

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1    Electric elevator system.
- .2    Passenger cabs with doors and frames; hoistway entrance doors and frames.
- .3    Machines, controllers, hoistway equipment, and accessories.

**1.2                RELATED SECTIONS**

- .1    Section 03 30 00 - Cast-in-place Concrete.
- .2    Section 05 12 00 - Structural Steel.
- .3    Section 05 50 00 - Metal Fabrications
- .4    Section 09 65 10 - Resilient Flooring.
- .5    Division 22 – Plumbing.
- .6    Division 23 – Heating, Ventilating and Air-Conditioning (HVAC).
- .1    Division 26 – Electrical.

**1.3                REFERENCES**

- .1    APA (American Plywood Association) Product Guide - Grades and Specifications.
- .2    ASTM A36/A36M - Carbon Structural Steel.
- .3    ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .4    ASTM A1008M - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Allow with Improved Formability.
- .5    ASTM A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .6    ASTM B221M - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
- .7    ASME A17.1/CSA-B44 - Safety Code for Elevators and Escalators (Bi-National Standard with ASME A17.1).
- .8    CAN/CSA-B44.1/ASME-A17.5 - Elevator and Escalator Electrical Equipment.
- .9    NFPA 80- Fire Doors and Fire Windows.

**1.4                SYSTEM DESCRIPTION**

- .1    Electric Elevator System: One (1) KONE EcoSpace series gearless traction elevator application..
- .2    Characteristics of elevator are as follows:
  - .1    Equipment Control: KCM 831 Control System.
  - .2    Drive: Regenerative
  - .3    Rated Net Capacity: 3000 lbs.
  - .4    Rated Speed: 0.75m/s.

- .5 Number of Stops: 2.
  - .6 Number of Openings: 2 Front.
  - .7 Car Inside Dimensions: 2032x1524 mm.
  - .8 Cab Height: 2440 mm.
  - .9 Hoistway and Cab Entrance Frame Opening Sizes: 1067x2134 mm.
  - .10 Operation:
    - .1 Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served
  - .11 Door Operation:
    - .1 Closed loop operator for hoistway and car. Opening and closing speed to suit handicapped requirements.
    - .2 Centre opening.
  - .12 Levelling Device: Stop elevator within 6 mm under any loading condition or direction of travel.
  - .13 Main Power Supply: 575 Volts, 3 Phase, 60 Hz.
  - .14 Lighting Power Supply: 120 Volts, 1 Phase, 15 Amp, 60 Hz.
  - .15 Machine Location: Inside the hoistway at the top of the hoistway.
  - .16 Controller Location: Controller(s) shall be located adjacent to the hoistway at the bottom landing in a control room.
- .3 Door Control Features:
- .1 Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
  - .2 Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
  - .3 Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening. Under normal operation and for any door position, the system shall detect as a blockage an opaque object that is equal to or greater than 1.3 inches (33 mm) in diameter when inserted between the car doors at vertical positions from within 1 inch (25 mm) above the sill to 71 inches (1800 mm) above the sill. Under degraded conditions (one or more blocked or failed beams), the primary protection shall detect opaque objects that are equal to or greater than 4" (100 mm) in diameter for the same vertical coverage. If the system performance is degraded to the point that the 4" object cannot be detected, the system shall maintain the doors open or permit closing only under nudging force conditions.
  - .4 Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.
- .4 Interconnect elevator control system with building fire alarm.

- .5 Independent Service: Key-activated service to remove and return car from normal operation and cancel all pre-registered car calls.

## **1.5 ADMINISTRATIVE REQUIREMENTS**

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination:
  - .1 Coordinate with other work having a direct bearing on work of this section.
  - .2 Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items to be embedded in concrete or masonry.
  - .3 Provide templates, sleeves, elevator equipment with integral anchors, and installation instructions in time for installation.

## **1.6 SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data on the following items:
  - .1 Signal and operating fixtures, operating panels, indicators.
  - .2 Cab design, dimensions, layout, and components.
  - .3 Cab and hoistway door and frame details.
  - .4 Electrical characteristics and connection requirements.
- .3 Shop Drawings: Indicate the following information:
  - .1 Driving machine, controller, selector, governor and other component locations.
  - .2 Car, counterweight, sheaves, machine and sheave beams, guide rails, buffers, ropes, and other components in hoistway.
  - .3 Individual weight of principal components; load reaction at points of support.
  - .4 Loads on hoisting beams.
  - .5 Location of components in machine room.
  - .6 Locations in hoistway and machine room of traveling cables and connections for car light and telephone.
  - .7 Location and sizes of access doors, doors, and frames.
  - .8 Expected heat dissipation of elevator equipment in machine room.
  - .9 Interface with building security system.
  - .10 Electrical characteristics and connection requirements.

## **1.7 CLOSEOUT SUBMITTALS**

- .1 Section 01 78 10: Submission procedures.
- .2 Maintenance Contracts:
  - .1 Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.
- .3 Operation and Maintenance Data: Provide manufacturer's standard operations and maintenance manual

## **1.8 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Section 01 78 40: Maintenance and extra material requirements.

- .2 Extra Stock Materials: Supply two (2) extra keys.

### **1.9 QUALITY ASSURANCE**

- .1 Perform Work in accordance with CSA-B44, CAN/CSA-B44.1, CSA-W55.3, CSA-C22.1, and as supplemented in this section.
- .2 Fabricate and install door and frame assemblies in accordance with NFPA 80.
- .3 Installer: Employees and supervisor on payroll of elevator equipment manufacturer.

### **1.10 REGULATORY REQUIREMENTS**

- .1 Conform to applicable code for manufacture and installation of elevator system.
- .2 Accessibility Requirements: CAN/CSA-B44.1 Appendix B .
- .3 Products Requiring Electrical Connection: Listed and classified by ULC testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

### **1.11 WARRANTY**

- .1 Provide a one (1) year warranty to include coverage for failure to meet specified requirements, including coverage for elevator operating equipment and devices.

### **1.12 MAINTENANCE SERVICE**

- .1 Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.
- .2 If the building location is not near elevator service facilities, maintenance should be specified to be carried out at specific intervals (ie: quarterly etc.) depending upon anticipated usage.
- .3 Examine system components quarterly. Clean, adjust, and lubricate equipment.
- .4 Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.
- .5 Perform work without removing cars during peak traffic periods.
- .6 Provide emergency call back service at all hours for this maintenance period.
- .7 Maintain locally, near the Place of the Work, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- .8 Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.
- .9 Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the City.

**Part 2 Products**

**2.1 MANUFACTURERS**

- .1 KONE Elevator Company Model EcoSpace Series. with AC gearless machine using embedded permanent magnets mounted the top of the hoistway and standard steel wire ropes for elevator hoisting purposes.

**2.2 MATERIALS**

- .1 Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- .2 Sheet Steel: ASTM A1008/A1008M, with commercial bright finish. ASTM A653/A653M, zinc coated to Z275 .
- .3 Stainless Steel: ASTM A167, No. 4 finish.
- .4 Aluminum: ASTM B221M, extruded.
- .5 Plywood: APA Structural I, Grade C-D , sanded.

**2.3 FINISH MATERIALS**

- .1 Shop and Touch-Up Primer on Steel Surfaces: manufacturer's standard.
- .2 Primer for Wood Surfaces: Alkyd primer sealer.

**2.4 EQUIPMENT: CONTROL ROOM COMPONENTS**

- .1 Controller: A microcomputer based control system shall be provided to perform all of the functions of safe elevator operation. The system shall also perform car and group operational control.
  - .1 All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
  - .2 Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller.
  - .3 Field conductor terminations points shall be segregated; high voltage (30 volts DC and 110 VAC,) and low voltage ( 30 volts DC)
  - .4 Controllers shall be designed and tested for Electromagnetic Interference (EMI) immunity according to the EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
- .2 Drive: A Variable Voltage Variable Frequency AC drive system shall be provided. The drive shall be set up for regeneration of AC power back to the building grid.

**2.5 MACHINE AND GOVERNOR**

- .1 Machine: AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.
- .2 Governor: The governor shall be a tension type governor with remote reset. No access panel allowed.
- .3 Buffers, Car and Counterweight: Compression spring type buffers shall be used to meet code.

- .4 Hoistway Operating Devices:
  - .1 Emergency stop switch in the pit.
  - .2 Terminal stopping switches.
- .5 Positioning System: Consists of an encoder, reader box, and door zone vanes.
- .6 Guide Rails and Attachments: Guide rails shall be Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.
- .7 Standard Steel Wire ropes.
- .8 Governor Rope: Governor rope shall be steel and shall consist of at least eight strands wound about a sisal core center.
- .9 Hoistway Entrances:
  - .1 Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
  - .2 Sills shall be extruded aluminum.
  - .3 Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
  - .4 Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour.
  - .5 Entrance Finish: Stainless Steel #4; 166 ga. thick metal, of hollow sandwich panel construction, flush design, rolled profiles, rigid construction.
  - .6 Entrance marking plates: Entrance jambs shall be marked with 102 mm x 102 mm plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.

## **2.6 CAR COMPONENTS**

- .1 Car frame and Safety: A car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosures. The car safety shall be integral to the car frame and shall be Type "B", flexible guide clamp type.
- .2 Steel Cab with flush wall with naural aluminum colour trim pieces between panels, plastic laminate selected from standard manufacturer's catalogue of choices.
- .3 Car Front Finish: satin stainless steel with #4 finish.
- .4 Car Door and frame Finish: satin stainless steel with #4 finish.
- .5 Canopy: steel canopy.
- .6 Ceiling Type: drop stainless steel ceiling with LED light fixtures.
- .7 Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
- .8 Emergency Pulsating Siren: Siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged. Siren shall have a rated sound pressure level of 80 dB(A) at a distance of 10 feet from the device. Siren shall respond with a delay of not more than 1 second after the switch or push button has been pressed.

- .9 Fan: A variable speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. A key switch shall be provided in the car-operating panel to control the fan.
- .10 Handrail: Handrails shall be provided on the side and back walls of the car enclosure. Handrails shall be 13mm x 38mm flat satin stainless steel handrail.
- .11 Threshold: aluminum.
- .12 Roller Guides: Rubber roller guides shall be mounted on the top and the bottom of the car. The counterweight shall be slide type guides at the top and the bottom.
- .13 Platform: The car platform shall be constructed of composite plywood. Load weighing device shall be mounted on the belts at the top of the hoistway.
- .14 Certificate frame: Provide a Certificate frame.
- .15 Protective pad hooks and quilted fire retardant protective pads: Pads to be hung from suspended ceiling.

## 2.7 SIGNAL DEVICES AND FIXTURES

- .1 Car Operating Panel: A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a satin stainless steel finish.
  - .1 Vandal- Resistant Fixtures: Applied car operating panel shall be furnished. It shall contain a bank of round mechanical illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served, an emergency call button, door open and door close buttons, and switches for lights, inspection and the exhaust fan. The emergency call button shall be connected to a bell that serves as an emergency signal. All buttons to have raised numerals and Braille markings. Red LED in center of button for illumination with Flat Flush targets. Target finishes: satin stainless steel.
  - .2 The car operating panel shall be equipped with the following features:
    - .3 Standard:
      - .1 Raised markings and Braille shall be provided to the left hand side of each push-button
      - .2 Car Position Indicator at the top of and integral to the car operating panel.
      - .3 Door open and door close buttons.
      - .4 Light key-switch.
      - .5 Fan key-switch.
      - .6 Inspection key-switch.
      - .7 Elevator Data Plate marked with elevator capacity and car number.
      - .8 Illuminated alarm button with raised markings.
      - .9 Firefighter's Phase II Key-switch.
      - .10 Hands free emergency phone.
  - .2 Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation.

- .1 Hall fixtures shall feature round mechanical buttons in flush mount face frame with vandal resistant buttons. Buttons shall be 1/8" projecting in vertically mounted fixture. Fixture shall be satin stainless steel finish.
- .2 Select finish: satin stainless steel or satin bronze or mirror stainless steel or mirror bronze finish.
- .3 Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.
- .3 Access key-switch at top floor.
- .4 Access key-switch at lowest floor.

## **2.8 FINISHES**

- .1 Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- .2 Galvanized Surfaces: Clean with neutralizing solvent; prime one coat. two coats.
- .3 Aluminum: Clear anodized Mill finish.
- .4 Wood Surfaces not Exposed to Public View: One coat primer; one coat two coats enamel.
- .5 Baked Enamel on Steel: Clean and degrease metal surface; apply one coat of primer sprayed and baked; two coats of enamel sprayed and baked; colour as selected.
- .6 Stainless Steel: #4 Satin .

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verify existing conditions before starting work.
- .2 Verify that hoistway, pit, and machine room are ready for work of this section.
- .3 Verify hoistway shaft and openings are of correct size and within tolerance.
- .4 Verify location and size of machine foundation and position of machine foundation bolts.
- .5 Verify that electrical power is available and of the correct characteristics.

### **3.2 PREPARATION**

- .1 Arrange for temporary electrical power for installation work and testing of elevator components.

### **3.3 INSTALLATION**

- .1 Install in accordance with CSA-B44, CAN/CSA-B44.1, CSA-W55.3.
- .2 Install system components. Connect equipment to building utilities.
- .3 Provide conduit, boxes, wiring, and accessories.



- .4 Accurately machine and align guide rails. Form smooth joints with machined splice plates.
- .5 Coordinate installation of hoistway wall construction.
- .6 Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
- .7 Adjust equipment for smooth and quiet operation.

**3.4 ADJUSTING**

- .1 Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- .2 Adjust automatic floor levelling feature at each floor to achieve ¼" from flush.

**3.5 CLEANING**

- .1 Section 01 74 00: Cleaning installed work.
- .2 Remove protective coverings from finished surfaces.
- .3 Clean surfaces and components ready for inspection.

**3.6 PROTECTION OF FINISHED WORK**

- .1 Section 01 78 40: Protecting installed work.
- .2 Do not permit construction traffic within cab after cleaning.

**END OF SECTION**

