
    g. Security System Provisions: On exterior doors, coordinate with Contract Administrator Provide interface relays for interlocking with plant security system as supplied by separate security contractor.

C. Fire Rolling Shutter –Electrically Operated:
1. Curtain: Interlocking galvanized steel slats, cold rolled. Slats with endlocks locking each end of alternate slats to act as a wearing surface, and maintain slat alignment. Curtain slat 1.9mm thick minimum or the thickness required by ULC, UL, WH or FM whichever is greater. Slats cross section not less than 76mm wide by 23mm deep.
2. Bottom Bar: Consist of two (2) angles, each not less than 50mm by 50mm by 3mm steel formed to fit slats. Bottom bar shall be provided with slotted holes to allow for thermal expansion.
3. Guides: Each guide assembly fabricated of a minimum 100mm by 100mm steel support tube and two curtain guide angles fabricated of 3mm thick minimum steel bent shapes with a minimum 75mm depth. Support tubes shall be constructed with a slip joint at the top to provide for thermal expansion and guide angles shall be provided with slotted holes to allow for thermal expansion.
4. Provide internal ULC/UL classified smoke seals in each guide assembly.
5. Floating Guide: Each curtain incorporate a steel channel assembly to ensure proper feeding of the curtain into the door frames.
6. Mounting Brackets: Fabricated of hot rolled 8mm steel plate minimum, brackets shall be provided to house ends of the counterbalance barrel assembly.

7. Hood: Provided to entirely enclose curtain and counterbalance barrel assembly. Fabricated 1.9mm thick minimum, galvanized steel and designed to match brackets. Bent and reinforce top and bottom for stiffness.
8. Provide UL/ULC approved lintel smoke seals. Counterbalance Assembly: Counterbalance the door by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Attach grease sealed bearings or self-lubricating graphite bearings to the spring barrel which fabricated of hot formed structural quality carbon steel seamless pipe.
9. Operator:
    a. Electrical motor, 575 volts, three-phase, NEMAC type 1 enclosure and endless chain or crankshaft for emergency operation. Motor Controls: Reversing starter, 120 V controls, control transformer as required, auxiliary relays and interlocks as required, in accordance with Division 26, Electrical.
    b. Provide fire door with a compact power unit designed and built by the door manufacturer. Equip operator adjustable screw-type limit switch to break the circuit at termination of travel. Furnish high efficiency planetary gearing running in an oil bath, together with a centrifugal governor, magnetic operated brake and a fail-safe magnetic release device, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator housed in a NEMA type 1 enclosure.
    c. Intermediate duty, thermally protected, ball bearing type with a class A or better insulation. 1/3 hp horsepower minimum or of manufacturer's recommended size, whichever is greater.
    d. Starter: Size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
    e. Reducer: Planetary gear type, 80 percent efficiency minimum.
    f. Brake: Magnetically activated, integral within the operator's housing.
    g. Control Station: Provide flush mount key switch control station marked open, close and stop.
    h. Self-Closing Mechanism: The fire door is to be designed with a centrifugal governor as an integral part of the operator's construction. The automatic release mechanism activated by a fusible link and a smoke detector. When activated, ten seconds later the coiling curtain is released and begins to close due to gravitational force. The speed of the curtain is governed by a centrifugal governor, designed to match the normal operating speed of the door, at a rate of not greater than 225mm per second but less than 150mm per second.
    i. Magnetic Release with 10 Second Time Delay: A fail-safe magnetic release device built into the operator as an integral part of the release mechanism. When power is interrupted to the release mechanism by the smoke detector or fire alarm, the door shall begin to self-close. In the event of power failure the time delay shall prevent the coiling curtain from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the coiling curtain shall self-close. Once power has been restored to the release mechanism the automatic reset time delay as well as the fire door shall automatically reset themselves.
    j. Obstruction Sensing Safety Edge: Design the coiling curtain with an obstruction sensing safety edge. In the event that the safety edge meets an obstruction during the normal closing operation, the door shall stop, reverse and return to the open position.

In the event the safety edge meets an obstruction during the self-closing operation, the door shall come to rest on the obstruction and once the obstruction has been removed the fire door shall continue to the fully closed position.

k. Easy Trip Test Feature: Design fire door so that it may be trip tested simply by cutting power to the operator. By turning the power switch off, the door shall self-close. Once the fire door has satisfactorily closed, it shall be reset simply by turning the power back on. No ladders or tools shall be needed to reset the door or the time delay unit.

10. Finish:
    a. Face slat: PPG Duranar 2 coat system, 30 plus or minus 5 microns dry film thickness, colour to later selection.
    b. Back slat: Anodized, AA-M12C22A41, Clear class I.
    c. Bottom Bar, and Hood: Galvanized and prime painted.
    d. Other Steel Surfaces: Corrosion-inhibiting prime paint, compatible with finish paint specified in Section 09 90 00, Painting and Coating.
11. Auxiliary Devices: Provide smoke detectors and fusible link, as recommended by door manufacturer.
12. Provide rough in, in door frame for concealed door contact where indicated on door schedule and Drawings.
13. Operator Control: Pushbutton type, OPEN-CLOSE-STOP functions, momentary contacts, surface mounted in the pushbutton station.
14. Field Conduit & Wiring: Comply with Division 16. Provide all wiring and conduit between door operator motor(s), door safety and operational devices, door motor control panel, operator pushbuttons and local disconnect switch (load side terminals).

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to which work is to be anchored or connected and job conditions.

B. Report unsatisfactory conditions likely to prevent or prejudice proper installation of work.

C. Commencing work after unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install door in accordance with manufacturer's instructions and under supervision of manufacturer's representative.

B. Install conduits and wiring. Make required connections.

3.3 INSTALLATION – FIRE ROLLING SHUTTERS

A. Perform installation, of fire rolling shutter, using only factory approved and certified representatives of the door manufacturer.

B. Install fire rolling shutters to meet the requirements of UL/ULC design listing.

C. Test door closing sequence when activated by the building's fire alarm system. Reset door after successful test.

3.4 ADJUSTMENT AND DEMONSTRATION

A. On completion, adjust and lubricate doors, check and adjust controls, verify that equipment and mechanisms are operating smoothly. When directed demonstrate the operation, control and safety features on each door.

3.5 CLEANING

A. Clean and make good surfaces soiled or otherwise damaged in connection with the work of this Section.

END OF SECTION

SECTION 08 16 13

FIBERGLASS DOORS

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards that may be referenced in this section:
   1. ASTM International (ASTM):
      a. D635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
      b. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. Steel Door Institute (SDI):
      a. SDI 100/ANSI A250.8, Recommended Specifications, Standard Steel Doors and Frames.
      b. SDI 105, Recommended Erection Instructions for Steel Frames.
   3. National Fire Protection Association (NFPA): 80, Standard for Fire Doors and Windows.
   4. Underwriters Laboratories Inc. (UL): Building Materials Directory.
   5. Warnock Hersey Certification Listings.

1.2 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings: Manufacturer’s literature, and drawings prepared for this project showing types, sizes, fire ratings, complete details of door and frame construction, including resin used, glass/resin ration, cutouts and anchorage for units.
   2. Samples: Two Samples to verify custom color match, if any.

B. Informational Submittals:
   1. Manufacturer’s installation instructions.
   2. Manufacturer’s instructions for handling and care of products.
   3. Executed guarantee.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Deliver doors to Job Site after moisture-producing construction operations are complete and building has reached average prevailing relative humidity of locality.
   2. Deliver doors and frames in unopened packages, clearly marked with manufacturer’s name, brand name, size, thickness, and identifying symbol or mark related to door numbers used in Contract Documents.

B. Storage and Handling:
   1. In strict compliance with manufacturer's instructions and recommendations.
   2. Minimize onsite storage time.
   3. Handle with clean gloves.
   4. Do not drag doors across one another or across other surfaces.
   5. Store in dry area and protect from damage.

1.4 SPECIAL GUARANTEE

A. As special guarantee, provide manufacturer's extended guarantee or warranty, with the City named in writing as beneficiary. Special guarantee shall provide for correction, or at option of the City, removal and replacement of Work specified in this Specification section found defective during a period of 10 years after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in General Conditions.

B. Defects include warp, separation or delamination from core, expansion of core, and failures due to corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Special-Lite Doors Chem-Pruf Door Company.

B. Flemming Door Products

C. KM Thoma FRP Doors

2.2 DOORS

A. General:
   1. Flush construction, minimum 1-3/4 inches thick, with no seams, cracks, or joints.
   2. Full length integral edge reinforcement.
   3. Face shall not deviate more than 1/4 inch from a true plane at any point.
   4. Reinforced to receive hardware specified.
   5. Doors may be prehung at factory or hung in field.
   6. Resins:
      a. Formulate for extremely corrosive and humid environments above 50 percent relative humidity that may contain chloride gas
      b. Fire retardant formulation plus antimony trioxide to achieve an ASTM E84 flame spread of 25 or less and be self-extinguishing in accordance with ASTM D635.
      c. Contain Ultraviolet light inhibitor additives.
   7. Prepare doors and frames for hardware only after receipt of hardware templates.
   8. Make cutouts for openings at factory and furnish with FRP frames and stops that prevent moisture from entering or passing through door.
   9. Glazing: As specified in Section 08 80 00, Glazing.
   10. Glazing may be done in factory or field.

B. Doors:
   1. Molded in one continuous piece.
   2. Core of end-grain balsa wood or closed cell, non-absorptive, 2 pounds per square foot density, isocyanurate or urethane rigid foam.
   3. Finish: Manufacturer's standard in colors selected.
   4. Furnish astragals at joints between pairs and with transom panels.

C. Transom Panels: Match door construction and finish.

2.3 FRAMES

A. Manufacturer's standard one-piece-pultruded, three-piece built-up, or one-piece molded FRP with double rabbeted profile, reinforced for specified hardware, assembled with stainless steel fasteners, and furnished with wall anchors for installation after wall opening is complete.

B. Furnished by door manufacturer with finish to match doors and prepared for hardware specified.

2.4 FIRE RATED DOORS:

A. Doors and frames: Manufacturer's standard with UL listed in Warnock Hersey Certification Listings and labeled with rating as scheduled or UL listed meeting requirements of NFPA 80 and SDI 100.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify doors and frames comply with approved Shop Drawings and meet indicated requirements for type, size, hardware, location, and swing.

B. Examine openings for conditions that would prevent proper installation.

C. Do not proceed with installation until defects are corrected.

D. Do not install doors in frames that would hinder operation of doors.

3.2 INSTALLATION

A. Install, following manufacturer's written instructions, using only noncorrosive materials and methods.

B. Tolerances:
   1. From Door Bottom to Floor Covering: 1/2 inch.
   2. From Bottom to Top of Threshold: 1/4 inch.
   3. Maximum From Top: 1/8 inch.
   4. Bevel Lock and Hinge Edges: 1/8 inch in 2 inches.
   5. Clearance of Meeting Stiles of Pairs of Doors: 1/8 inch.

C. Install frames square, plumb, rigid, and in true alignment. Brace securely during construction to retain proper position and clearances. Anchor firmly in place.

D. Do not cut or otherwise alter integrity of door to allow door to fit frame.

E. Frames Set in Concrete or Masonry: Secure each jamb with four stainless steel expansion anchors following manufacturer's instructions.

3.3 ADJUST AND CLEAN

A. Replace or rehang doors that are hinge-bound and do not swing, latch or operate smoothly and freely.

B. Remove and install new prefinished doors in place of those damaged during installation.

C. Refinish, or replace with new, job-finished doors damaged during installation.

D. Modify doors and frames only at manufacturer's factory.

3.4 SCHEDULE

A. For tabulation of door and frame characteristics, such as size, type, detail, and finish hardware requirements see Door and Hardware Schedule on Drawings.

END OF SECTION

SECTION 08 36 20

SECTIONAL OVERHEAD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements and Division 26, Electrical.

B. Supply of Power and Local Disconnect Switch: Division 26, Electrical.

1.2 DESIGN REQUIREMENTS

A. Design members and their connections to withstand within acceptable deflection limitations their own weight, loads imposed by the motion of operable elements and the minimum design loads.

B. Design work of this Section, which will support other items or will be required to support structural loads of any nature, by a Professional Engineer licensed in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

C. Operating speed (open/close): 300mm/sec.

1.3 SUBMITTALS – GENERAL

A. Shop Drawings: Submit Shop Drawings with the following:
   1. Include large-scale details of members and materials, anchorage devices where required, dimensions, thicknesses, description of materials, metal finishing specifications and other pertinent information.
   2. Include interior view of doorframe.
   3. Include control schematics, wiring diagrams, control panel layout and construction details.
   4. Electrical Bill of Material.

B. At time of Shop Drawing submittals, Submit written certification from Professional Engineer licensed in the Province of Manitoba, stating that support system, anchorage and equipment have been designed according to requirements of the OBC, Division B, Part 4, article 4.1.8.18 for post-disaster structures.

C. Manufacturer's operating and maintenance instructions: Submit three copies including recommended maintenance practice and project record documents.

1.4 WARRANTY

A. Submit manufacturer’s two year warranty for the work of this section against defects in workmanship and materials.

B. Submit manufacturer's five year warranty for electrically operated units.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: Complete, interior face-mounted insulated weather sealed, rolling service door assemblies.

B. Manufacturers and Products:
   1. Overhead Door Corp.; 625 Series
   2. Garaga Inc., G-2000
   3. Kennear Commercial/Industrial Sectional Doors, Thermospan
   4. Lynex Industries Inc., UNI-COM ST-101The Cookson Co.; FMWI.

C. Overhead Sectional Insulated Doors:
   1. Sectional Overhead Door, complete, interior face-mounted insulated weather sealed, heavy-duty insulated steel service door assemblies.
   2. Full vertical track.
   3. Electrical operation.

D. Door: Flush panel door consisting of sections, hinged together to suit opening size indicated.

E. Door Sections: 50mm thick with deep shiplap joints, fabricated of 1.6mm Z275 galvanized steel sheet, muntins and stiles, and 0.48mm Z275 galvanized backing sheet, rivetted construction.

F. Reinforcement of Door Sections: Strut bars or trusses as required by door width.

G. Finish: Provide powder coat finish of color as selected from manufacturer's standard RAL powder coat selection chart.

H. On Door Sections: Baked acrylic prime paint. Colour to later selection.

I. Emergency Chain Hoistway: Type 304 Stainless steel.

J. Insulation: CSA A101-M, 50mm thick glass fibre board AF530.

K. Weatherstripping: Adjustable continuous track angle for seal between door and jamb, with door overlapping clear opening by 25mm. Aluminum-vinyl weatherstrip at head.

L. Hardware: 75mm hardware standard lift to suit. Steel angle mounted solid torsion shaft 100,000 cycle rated.

M. Accessories: Pusher springs to rear (for low -lift sets with less than 300mm headroom).

N. Safety Edge: Electromechanic combination safety bar and weatherstripping for electrically operated doors.

O. Locking Mechanism: Double point bar latch with switch interlocked with electric door motor starter.

P. Exhaust Ports: Zinc die cast plated.

2.2 ELECTRICAL OPERATION REQUIREMENTS

A. Comply with Division 26, Electrical.

B. Electric Operator: Belt drive, with emergency hand chain hoist, Low-Lift Hardware:
   1. Manaras: MTBH series
   2. Dorlec: Model ETBH

C. Drive Motor: Comply with Division 26. Induction motor type, rating as required by door manufacturer. Door Operating Speed: 300mm per second minimum;
   1. Power Supply: 575 V, 3 phase, 0.375 kW.

D. Motor Controls: Magnetic reversing starter, minimum EEMAC size 1 with motor overload protection, 120 V controls, control transformer as required, auxiliary relays and interlocks as required, in accordance with Division 26, Electrical.

E. Supply of Power and Local Disconnect Switch: Division 26, Electrical.

F. Door Motor Control Panel Enclosure: EEMAC 4, to house starter, ancillary motor circuit controls, terminal blocks and door mounted operator devices. Mounting location of control panel to the Contract Administrator’s approval.

G. Operator Controls:
   1. Pushbutton type, Open/close/hold open button on each side of the door, two per door.
   2. Open/close/hold open button functions, momentary contacts, surface mounted in door of local motor control enclosure and separate locally mounted EEMAC 4 pushbutton station where indicated on Drawings.

H. Field Conduit and Wiring: Comply with Division 26, Provide all wiring and conduit between door operator motor(s), door safety and operational devices, door motor control panel, operator pushbuttons and local disconnect switch (load side terminals).

I. Embedded Vehicle Detector and Timer: To operate door when vehicle is entering through door. Timer: Adjustable type up to three minutes.

J. Door Operation: Open/close/hold open button on each side of the door, two per door.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to which work is to be anchored or connected and job conditions.

B. Verify all dimensions taken at Job Site affecting the work. Notify the Contract Administrator in any instance where dimensions vary.

C. Report unsatisfactory conditions likely to prevent or prejudice proper installation of work.

D. Commencing work after unsatisfactory conditions are corrected.

3.2 INSTALLATION - GENERAL

A. Install door in accordance with manufacturer's instructions and under supervision of manufacturer's representative.

B. Install door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Install conduits and wiring. Make required connections.

3.3 ADJUSTMENT AND DEMONSTRATION

A. On completion, adjust and lubricate doors, check and adjust controls, verify that equipment and mechanisms are operating smoothly. When directed demonstrate the operation, control and safety features on each door.

3.4 CLEANING

A. Clean and make good surfaces soiled or otherwise damaged in connection with the work of this Section.

B. Protect installed work using adequate and suitable means during and after installation until accepted by the City.

C. Remove, repair or replace materials which have been damaged in any way.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. National Building Code of Canada (NBC) with Manitoba Amendments.

B. Comply with the latest edition of the following statutes, codes and standards and all amendments thereto.
1. CAN/CSA A440.4 Window, Door and Skylight Installation.
2. CAN/ULC S701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
3. CAN3-G40.20/G40.21 General Requirements for Rolled or Welded Structural Quality Steel.
4. CSA 0121 Douglas Fir Plywood.
5. ASTM B136 Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
6. ASTM B137 Standard Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum.
7. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
8. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
9. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
10. ASTM B244 Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
11. ASTM D395 Standard Test Methods for Rubber Property - Compression Set.
12. ASTM D412 Standard test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension.
13. ASTM D1149 Standard Test Method for Rubber Deterioration Cracking in an Ozone Controlled Environment.
14. ASTM D1187 Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
15. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

1.3 DESIGN REQUIREMENTS

A. Design members and their connections to withstand within acceptable deflection limitations their own weight, the weight of their glass, loads imposed by the motion of operable elements and the minimum design loads, and combinations of loads, due to the pressure and suction of wind as calculated in accordance with the National Building Code of Canada for the locality.

B. Limit deflection to L/175 of clear span tested to ASTM E330 under wind loads for building locality as per National Building Code of Canada Division B, Appendix C, Climatic and Seismic Information for Building Design in Canada.

C. Design work of this Section, which will support other items or will be required to support structural loads of any nature, by a Professional Engineer licensed in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

D. Design sections to accommodate expansion and contraction when subject to minimum and maximum surface temperature of minus 35 degrees C to 45 degrees C. Make allowances for deflection to ensure that structural loads are not transmitted to aluminum work.

E. Provide supplemental structural steel reinforcement within mullions as required for adequate strength, stiffness and connections.

1.4 SUBMITTALS

A. Shop Drawings:
   1. Shop Drawings to bear professional seal or stamp and signature of a Professional Engineer licensed to practice in the Province of Manitoba.
   2. Indicate type of assembly.
   3. Indicate material being supplied, wall thickness of sheet and extrusions, and finish specification.
   4. Indicate connections, attachments, stiffenings, anchorage and location of fastenings.
   5. Indicate provision for thermal and structural movement between components of this Section and between components of this Section and adjacent materials.
   6. Indicate air-seal details.

B. Submit Finish Hardware Schedule indicating type of door, type of frame, material, thicknesses, cut-outs, reinforcements, anchors, location of fastenings, door hand and location of hardware and each manufacturer. Submit catalogue cuts of hardware.

C. Submit metal finisher's certificate that metal components received coating system specified.

D. Submit three copies of manufacturer's installation and maintenance instructions for each item of hardware.

E. At time of Shop Drawing submittals, Submit written certification from Professional Engineer licensed in the Province of Manitoba, stating that support system, anchorage and equipment have been designed according to requirements of the NBC, Division B, Part 4, article 4.1.8.17 for post-disaster structures.

1.5 QUALITY ASSURANCE

A. Perform metal pre-treatments and fluoropolymer thermal setting enamel-coating applicator approved in writing by the manufacturer of the coating and under the supervision of the manufacturer.

B. Have work executed by skilled mechanics.

1.6 WARRANTY

A. Submit manufacturer's two-year warranty for work of this Section against defects in materials and installation including but not limited to:
   1. No condensation on inside face of insulating glass or frame at 40 percent RH at plus 20 degrees C inside and minus 20 degrees C outside.
   2. Maximum acceptable air leakage rate for exterior aluminum framing and interfaces: 0.25 $m^3/h/m$ under 75 Pa pressure differential. No uncontrolled water leakage under negative pressure 750 Pa.
   3. Loosening of glazing.
   4. Water penetration beyond air seal.
   5. Fading, discolouration or evidence of other defects of metal finish.
   6. Failure of glazing system.
   7. Failure of seals or gaskets.
   8. Performance failure of any metal component.
   9. Joint sealant provided under this Section: Non-staining, adhesion, cohesion and against any other failure.
   10. Installation of hardware provided under this Section.

B. Submit manufacturer's five-year warranty against defects in materials and workmanship for insulating glass units.

C. Submit manufacturer's written warranty for each item of hardware under this Section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Kawneer, Sherwood Windows Ltd., Alumicor Ltd.

B. Sections are based on Kawneer’s size, and thickness of extrusions and location of thermal break. Other sections will be permitted if they meet the design requirements of the Specifications.

2.2 MATERIALS

A. Aluminum:
   1. Aluminum Sections: ASTM B211, accurately formed and extruded aluminum alloy 6063-T5, free from defects impairing appearance, strength and durability.

2. Aluminum Sheet: ASTM B209; Alloy 1100-H14 anodizing quality.
3. Sheet for Door Panels: 1.6 mm aluminum sheet.

B. Miscellaneous Steel: CSA G40.20, hot-dip galvanized after fabrication.

C. Screws, Bolts and Fasteners: ASTM A167, #300 Series stainless steel.

D. Polystyrene Insulation: CAN/ULC S701 Type 4, compression strength 210 kPa, thickness as shown.

E. Mineral Fiber Insulation: CW225 by Owens Corning Canada Inc., or RXL40 by Roxul Inc. Thickness as indicated.

F. Sealant for Glazing: Vision strip by Tremco (Canada) Ltd. Primer: As recommended by sealant manufacturer.

G. Sealants: As specified in Section 07 92 00, Joint Sealants.

H. Backer rod: Closed cell, polystyrene rope, 25 percent oversized.

I. Air-seal: Thermo-fusible, 2.2 mm thick min glass reinforced elastomeric membrane Blueskin TG by Bakor Inc., Sopraseal by Soprema Ltd.

J. Isolation Coating: ASTM D1187

K. Shimming Material: Corrosion resistant, metal or plastic.

L. Plywood: CSA 0121, exterior bond, Douglas Fir plywood G1S, preservative treated on all sides and edges.

M. Glazing: As specified in Section 08 80 00, Glazing.

N. Shims, Spacers and Setting Blocks: 45, 50 and 70 Durometer A hardness plus/minus 5 respectively, neoprene rubber. Resistance to oxidation and permanent deformation under load. Sized to suit glass weight.

O. One Part Glazing Gaskets: Extruded neoprene or polyvinyl chloride of accepted profile. Gaskets properties: Tensile strength, ASTM D412, 7300 kPa (1500 psi); Durometer A hardness, 50 plus/minus 5; resistance to permanent set, ASTM D395, Method D, 25 percent maximum set; minimum elongation at break, ASTM D412, 300 percent; resistance to ozone, ASTM D1149, showing no cracks. Colour: Black.

P. Glazing Tape: Polyshim II Tremco (Canada) Ltd.

2.3 COMPONENTS - GENERAL

A. Frames: By Kawneer:
1. Interior frames: Kawneer 1602 Wall, single glazed without thermal break, 50.8 mm wide.

2. Exterior frames: Kawneer 1602 Wall, double glazed with thermal break, 50.8 mm wide.
3. Sidelights and transom: Kawneer 1602 Wall, thermally broken, 50.8 mm wide.

B. Door: Kawneer 560 Insulclad Heavy Wall Entrance:
1. Vertical stile: 127 mm
2. Top rail: 127 mm
3. Bottom rail: 260.4 mm two piece.
4. Mid rail: 165.1 mm.
5. Thickness: 57 mm.

C. Door: Kawneer 500 Heavy Wall Entrance:
1. Vertical stile: 127 mm
2. Top rail: 127 mm
3. Bottom rail: 260.4 mm two piece.
4. Mid rail: 165.1 mm.
5. Thickness: 45 mm.

D. Panels in Aluminum Frames: Fabricated of 3 mm thick aluminum face sheets and polystyrene or polyisocyanurate rigid insulation. Thickness as indicated. Wrap panel edges with face sheet.

E. Panels in Aluminum Doors: Fabricated of 1.6 mm thick aluminum sheets laminated to both sides of 19 mm thick plywood.

F. Metal Spandrel Panels: Fabricated of 1.6 mm thick aluminum sheet, 0.76 mm thick galvanized steel backing sheet and 50 mm thick mineral fibre insulation core. Wrap panel edges with face sheet.

G. Extruded Sills: 2.4 mm thick aluminum, to profiles indicated including cover plates, anchor clips and drip deflectors.

H. Sill flashing: 1.6 mm thick aluminum, to profiles indicated. Form sills as detailed, raw edges are not allowed.

I. Miscellaneous Metal Trim Members: 2.4 mm thick aluminum to profiles indicated.

J. Astragal: Provide 38 mm by 3 mm thick aluminum astragal full height of door to each leaf of pair of doors scheduled to receive astragal. Tack weld 2.4 mm thick continuous aluminum spacer between door and astragal. Continuously weld astragal to door. Body fill, grind smooth and polish to match door finish.

2.4 HARDWARE

A. Manufacturers' catalogue numbers specified denote standard of quality, style and function of items required.

B. Finish of Hardware: To match colour and finish specified for doors and/or to the Contract Administrator's acceptance. Finish of fastenings: Complementary to related hardware.

C. Push-pull Handle: Kawneer 304.8 mm high model CO-9CO-12, on each side of door unless otherwise indicated in Door Schedule.

D. Hardware: As per Section 08 71 00, Door Hardware.

E. Frame Weatherstripping: Semi-rigid neoprene keyed into door stop.

F. Double Door Weatherstripping for Meeting Stile: Double pile with clear plastic centre strip, Fin-Seal by Schlegel Canada Inc.

2.5 FABRICATION

A. Form accurate extrusions with clean, straight, sharply defined profiles free from defects.

B. Fabricate removable lock-in type glazing stops with solid inside face so that glazing tape or gasket is retained in place.

C. Fabricate glazing stops in screens with recessed flat head fixing screws.

D. Fabricate extruded aluminum glazing stops for doors, square section, interlocking snap-in type, with integral continuous dry glazing gaskets.

E. Include fastenings necessary to anchor sections together and to adjacent work.

F. Conceal nuts, bolts, screws, clips and other means of fastening in finished work.

G. Where exposed fasteners are necessary use counter-sunk fixing screws Phillips or Robertson Head, flush with adjacent surfaces. Locate screws at removable stops maximum 200 mm o.c. and 50 mm from corners.

H. Corner Construction of Frames: Butt jointed with welds along concealed lines of contact, with inserted spigots, sealed with sealant. Fabricate continuous facings, anchors and angles.

I. Fabricate frames with two drain holes at sill to exterior.

J. Door Rails and Stiles: Single extruded tubular sections. Accurately join and fit corners of door to flush hairline joints and weld along concealed lines of contact. Seal interlocking joint sections with sealant.

K. Accurately make door cutouts and recesses by mortising or milling operations required for hardware. Reinforce cutouts and recesses with backing plates.

L. Fabricate panels for frames with face sheets laminated under pressure to insulation core. Enclose and seal edges. Oil canning in face sheets is not acceptable.

M. Fabricate panels for doors with face sheets laminated under pressure to plywood core. Enclose and seal edges. Oil canning in face sheets is not acceptable.

N. Include aluminum cover plates, trim components, bent plates, closure trim, drips, flashings and other components required to complete installation.

2.6 FINISH

A. Apply finish to aluminum components after fabrication or forming.

B. Fluoropolymer Enamel: PPG Duranar two coat system 30 plus/minus 5 microns dry film thickness. Colour to later selection.

PART 3 EXECUTION

3.1 PREPARATION

A. Ensure that openings are within acceptable tolerances.

3.2 INSTALLATION

A. Erect assemblies plumb, true and square, in accordance with manufacturer's printed instructions.

B. Accurately fit assemblies to provide air-tight and watertight installation and provide clearance required due to expansion, contraction and deflection of building structures and frames. Anchor units securely to building structure.

C. Seal hairline joints at junction of frame members on interior side.

D. Install doors to operate freely and close tightly.

E. Install sills with two-point anchor system, at front and back of sill at 400 mm. o.c. Exposed fasteners are not allowed.

F. Installation Tolerances for Each Unit:
1. vertical position: plus/minus 3 mm.
2. horizontal position: plus/minus 3 mm.
3. deviation from plumb: 3 mm maximum each plane
4. racking of face: 6 mm maximum.
5. racking in elevation: nil.

G. Install existing assemblies reclaimed for installation.

3.3 INSTALLATION - AIR SEAL

A. Install air seal interface. Secure air seal to frame with continuous aluminum bar and to adjacent air and vapour barrier to manufacturer's recommendations. Seal joints in air seal airtight.

3.4 INSTALLATION - GLAZING

A. Size glass units to accurately fit openings, with clearances as recommended by glass manufacturer.

B. Mark each lite of glass with large, white cross to indicate presence of glass.

C. Locate and install setting blocks and shims according to glass manufacturer's printed instructions.

D. Clean glass and metal surfaces to present clean, dry, grease and oil free surfaces to receive glazing materials.

E. Glaze at temperatures recommended by manufacturer of glazing materials.

F. Set channels of insulating glass at least 3 mm below glass stop face channel.

G. Door and Screen glazing: Glazing tape both sides of glass unit for exterior application. Dry glazing using gasket glazing for interior application.

H. Provide air-tight glazing installation.

3.5 INSTALLATION - MISCELLANEOUS METALS

A. Provide reinforcing in door frames which form part of window wall assembly and are not directly attached to masonry or structural members.

B. Install miscellaneous steel reinforcing of aluminum frames where required.

3.6 APPLICATION - ISOLATION COATING

A. Backpaint aluminum surfaces in contact with concrete, masonry or dissimilar metals with 1.0 mm thick coat of isolation coating.

3.7 INSTALLATION - DOOR HARDWARE

A. Install hardware in accordance with manufacturer's requirements. Adjust hardware as and when required to provide smooth operation. Ensure clearances are maintained. Install hardware in accordance with Standard Hardware Locations Metric Guide issued by CSDFMA. and to match exiting mounting heights

B. Lubricate operable units as required to ensure smooth functioning of hardware consistent with manufacturers' recommendations.

C. Ensure fastening components are tightened. Do not damage or otherwise mar edges or surfaces of hardware components. Repair defects.

D. Adjust weatherstripping so as to leave each opening unit in its most weathertight position.

E. Upon completion of the project and just prior to the handing over of the building to the City or at a time as directed, inspect, test and adjust installation. Inspect units for damage and correct same immediately. Test and adjust hardware and replace or repair faulty items. Test operable elements and ensure easy and smooth operation.

3.8 RECONSTRUCTION, ALTERATIONS AND REPAIRS

A. Do alterations to existing assemblies as indicated and as required.

END OF SECTION

SECTION 08 45 00

TRANSLUCENT WALL AND ROOF ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 DESIGN REQUIREMENTS

A. Design members and their connections to withstand within acceptable deflection limitations their own weight, the weight of their glass, loads imposed by the motion of operable elements and the minimum design loads, loading shown on Structural Drawings, and combinations of loads, due to the pressure and suction of wind as calculated in accordance with the National Building Code of Canada for the locality.

B. Design work of this Section, which will support other items or will be required to support structural loads of any nature, by a Professional Engineer licensed in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

C. Deflection Limit Under Live Load: Maximum 1/360 of span or 13 mm, whichever is less.

D. Design sections to accommodate expansion and contraction when subject to minimum and maximum surface temperature of minus 35 degrees C to 75 degrees C.

E. Design skylight assembly in the Chemical Building to be removable.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Shop Drawings to bear professional seal, signature of a Professional Engineer licensed to design structures in the Province of Manitoba.
   2. Indicate materials being supplied, wall thickness of sheets and extrusions, finish specification.
   3. Indicate fabrication and erection of insulated translucent panels.
   4. Indicate types of mullions and anchorage details.
   5. Indicate method of removal and reinstallation of skylights.
   6. OPS and maintenance directions.

B. At time of Shop Drawing submittals, Submit written certification from Professional Engineer licensed in the Province of Manitoba stating that support system, anchorage and equipment have been designed according to requirements of the NBC for post-disaster structures.

C. Samples:
   1. Submit sample of assembled panel with specified facings, minimum 600 mm by 600 mm size.
   2. Submit sample of mullions and fasteners.

1.4 WARRANTY

A. Submit manufacturers five year warranty for work of this section against defects in materials and installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Kalwall Corp., Manchester, NH., distributed by Consulac Architectural Products, Oakville, Ontario. No “or approved equal” or substitute products will be considered.

2.2 MATERIALS

A. Translucent fiberglass face sheets, crystal exterior, white interior. Flame spread less than 45 when tested in accordance with ASTM E84. Exterior faces factory coated with thermoset acrylic protective coating, minimum thickness 30 microns.

B. Aluminum Section: Alloy 6-63-T6, mill finish.

C. Adhesive: Heat and pressure resin type, approved for use in sandwich panel constructions.

D. Battens and Perimeter Closures: Extruded aluminum, alloy 6-63-T6 and 6060-T5.

E. Fasteners: Stainless steel.

2.3 FABRICATION

A. Panel Construction: Flat fiberglass face sheets resin laminated to grid core of mechanically interlocking aluminum I-beams.
   1. Thickness: 70 mm.
   2. Insulation Value: RSI 0.73.
   3. Light Transmission: 20 percent.
   4. Shading Coefficient: 0.27.

B. Grid Pattern: 300 mm by 600 mm nominal grid size, shoji pattern, symmetrical about vertical centerline of each panel.

C. Preassemble and seal panels at the factory under controlled process of heat and pressure.

D. Configuration: As shown on Drawings, self supporting, clearspan between structural curbs, slope as indicated.

E. Fabricate removable skylight with lockable latching devices and lifting hooks as per manufacturer's standard. Provide any special rigging, frames, hooks and cables as required.

PART 3 EXECUTION

3.1 PREPARATION

A. Ensure that openings are within acceptable tolerances.

3.2 INSTALLATION

A. Coordinate the work of this Section with the work of Chemical Storage Tanks, covered by other Sections, for the sequence of installation.

B. Accurately fit assemblies to provide air-tight and watertight installation. Provide clearances required for expansion, contraction and deflection of building structures and frames.

C. Erect translucent panel system in accordance with proper installation and weathertight.

D. Demonstrate installation and removal of removable skylight to the Contract Administrator and the City.

E. Provide any special rigging apparatus or equipment\tools as required for installation and removal as recommended by the manufacturer.

3.3 CLEANING

A. Make good to Contract Administrator's acceptance surfaces damaged in connection with work of this Section.

B. Wash and polish both faces of skylight.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. National Building Code of Canada (NBC).

B. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
1. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM B136 Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
3. ASTM B137 Standard Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum.
4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM B244 Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
7. ASTM D395 Standard Test Methods for Rubber Property - Compression Set.
8. ASTM D412 Standard test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension.
9. ASTM D1149 Standard Test Method for Rubber Deterioration Cracking in an Ozone Controlled Environment.
10. ASTM D1187 Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
11. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Door, Skylight and Curtain Walls by Uniform Static Air Pressure Difference.
12. CAN/ULC S701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
13. CSA 0121 Douglas Fir Plywood.
14. CSA G40.20/G40.21General Requirements for Rolled or Welded Structural Quality Steel.

1.3 DESIGN REQUIREMENTS

A. Design members and their connections to withstand within acceptable deflection limitations their own weight, the weight of their glass, loads imposed by the motion of operable elements and the minimum design loads, and combinations of loads, due to the pressure and suction of wind as calculated in accordance with the National Building Code of Canada for the locality.

B. Limit deflection to L/175 of clear span tested to ASTM E330 under wind loads for building locality as per National Building Code of Canada Division B, Appendix C, Climatic and Seismic Information for Building Design in Canada.

C. Design work of this Section, which will support other items or will be required to support structural loads of any nature, by a Professional Engineer licensed to practice in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

D. Design sections to accommodate expansion and contraction when subject to minimum and maximum surface temperature of minus 35 degrees C to 45 degrees C. Make allowance for deflection to ensure that structural loads are not transmitted to aluminum work.

E. Provide supplemental structural steel reinforcement within mullions as required for adequate strength, stiffness and connections.

1.4 SUBMITTALS

A. Shop Drawings:
   1. Shop Drawings to bear professional seal or stamp and signature of a Professional Engineer licensed to practice in the Province of Manitoba.
   2. Indicate type of assemblies.
   3. Indicate material being supplied, wall thickness of sheet and extrusions, and finish specification.
   4. Indicate connections, attachments, stiffening, anchorage and location of anchors and fastenings.
   5. Indicate provision for thermal and structural movement between components of this Section and between components of this Section and adjacent materials.
   6. Indicate air-seal details.

B. Submit Finish Hardware Schedule indicating standard hardware and each manufacturer. Include catalogue cuts of hardware.

C. Submit metal finisher's certificate that metal components received coating system specified.

D. Submit three copies of manufacturer's installation and maintenance instructions for each item of hardware.

E. Submit manufacturer's certification for explosion vent release pressure.

F. At time of Shop Drawing submittals, submit written certification from Professional Engineer licensed in the Province of Manitoba stating that support system, anchorage and equipment have been designed according to requirements of the NBC, Division B, Part 4, article 4.1.8.17 for post-disaster structures.

1.5 QUALITY ASSURANCE

A. Perform metal pre-treatments and fluoropolymer thermal setting enamel coating applicator approved in writing by the manufacturer of the coating and under the supervision of the manufacturer.

B. Have work executed by skilled mechanics.

1.6 WARRANTY

A. Submit manufacturer's two-year warranty for work of this Section against defects in materials and installation including but not limited to:
   1. No condensation on inside face of insulating glass or frame at 40 percent RH at plus 20 degrees C inside and minus 20 degrees C outside.
   2. Maximum acceptable air leakage rate for exterior aluminum framing and interfaces: 0.25 (m^3/h)/m, for fixed glazing under 75 Pa pressure differential. No uncontrolled water leakage under negative pressure 750 Pa.
   3. Loosening of glazing
   4. Water penetration beyond air seal
   5. Fading, discolouration or evidence of other defects of metal finish
   6. Failure of glazing system
   7. Failure of seals or gaskets
   8. Performance failure of any metal component
   9. Joint sealant provided under this Section: Non-staining, adhesion, cohesion and against any other failure
   10. Installation of hardware provided under this Section.

B. Submit manufacturer's five-year warranty against defects in materials and workmanship for insulating glass units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers: Kawneer, Sherwood Windows Ltd., Alumicor Ltd.

B. Sections are based on Kawneer’s sizes and thickness of extrusions and location of thermal break. Other sections will be permitted if they meet the design requirements of the specifications.

2.2 MATERIALS

A. Aluminum:
   1. Aluminum Sections: ASTM B221, alloy AA6063-T5, accurately formed and extruded aluminum free from defects impairing appearance, strength and durability.
   2. Aluminum Sheet: ASTM B209, Alloy 1100-H14 anodizing quality.

B. Miscellaneous Steel: CSA G40.20 hot dip galvanized after fabrication.

C. Screws, Bolts and Fasteners: ASTM A167, #300 Series stainless steel.

D. Polystyrene Insulation: CAN/ULC S701 Type 4, compressive strength 210 kPa, thickness as shown.

E. Mineral Fiber Insulation: CW225 by Owens Corning Canada Inc., or RXL40 by Roxul Inc. Thickness as indicated.

F. Sealant for Glazing: Vision strip by Tremco (Canada) Ltd. Primer: As recommended by sealant manufacturer.

G. Sealants: As specified in Section 07 92 00, Joint Sealants.

H. Backer rod: Closed cell, polystyrene rope, 25 percent oversized.

I. Sealant Tape: Polyshim II by Tremco (Canada) Ltd.

J. Air-seal: Thermo-fusible, 2.2 mm thick min glass reinforced elastomeric membrane Blueskin TG by Bakor Inc., Sopraseal by Soprema Ltd.

K. Isolation Coating: ASTM D1187.

L. Shimming Material: Corrosion resistant metal or plastic.

M. Plywood: CSA 0121, exterior bond, Douglas Fir plywood G1S, preservative treated on all sides and edges.

N. Extruded Sills: 2.4 mm thick aluminum to profiles indicated including cover plates, anchor clips and drip deflectors.

O. Aluminum sill flashing: 1.6 mm thick aluminum, to profiles indicated. Crimp sill as detailed. Raw edges will not the accepted.

P. Miscellaneous Metal Trim Members: 2.4 mm thick aluminum to profiles indicated.

Q. Glazing: As specified in Section 08 80 00, Glazing.

R. Shims, Spacers and Setting Blocks: 45, 50 and 70 Durometer A hardness plus/minus 5 respectively, neoprene rubber. Resistance to oxidation and permanent deformation under load. Sized to suit glass weight.

S. One Part Glazing Gaskets: Extruded neoprene of accepted profile. Gaskets properties: Tensile strength, ASTM D412, 7300 kPa; Durometer A hardness, 50 plus/minus 5; resistance to permanent set, ASTM D395, Method D, 25 percent maximum set; minimum elongation at break, ASTM D412, 300 percent; resistance to ozone, ASTM D1149, showing no cracks. Colour: Black. Reinforced to prevent stretching.

T. Sealant for Heel Bead Air-tight/Gas-tight and Bedding Exterior Glazing: Vision strip by Tremco (Canada) Ltd.

U. Glazing Tape: Polyshim II by Tremco (Canada) Ltd.

V. Ventilator Weatherstripping: Bulb type neoprene weatherstrip.

2.3 COMPONENTS - GENERAL

A. Frames:
   1. Exterior Frames: By Kawneer
      a. Window Frames: Kawneer 1602 Wall, double glazed with thermal break, 50.8 mm wide.
      b. Spandrel Frames: Kawneer 1602 Wall, 50.8 mm wide.
   2. Acoustic Separator: 1.1 mm thick perforated aluminum sound band filled with 72 kg/m glass fiber insulation.

B. Panels in Aluminum Frames: Fabricated of 1.6 mm thick aluminum face sheets on both sides adhered to polystyrene or polyisocyanurate rigid insulation. Wrap edges with face sheet. Thickness 24mm thick.

C. Metal Spandrel Panels: Fabricated of 1.6 mm thick aluminum face sheet, 0.76 mm thick galvanized steel backing sheet and 50 mm thick mineral fibre insulation core. Wrap edges with face sheet.

2.4 FABRICATION

A. Fabricate windows to CAN/CSA A440 - Fixed/B7/C5/I41 (at 20 percent RH) . Form accurate extrusions with clean, straight, sharply defined profiles free from defects.

B. Attach label with rating to CAN/CSA A440 to each window.

C. Fabricate window frames for interior glazing. Fabricate skylight frames for exterior glazing. Fabricate removable lock-in type glazing stops with solid inside face so that glazing material is retained in place.

D. Include fastenings necessary to anchor sections together or to adjacent work.

E. Conceal nuts, bolts, screws, clips and other means of fastening in finished work.

F. Where necessary provide counter-sunk fixing screws Phillips or Robertson Head, flush with adjacent surfaces. Locate screws at removable stops maximum 200 mm o.c. and 50 mm from corners.

G. Corner Construction of Frames: Butt jointed with welds along concealed lines of contact, with inserted spigots, sealed with sealant. Fabricate continuous facings, anchors and angles.

H. Fabricate frames with two drain holes at window sill to exterior.

I. Accurately make window cutouts and recesses by mortising or milling operations required for hardware. Reinforce cutouts and recesses with backing plates.

J. Factory fabricate expansion joint sections with accurately fitted joints.

K. Provide each vent with hardware.

L. Provide insect screens for each operable window/vent and where indicated.

M. Fabricate aluminum sills to profiles indicated.

N. Fabricate panels for frames with face sheets laminated under pressure to insulation core. Enclose and seal edges. Oil canning in face sheets is not acceptable.

O. Fabricate panels with face and backing sheets laminated under pressure to plywood or insulation core. Enclose and seal edges. Oil canning in face sheets is not acceptable. Make provision for concealed fastening. Finish panel to match finish on aluminum frames.

P. Isolate dissimilar metals with isolation coating. Apply to 1.0 mm DFT.

Q. Include aluminum cover plates, trim components, bent plates, closure trim, drips, flashings and other components required to complete installation.

2.5 FINISH

A. Apply finish to aluminum components after fabrication or forming.

B. Fluoropolymer Enamel: PPG Duranar three-coat system Duranar XL 40 microns dry film thickness. Colour to later selection.

PART 3 EXECUTION

3.1 PREPARATION

A. Ensure that openings are within acceptable tolerances.

3.2 INSTALLATION

A. Erect assemblies plumb, true and square, in accordance with manufacturer's printed instructions. Support glazing frames at quarter joints.

B. Accurately fit assemblies to provide air-tight and watertight installation and provide clearance required due to expansion, contraction and deflection of building structures and frames. Anchor units securely to building structure.

C. Installation Tolerances:
   1. vertical position: plus/minus 3 mm
   2. horizontal position: plus/minus 3 mm
   3. deviation from plumb: 3 mm, maximum each plane
   4. racking of face: 6 mm maximum
   5. racking in elevation: nil.

D. Install sills with two-point anchor system, at front and back of sill. Exposed fasteners are not allowed.

E. Install spandrel panels with concealed fasteners at points indicated.

F. Install existing assemblies reclaimed for installation.

G. Fill space between wall and acoustical screen frame with insulation material.

H. Install insect screens such that easy removal for maintenance is attained.

3.3 INSTALLATION - AIR SEAL

A. Install air seal interface. Secure air seal to frame with continuous aluminum bar and to adjacent air and vapour barrier to manufacturer's recommendations. Seal joints in air seal airtight.

3.4 INSTALLATION - GLAZING

A. Size glass units to accurately fit openings. Provide clearances as recommended by glass manufacturer.

B. Mark each lite of glass with large, white cross to indicate presence of glass.

C. Locate and install setting blocks and shims according to glass manufacturer's printed instructions.

D. Clean glass and metal surfaces to present clean, dry, grease and oil free surfaces to receive glazing materials.

E. Glaze at temperatures recommended by manufacturer of glazing materials.

F. Glaze explosion vents with tempered glass.

G. Set channels of insulating glass at least 3 mm within weathertight seal so that edging does not protrude above visual line of glazing stop.

H. Provide air-tight glazing installation using glazing tape and heel bead on interior side.

3.5 INSTALLATION - MISCELLANEOUS METALS

A. Install miscellaneous steel reinforcing of aluminum frames where required.

3.6 APPLICATION - ISOLATION COATING

A. Backpaint aluminum surfaces in contact with concrete, masonry or dissimilar metals with 1.0 mm thick coat of isolation coating.

B. Install steel reinforcing of aluminum frames where required.

3.7 INSTALLATION - HARDWARE

A. Install hardware in accordance with manufacturer's requirements. Adjust hardware as and when required to provide smooth operation of operable units. Ensure clearances are maintained.

B. Lubricant operable units as required to ensure smooth function of hardware consistent with manufacturer's recommendations.

C. Ensure fastening components are tightened. Do not damage or otherwise mar edges or surfaces of hardware components. Repair defects.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 SUBMITTALS

A. Comply with Division 1, General Requirements.

1.3 SUBMITTALS

A. Manufacturer's instructions: Submit three copies of installation and maintenance instructions for each item of hardware.

B. Hardware schedule: Submit schedule indicating hardware and each manufacturer. Include catalogue cuts of each hardware.

C. Submit templates and template information drawings when requested.

1.4 WARRANTY

A. Submit manufacturers' warranty against defects in materials and workmanship for the following items:

Hardware Item	Length of Warranty
Hinges	Lifetime
Locks (Cylindrical)	7 years
Locks (Mortise)	3 years
Keypad Locks	1 year
Exit Devices	3 years
Door closers – mechanical	10 years
Door Operators – Electro mechanical	2 years
Overhead stops/holders	1 year
Floor/Wall stops	1 year
Electric Strikes/Key Switches/Power Supplies	1 year
Electromagnetic Locks	Lifetime

PART 2 PRODUCTS

2.1 GENERAL

A. Manufacturers' catalogue numbers specified, denote quality, style and function of items required.

B. Hardware finish: BMHA symbols as specified. Finish of fastenings: Complementary to related hardware.

C. Hardware for Fire-Rated Openings: Listed by ULC or WHI including Building Code time/temperature rise requirements where required. UL listed hardware is acceptable only where authorities having jurisdiction approve such hardware.

D. Package each item of hardware complete with trim, fastenings and accessories, marked as to contents and appropriate use.

E. Package items of hardware subject to handling when installed, with easily removable protective covering.

2.2 FASTENERS

A. Stainless steel.

2.3 BUTT HINGES

A. Quantity per Door Leaf (Minimum):

Door Height		Hinges
Up to 1500 mm		1 pair
Over 1500 mm to 2310 mm		1-1/2 pair
Over 2310 mm to 3000 mm		2 pairs
Over 3000 mm to 3800 mm		2-1/2 pairs

B. Hinge Height (Minimum):

Door Width		Hinge Height
Up to 900 mm		114 mm
Over 900 mm to 1200 mm		125 mm
Over 1200 mm		150 mm

C. Width: Minimum for clearance of trim and 180-degree swing.

D. Joint Tolerance: 0.03 mm maximum, gauged in closed position.

E. Finish: Satin stainless steel No. 630.

F. For Exterior and Lockable Outswinging Doors: Non-removable pin (NRP).

G. Types and Manufacturers:

No.	Type Description	Stanley	McKinney
H1	Regular weight, two ball-races, full mortise, stainless steel	FBB191-32D	TA2314-32D
H4	Extra heavy-weight, four ball races, full mortise, stainless steel	FBB199-32D	T4A3386-32D
H5	Heavyweight, four ball races, half mortise, stainless steel	FBB98	T4A3384-32D

2.4 LOCKSET AND LATCH SETS

A. Cylindrical or Bored Locks:
1. Trim: Wrought or cold-forged metal knobs and roses.
2. Core Cylinders: Interchangeable, removable; minimum of six pins.
3. Strikes: Lip dimensions to fit configuration of trim.
4. Bolt Throw: 20mm minimum, on latchbolts for pair of doors.
5. Lever Backset: 70 mm.
6. Manufacturers and Products:
   a. Sargent; BC.
   b. Schlage; Plymouth.
   c. Best; 4C Washington.

B. Mortise Locks:
1. Materials: Brass or stainless steel.
2. Trim: Wrought or forged lever handles and roses.
3. Core Cylinders: Interchangeable, removable; minimum of six pins.
4. Bolt Throw: 16 mm minimum.
5. Lever Backset: 70 mm.
6. Manufacturers and Products:
   a. Sargent; LNJ.
   b. Schlage; 03.
   c. Best; 3H Fairbanks.

C. Tactile Warning: Knurl knob backs and lever handles for touch identification.

D. Finish:
1. Satin stainless steel No. 630. Satin chromium-plated No. 626.

E. Locks and Latches: Match existing in manufacturer, design, finish, and keying. No substitutions allowed.

F. Types and Manufacturers:

No.	Type Description	Best	Sargent	Schlage
L1	Mortise entrance lock with lever handle	35H7F3H	8245-LNJ	L9456P-03
L2	Bored, entrance lock with lever handle	35K7AB4C	10G05	
L3	Mortise latch with lever handle	35H0N3H	8215-LNJ	L9010-03
L5	Mortise utility room lock with lever handle	35H7EW3H	8204-LNJ	
L6	Bored, utility room lock with lever handle	35K7D4C	109G04	C80PD
L7	Mortise office lock with lever handle	35H7E3H	8205-LNJ	L9050-03
L8	Mortice privacy lock with lever handle	35H7LF3H	8265-LNJ	L9040-03
L13	Mechanical Pushbutton Security Locks with lever handle from opposite side of door.	Simplex 1000 Series – Knob by Kaba Beyond Security. www.kaba-adsamericas.com/solutions/mechanical-locks-simplex/standard-doors/292844/simplex-1000.html		
L16	Lock by exit device manufacturer; furnish locks, level handle and cylinders, for keying to other locks as required	35H7F3H	8245-LNJ	L9456P-03

G. Recessed strike plates to receive dead bolts.

H. Open back strike for labelled pair of door.

I. 2 point/3 point latch for labelled door.

J. Keying:
1. Lock Cylinders: Operate by a grand master key system that allows for future expansion.
2. Keylocks: Key new locks into existing and as directed by the City.
3. Keys: Two per lock; tag with schedule information.
4. Master Keys: Four; send by registered mail to Contract Administrator.
5. Key cabinet and casework locks into building system.
6. Furnish lock manufacturer's removable core maximum security keying system.

2.5 CONSTRUCTION KEY SYSTEM

A. Removable construction core system for locks.

B. See Article Manufacturer's Services under Part 3, Execution.

C. Assemble permanent cylinders with construction inserts into and ship with all lock sets by registered mail to Contract Administrator.

D. Change Keys: Pack in separately identified envelopes and ship by registered mail to Contract Administrator.

E. Construction Keys: Pack in cartons marked "packing list" and ship by registered mail to Contract Administrator.

F. Construction Insert Extractor Keys, Master Keys, and Grand Master Keys: Ship by registered mail to Contract Administrator.

G. On completion of the job, deliver construction keys to the City.

2.6 MASTER KEY SYSTEM

A. Supply three change keys per lockset and cylinder in addition to required master keys.

B. Key certain locksets alike in groups in addition to master keying.

C. Provide cylinders with six pins minimum, paracentric keyway to match existing.

D. Key cylinders for Master Key system to match existing.

E. Hand over keys to the Contract Administrator.

2.7 EXIT DEVICES

A. Furnish fire exit devices at fire-rated doors.

B. Removable Mullion: By exit device manufacturer.

C. Trim:
   1. Knobs: Sargent PRK; Von Duprin K.
   2. Levers: Sargent ETJ; Von Duprin 03.

D. Finish:
   1. Exit Device: Satin chromium-plated No. 626.
   2. Removable Mullion: Wrought steel or aluminum with prime coat, 980.

E. Types and Manufacturers:

No.	Type Description	VonDuprin	Sargent	Yale
X1	Rim type, Key locks/unlocks Knob (Lever)	Lever: 992L	Lever: 8813 ETJ	
X2	Rim type, Knob/Lever always active	Lever: 992L-BE	Lever: 8815 ETJ	
X4	Concealed Vertical Rod, Key locks/unlocks Knob (Lever)	Knob: 9947K Lever: 9947L	Lever: 8613 ETJ	
X5	Concealed Vertical Rod, Knob/Lever always active	Lever: 9947L-BE	Lever: 8615 ETJ	
X7	Dummy Trim Knob/Lever Rigid (Pull operation only)	Lever: 992L-DT	Lever: 710-DT-ETJ	

2.1 ELECTRIC STRIKE – (ES)

A. In-frame Electric Strike: Von Duprin 6000 Series Model 6100/6200 or Model 700 by Folger Adams Co.; stainless steel finish 6, 12-24V AC factory wrapped electrical connections in heat shrink tubing.

B. Key switch: Model 650-03 by Schlage with lock/unlock light indicator.

C. Power Supplies (PS): Model PS-902-4RL-by Schlage with delay time option. Power supply to be tested and certified to meet UL294, Universal 120-240 VAC input, low voltage 4 amp DC output, 12/24VDC field selectable with jumper, regulated and filtered. Power supply to provide 4 amp high inrush for Von Duprin, Monarch, Doromatic electric latch retraction exit devices. The power supply to be flat mounting design and polarized locking connections for additional option boards specified. Model Von Duprin PS-904.

D. Refer to Division 26 of the Specifications for Electrical work.

2.2 CLOSERS

A. Size closers in accordance with manufacturer's standards.

B. Finish: Satin chromium-plated No. 626.

C. Types and Manufacturers:

No.	Type Description	LCN	Sargent	Norton
C1	Regular arm	4010 Series	350 Series	7500
C2	Parallel arm	4110 Series	350-P Series	PR7500
C3	Regular arm with hold-open	4010H Series	350-H Series	7500IT
C4	Parallel arm with integral stop	4110 Cush-N-Stop Series	350-PS Series	CLP7500
C5	Parallel arm with hold-open	4110H Series	350-PH Series	PR7500H
C6	Parallel arm with integral stop and hold-open	4110H Cush-N-Stop Series	350-PSH Series	CLP-7500T
C11	Parallel arm closer,	4110 Series	350-P Series	PR7500
	And Interlock Magnatic Door Holder with Fire Alarm System	RSG, Semi-Flush, wall mounted, Electromagnetic Door Holder by Simplex. UL, ULC, CSFM Listed and FM Approved. www.simplex-fire.com/en/us/DocumentsandMedia/2088-0014.PDF		

D. Size closer for one standard size larger than actual door size in accordance with manufacturer's recommended standard.

2.3 DOOR STOPS AND HOLDERS

A. Machine Screws: In threaded anchors at concrete or masonry.

B. Self-Tapping Screws: At stud partitions, wood, or metal mountings.

C. Metal Risers: For mounting at carpet floors.

D. Finish: Satin chromium-plated No. 626.

E. Types and Manufacturers for Each Leaf:

No.	Type Description	BBW or GJ	Baldwin
S1	Floor stop	F121X	4086
S2	Wall bumper	WC9X	4031
S7	Heavy-duty overhead stop	GJ79HDS	

2.4 RAINDRIP

A. Raindrip: Zero 11 aluminum mill finish, for exterior side of frame head door by Zero International Inc. Provide raindrip on all exterior doors unless noted otherwise.

2.5 DOOR BOTTOM SWEEP

A. Door bottom sweep: W-13S heavy duty surface mounted anodized extruded aluminum with black solid neoprene seal for each leaf by K.N. Crowder Mfg. Inc. Finish: to match door finish. Provide door bottom sweep for each door location where threshold has not been scheduled.

2.6 BOLTS

A. Finish: Bright nickel No. 645.

B. Types and Manufacturers:

No.	Type Description	Stanley	Lawrence
B1	Top and bottom flush bolts	393-1/2	280

2.7 KICKPLATES

A. Solid metal, not plated. Bevel four edges.

B. Width of door leaf less 37 mm at single leaf and less 25 mm at pairs.

C. Finish: Satin stainless steel No. 630.

D. Types and Manufacturers: Builders Brass Works, Baldwin, or Cipco as follows:
1. K1 250 mm high by 1.27 mm thick.
2. K2 900 mm high by 1.27 mm thick.

2.8 THRESHOLD

A. Thresholds: One-piece full width of opening.

B. Provide with stainless steel self tapping screws in threaded expansion anchors.

C. Finish: Dark bronze anodized aluminum, unless indicated otherwise.

D. Types and Manufacturers:

No.	Type Description	Pemko	Reese	K.N. Crowder
T1	Saddle (smooth, 125 mm x 12 mm)	175A	S104A	CT-10
T2	Half Saddle	227A	S284A	CT-18

No.	Type Description	Pemko	Reese	K.N. Crowder
T3	Thermal break saddle (155 mm x 12 mm)	253X3AFG	S473A	CT-45

2.9 AUTOMATIC DOOR BOTTOM AND GAS-TIGHT SEAL

A. Automatic door bottom (A1): CT-50 by K.N. Crowder Mfg. Ltd. Heavy duty anodized extruded aluminum with closed cell sponge neoprene seal.

2.10 WEATHERSTRIPPING

A. Finish: Dark bronze anodized aluminum, unless indicated otherwise.

B. Seal Types and Manufacturers:

No.	Type Description	Pemko	Reese	KN Crowder
W2	Rubber or vinyl bulb at jambs and head, and at meeting stiles of pairs	S88D	797B	

2.11 SILENCERS

A. Ives, Glynn-Johnson.

B. At metal frame of each hinged door that does not have seals scheduled.

C. Three at single leaves and two at pairs.

2.12 NAMEPLATES

A. Material: Plastic plate; 3 mm thick with beveled edges.

B. Types and Manufacturers: Builders Brass Works, Trimco, and as follows:

N1	50 mm high black plate with 25 mm high white Helvetica medium letters in text noted in Door and Hardware Schedule
N2	Same as N1 with addition of barrier-free pictorial symbol

2.13 TEMPLATES

A. Fabricate to template hardware applied to metal doors and frames.

B. Ensure that required templates are furnished to the various manufacturers for fabrication purposes.

C. Templates: Make available not more than 10 days after receipt of approved Hardware Schedule.

2.14 FIRE RATED DOORS

A. Hardware for Fire Rated Doors: Underwriters Laboratories of Canada, Fire Protection Equipment List.

PART 3 EXECUTION

3.1 MANUFACTURER'S SERVICES

A. Deliver permanent lock core to the Site.

B. Remove temporary construction cores and insert permanent cores.

C. Inspect each lock set to ensure permanent cores are operating satisfactorily.

D. Delivery to the City change and control keys for the permanent system.

E. Return temporary construction cores to the manufacturer.

F. Coordinate electrified hardware with security system provider. Coordinate electrified hardware with Division 26, Electrical.

G. Furnish manufacturer's representative for the following services at Site or classroom as designated by the City, for minimum person-days listed below, travel time excluded:
   1. 2 person-days for installation assistance, inspection, and Manufacturer's Certificate of Proper Installation.
   2. 2 person-days for functional and performance testing.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. CAN/CGSB-12.1-M Tempered or Laminated Safety Glass.
   2. CAN/CGSB-12.2-M Flat, Clear Sheet Glass.
   3. CAN/CGSB-12.3-M Flat, Clear Float Glass.
   4. CAN/CGSB-12.8-M Insulating Glass Units.
   5. CAN/CGSB-12.9-M Spandrel Glass.
   6. CAN/CGSB-12.11 Wired, Safety Glass.

1.3 SUBMITTALS

A. Submit two 100 by 200 mm samples of each type and thickness of glass and mirror specified, fully representing the physical properties of the materials to be supplied.

B. Submit samples of glass and mirror edge finishing for acceptance.

C. Submit three copies of manufacturer's instructions for protection of completed work, for reglazing, and for proper methods and materials to be used in cleaning.

D. Submit two samples of mouldings for mirror.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage:
   1. Support cases on both sides when stored vertically.
   2. After unpacking, place interleaving protection between lites.
   3. Keep glass and interleaving dry by storing inside where temperatures are above dewpoint, or if outside storage is necessary, cover the glass interleaving with opaque tarpaulins or plastic and inspect periodically. Wet interleaving can stain glass.
   4. Avoid exposing stored glass to direct sunlight.

B. Handling:
   1. Stack individual lites on edge and lean them against sturdy uprights at a slope of 5 to 7 degrees from vertical.
   2. Cushion the bottom edges with soft, firm pads free of dirt, grit, glass chips, or other foreign material.

3. Do not rotate or cartwheel insulating glass units over their corners. Use a turning device such as a rolling block if units must be rotated.

1.5 WARRANTY

A. Submit a two-year warranty for the work of this Section against defects in workmanship and materials for a period, except for mirrors. Cracked or scratched glass, shrinking, cracking, staining, hardening, sagging of glazing materials, loosening or rattling of glass will be considered defective work.

B. Submit a ten-year warranty covering spandrel glass coating against adhesion, flaking, peeling, chipping or develop any noticeable colour change.

C. Submit manufacturer's five-year warranty against defects in materials and workmanship for insulating glass units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. PPG Canada Inc./Industrial Control Development Inc. (ICD).

B. Guardian Industries, Corp.

C. Solutia Inc.

D. AFG Glass Inc.

2.2 MATERIALS

A. Glass: Each unit bearing manufacturer's labels indicating quality and thickness. Non-labeled glass will be rejected.

B. Float Glass (F.G.): Type 1, Class A, 6 mm thick clear float, Glazing Quality.

C. Tempered Float Glass (T.G.): Class A, Type I, 6 mm thick clear glass, Glazing Quality B; meeting ANSI Z97.1 and 16 CFR 1201, CI or CII, as applicable; 6 mm minimum thickness.

D. Wire Glass (W.G.): Type II, Class A Form 1, glazing quality, clear float, ULC approved, with 0.50 mm diameter welded wire in square mesh pattern embedded in 6 mm thickness.

E. Tempered Insulating Glass (TIG): Insulating glass units with 12 mm air space, clear tempered glass outboard and clear glass tempered inboard, each sheet 6-mm minimum thickness, Class C, warranted by manufacturer against failure of edge sealing for minimum 5 years from date of manufacture. Provide low emissivity coating on the No. 3 surface. Fill air space with Argon gas.

F. Spandrel Glass (S.G.): Tinted heat strengthened glass, 6-mm thick with factory applied silicone opacifier fused to inner side, as manufactured by:
   1. PPG/Industrial Control Development Inc, (ICD) Opaci-Coat-300.
   2. Approved equal in accordance with B8 product by other listed manufacturers.

G. Tempered Obscure Patterned Glass (T.O.G): Type II, Class A, Form 3, glazing quality, patterned as detailed on one side, 5.5 mm thick.

H. Shims, spacers and setting blocks: 45, 50 and 70 Durometer A hardness plus/minus 5 respectively, neoprene rubber by Goodyear Industrial Products. Resistance to oxidation and permanent deformation under load shall be the prime essentials of shims, spacers and setting blocks. Sized to suit glass weight.

I. One part glazing gaskets: Extruded neoprene of accepted profile. Gaskets properties: Tensile strength, 7300 kPa; Durometer A hardness, 50 plus/minus 5; resistance to permanent set, ASTM D395, Method D, 25 percent maximum set; minimum elongation at break, 300 percent; resistance to ozone, ASTM D1149, showing no cracks. Colour: Black.

J. Sealant for heel bead air-tight/gas-tight and bedding exterior glazing: Vision strip by Tremco Canada Ltd.

K. Glazing tape: Polyshim II by Tremco (Canada) Ltd.

L. Sealant: Compatible with gasket and as recommended by gasket manufacturer.

M. Colors for glazing materials: As selected later and not necessarily standard colours.
   1. Accessories: 1.6 mm stainless steel No. 4 satin finish mirror moldings and concealed fastenings, sized as recommended by manufacturer.

N. All glass must be the product of a single manufacturer.

2.3 FABRICATION

A. Accurately size glass to fit openings allowing the clearance shown on the following tables.
   1. Minimum glass clearances:

Thickness	Edge Clearance	Face Clearance
5 mm and 6 mm	6 mm	3 mm
over 6 mm	6 mm or 3/4 times the glass thickness whichever is the greater	3 mm

2. Bite of glass edge on stop:

Up to 1270 mm united size	6 mm minimum
1270 mm to 2900 mm united size	10 mm minimum
Over 2900 mm united size	13 mm minimum

B. Provide polished and 45 degree arrised edges to frameless surface-mounted mirrors and to exposed edges of other glass edges exposed in the finished work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions at the Site before proceeding with fabrication of glazing units.

B. Verify that openings are free from distortion, and that surfaces are free from protrusions that will obstruct face and edge clearances.

C. Verify that wood is sealed; ferrous metals are painted or zinc coated; and that surfaces are suitable for adhesion of the glazing materials.

D. Verify that movable units to be glazed are adjusted for proper operation.

E. Verify that ambient and surface temperatures are above 5 degrees C.

F. Verify that work to be glazed has been permanently fixed in position.

3.2 PREPARATION

A. Free rabbets, stops and glass edges of dust, dirt, moisture, oil and other foreign matter detrimental to or obstructing the glazing material.

3.3 INSTALLATION - GENERAL

A. Install glass according to material manufacturer's instructions and as specified.

B. Remove and replace glazing stops in original locations, using original fasteners, securely set and undamaged.

C. Use setting blocks and spacers as required to support the glass, centred in place in the glazing space independent of the materials and to uniformly distribute its load. Place setting blocks at 1/4 points. Use a minimum of 2 setting blocks.

D. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top and bottom.

E. Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.

F. Leave labels on glass until it has been set and inspected and accepted. Leave glass whole and without cracks, scratches or other defects and with settings in perfect condition at completion, to the acceptance of the Contract Administrator. Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with perfect materials. Units producing distorted vision will be rejected at the reasonable discretion of the Contract Administrator.

G. Trim glazing material to sight line at stops.

3.4 INSTALLATION - EXTERIOR GLAZING

A. Remove metal stops provided with steel doors and frames.

B. Install single pane glass using glazing tape. Precut glazing tape for each side of glazed opening. Butt corners of glazing tape and seal.

C. Install insulating glass units using glazing tape both sides and spacer shims in accordance with glass manufacturer's printed instructions.

3.5 INSTALLATION - INTERIOR GLAZING

A. Unless otherwise specified, make interior glazing dry glazing.

B. Install extruded channel gasket around entire perimeter of glass. Seal butt joint of gasket at corner of pane.

C. Place the unit into the frames and apply the stops against the gaskets. Tighten the screws or clips to obtain positive, uniform pressure avoiding excessive pressure.

D. Ensure rattle-free cushioning.

E. For fire rated doors, use glazing to meet ULC or WHI listing.

3.6 HOSE TEST

A. Use 20 mm minimum hose without nozzle. With full stream, flood glazing from bottom to top.

B. Correct any leaks disclosed by hose test by reglazing and retesting until eliminated.

3.7 CLEANING

A. Leave glass and glazing in undamaged condition and ready for final cleaning.

B. Remove excess glazing compound from installed glass.

C. Remove labels from glass surface at time of final cleaning.

D. Wash and polish both faces of glass.

3.8 PROTECTION OF COMPLETED WORK

A. Protection:
   1. Keep glass free from contamination by materials capable of staining glass.
   2. Install tape across lights secured to frames or structure.
   3. No tape or marking allowed on glass.

B. Replacements and Repairs:
   1. Prior to Substantial Completion, replace broken, defective, or scratched glass and repair damaged components.

3.9 SCHEDULE OF APPLICATION

A. Tempered Float Glass (T.G.): Interior doors and screens adjacent to doors.

B. Wire Glass (W.G.): Fire rated door assemblies.

C. Tempered Insulating Glass (T.I.G.) – Exterior Doors and windows.

D. Spandrel Glass (S.G.) – Exterior Doors and windows.

END OF SECTION

SECTION 08 90 00

LOUVERS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. AMCA 511 Certified Ratings Program For Air Control Devices.
   2. ASTM A653/A653-M Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
   3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   5. ASTM D1187 Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
   6. ASTM E90 Standard Test Method for Laboratory Measurement of Airbourne Sound Transmission Loss of Building Partitions and Elements.
   7. CAN/CGSB-19.24 Multicomponent, Chemical-Curing Sealing Compound.]CSA G40.20/G40.21General Requirements for Rolled or Welded Structural Quality Steels.
   8. CAN/CSA G164 Hot Dip Galvanizing of Irregular Shaped Articles.
   9. CSA W47.1 Certification of Companies for Fusion Welding of Steel Structures.
   10. CSA W59 Welded Steel Construction (Metal Arc Welding).

1.3 DESIGN REQUIREMENTS

A. Design work of this Section by a Professional Engineer licensed in the Province of Manitoba. Affix professional seal and signature to Shop Drawings for such items.

B. Design louver members and their connections for applicable loads established by the National Building Code of Canada (NBC) for the locality.

C. Design to limit deflection to L/175 of clear span under wind loads for building locality as per National Building Code of Canada, Division B, Appendix C, Climatic and Seismic Information for Building Design in Canada.

D. Design for pressure and suction of wind as calculated in accordance with NBC hourly wind pressure one in 30. Gust effect factor: Minimum 2.5.

E. Design for expansion and contraction of materials as required.

F. Performance Requirements: AMCA 511 certified rating for water penetration and air performance, tested with mill finish and using 0.28 millilitre as the point of beginning water penetration.

1.4 SUBMITTALS

A. Shop Drawings:
   1. Submit Shop Drawings for louvers and vents. Include large scale details of members and materials, anchorage devices where required, reinforcement, fasteners, dimensions, thicknesses, description of materials, metal finishing specifications, and other pertinent information.
   2. Submit Shop Drawings for louvers signed and sealed by Professional Engineer licensed in the Province of Manitoba.

B. Submit three copies of data substantiating structural characteristics of louvers for review prior to fabrication.

C. Submit two 75 mm by 125 mm samples of each finish selected.

1.5 WARRANTY

A. Submit a five-year warranty for the work of this Section against defects in materials and workmanship. Warrant that louver and ventwork is structurally sound and free from distortion; that aluminum finishes will not develop excessive fading or non-uniformity of colour, and will not crack, peel or otherwise corrode.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers:
   1. C-S Group Ltd.
   2. E.H. Price Ltd.
   3. McGill Architectural Products.

B. Louver design and performance characteristics are based on products manufactured by C-S Group Ltd. Louvers by other acceptable manufactures are acceptable provided they meet the design requirements of the specified louvers.

2.2 MATERIALS

A. Aluminum:
   1. Aluminum Extrusions: ASTM B221, Alloy AA6063-T5.
   2. Aluminum Sheet: ASTM B209, Alloy 1100-H14, anodizing quality.

B. Steel: CAN/CSA G40.21 hot-dip galvanized in accordance with CAN/CSA G164. Thread dimensions to be such that nuts will thread over bolts without re-threading or chasing galvanized threads.

C. Steel Sheet: ASTM A653/A653M galvanized not less than 381 g/m² (1.25 oz/sq.ft.) of zinc coating, 0.70 mm.

D. Isolation Paint: ASTM D1187.

E. Butyl Tape: Tremco 440 tape by Tremco Mfg. Co., Weatherban Ribbon Sealer by 3M Inc.

F. Bird Screen: 16 mm mesh, 1.27 mm thick expanded and flattened aluminum secured within 1.40 mm thick extruded aluminum frames. Frames to have mitered corners and corner locks.

G. Insect Screen for Intake: 18 by 16 mesh of 0.279 mm diameter aluminum wire, secured within1.40 mm thick extruded aluminum frame. Frames to have mitered corners and corner locks.

H. Fastenings: Stainless steel.

I. Flashing and Close-off Panels: 1.27 mm thick, aluminum.

J. Galvanizing: CSA G164, minimum Z275. Follow recommended precautions to avoid embrittlement of base metal by overpickling, overheating or during galvanizing.

K. Sealant: Refer to Section 07 92 00, Joint Sealants

L. Cleaning Material: Xylol, Methyl-ethyl-ketone, Toluol or as recommended by sealant manufacturer.

2.3 FABRICATION

A. Fabricate louvers of extruded alloy aluminum, complete with necessary accessories, reinforcement, flashings, fixing devices and integral wind-driven-rain baffle on blades.

B. Fabricate extruded aluminum angles, channels and reinforcement as required to frame and support the louver elements.

C. Fabricate louvers with no intermediate mullions and reinforcement visible on the building exterior; finished appearance of continuous blades housed in a rectangular frame.

D. Fabricate frames with weep holes at maximum 600 mm o.c. and positioned to direct water to building exterior.

E. Fabricate frames with allowance for expansion at jambs and at maximum 6000 mm o.c.

F. Louvers: Fixed horizontal storm resistant louver Model RS-7705 by C-S Group.
   1. Frame 177.8 mm deep, minimum 2.06 mm thick.
   2. Full depth sill flashing 101.6 mm high, formed from 1.27 mm thick aluminum, with welded side panels.
   3. Continuous 38 mm by 38 mm fixing angle at jambs and head.
   4. Stainless steel fasteners.
   5. Minimum free area: 50.5 percent for nominal 1220 mm by 1220 mm louver.

G. Louvered Penthouse: Fixed horizontal storm resistant louver Model RS-7705 by C-S Group.
   1. Frame 177.8 mm deep, minimum 2.06 mm thick.
   2. Full depth sill flashing 101.6 mm high, formed from 1.27 mm thick aluminum, with welded side panels.
   3. Continuous 38 mm by 38 mm fixing angle at jambs and head.
   4. Stainless steel fasteners.
      1. Minimum free area: 50.5 percent for nominal 1220 mm by 1220 mm louver
      2. Structural supports to be designed to by penthouse manufacturers to carry a wind load of not less than 957 Pa and a roof snow load of not less than 1436 Pa.
      3. Roof:
         a. 2.06 mm thick Weatherproof aluminum sheet reinforced with structural supports.
         b. Underside of roof insulated with minimum 6.4 mm insulation and sound deadener.
         c. Removable roof assembly for access.
         d. Continuously heliarc welded at the corners.
      4. Fasteners to be stainless steel.
      5. Penthouse shall have weatherproof roof of 2.06mm thick sheet aluminum reinforced with structural supports. All roof corners to be heliarc welded.
      6. Furnished with 12.7mm mesh, 1.6mm diameter wire intersrimp bird screen secured in removable extruded aluminum frames

H. Blank-off Panel: 38 mm thick glass fibre insulation 48 kg/m³, laminated on both sides with 1.27 mm thick aluminum sheet. Finish exterior and interior sheet: To match louver finish. Wrap panel edges with face sheet.

2.4 FINISH

A. Three Coat Pearlescent Fluorcarbon Coating:
   1. 70 percent resin, 3 coat Fluorpolymer coating.
   2. Coating thickness: minimum 35 microns.
   3. Colour: to later selection from manufacturer’s premium colour range.

PART 3 EXECUTION

3.1 INSTALLATION

A. Submit templates and instructions where fastenings or anchors have to be built in under the work of other Sections. Verify dimensions on Site before preparing drawings or proceeding with shop work.

B. Fasten louver to supporting structure plumb, level, true and secure, and in accordance with louver manufacturer's instructions. Make allowances for deflection of building structure and adjacent building components to prevent damage. Perform drilling of concrete and masonry necessary to anchor components.

C. Install sill extension at sill.

D. Close off unused portions of louver area from inside using blank-off panels securely fixed to frames.

E. Touch up shop primer coat with same primer after louvers are installed.

END OF SECTION