

PART 1 - GENERAL

1.1 GENERAL

- .1 Comply with requirements of Division 1.

1.2 RELATED WORK

- 1. Section 03 30 00 - Cast-In-Place Concrete.
- 2. Section 04 22 00 – Concrete Unit Masonry.
- 3. Section 05 50 00 - Metal Fabrications.
- 4. Section 09 65 17 – Resilient Sheet Flooring.
- 5. Division 23 - Heating, Ventilating, and Air Conditioning.
- 6. Division 26 - Electrical.
- 7. Division 27 – Communications.

1.3 REFERENCES

- 1. American National Standards:
 - .1 ANSI/NEMA MG1-2003, Motors and Generators.
- 2. Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.1, Canadian Electrical Code.
 - .2 CAN/CSA-B44-00, Safety Code for Elevators and Escalators.
 - .3 CAN/CSA-B651-2004, Accessible Design for the Built Environment.
- 3. Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- 4. National Building Code of Canada (NBCC), 2010 edition.

1.4 SYSTEM DESCRIPTION

- .1 Equipment Description: electric, gearless, machine-room less elevator where all components fit inside the hoistway.
- .2 Design and construct elevator in accordance with CSA-B44, local codes and regulations.
- .3 Equipment Control: Control System.
- .4 Drive: Regenerative
- .5 Quantity of Elevators: one (1).
- .6 Elevator Stop Designations: (3).
- .7 Stops: three (3).
- .8 Openings: front opening, in line.
- .9 Travel (maximum): 8.0 M. (from basement floor to second floor)
- .10 Rated Capacity: 2500 lb.
- .11 Rated Speed: 150 fpm.

- .12 Platform Size: 2100mm
- .13 Clear Inside Dimensions: as noted on drawings.
- .14 Cab Height: to manufacturer's standard but not less than 2362mm.
- .15 Clear Cab Height: 2362 mm with 3 mm floor recess and standard ceiling.
- .16 Entrance Type and Width: Single-Slide Door, 1067 mm.
- .17 Entrance Height: 2134 mm.
- .18 Main Power Supply: 600 Volts + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
- .19 Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- .20 Machine Location: Inside at top of hoistway.
- .21 Signal Fixtures: Manufacturer's standard with metal button targets (exc. CA).
- .22 Controller Location: Machine-Room Less Controller(s) located at the front opening of the top terminal landing in entrance frame.
- .23 Performance:
 - 1. Car Speed: $\pm 3\%$ of contract speed under any loading condition or direction of travel.
 - 2. Car Capacity: Safely lower, stop and hold up to 120% of rated load. (code required).
 - 3. Ride Quality:
 - .1 Vertical Vibration (maximum): 20 milli-g.
 - .2 Horizontal Vibration (maximum): 12 milli-g.
 - .3 Vertical Jerk (maximum): $1.4 \pm 0.3 \text{ m/sec}^3$.
 - .4 Acceleration/Deceleration (maximum): 0.8 m/sec^2 .
 - .5 In Car Noise: 55 – 60 dB(A).
 - .6 Stopping Accuracy: 10 mm max, $\pm 6 \text{ mm}$ Typical.
 - .7 Re-leveling Distance: $\pm 12 \text{ mm}$.
- .24 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.
- .25 Standard Operating Features to include:
 - 1. Full Collective Operation.
 - 2. Anti- nuisance.
 - 3. Fan and Light Protection.
 - 4. Load Weighing Bypass.
 - 5. Independent Service.
 - 6. Full Collective Operation.
 - 7. Special Emergency Service Phase I and II – Emergency Recall and In-Car Emergency Operation.
 - 8. Top of Car Inspection.
- .26 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. Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
 - .3 Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

- .27 Seismic Design Criteria:
 - .1 Design and assemble elevator equipment and components to withstand earthquake forces in accordance with National Building Code of Canada 2010 seismic zone requirements for Dartmouth, Nova Scotia, Canada.

1.5 ACTION AND INFORMATION SUBMITTALS

- .1 Provide all required submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:
 - 1. Signal and operating fixtures, operating panels and indicators.
 - 2. Cab design, dimensions and layout.
 - 3. Hoistway-door and frame details.
 - 4. Electrical characteristics and connection requirements.
 - 5. Expected heat dissipation of elevator equipment in hoistway (BTU).
 - 6. Color selection chart for Cab and Entrances.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate project layout, including details and the following information:
 - .1 Size and location of machine and controller.
 - .2 Size and location of elevator car, hoisting beam, guide rails, buffer stand, pit ladder and other components in hoistway.
 - .3 Rail bracket spacing and maximum loads on guide rails.
 - .4 Reactions at points of support.
 - .5 Weights of principal components.
 - .6 Top and bottom clearance and over travel of elevator car.
 - .7 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
 - .8 Location in hoistway(s), machine room for connection of travelling cables for elevator car light, and telephone.
 - .9 Location and size of access doors.
 - .10 Loads on hoisting beams.
 - .11 Expected heat generation of equipment.
 - .12 Seismic design data.
 - .2 Each shop drawing submitted shall bear stamp of qualified Professional Engineer registered in Nova Scotia. Include on general arrangement drawings:
 - .1 Type, size, location of hoistway entrances showing details of fastening to hoistway structure.
 - .2 Detailed seismic calculations.
 - .3 Provide wiring diagrams.

- .4 Samples:
 - .1 Submit two samples, complete with colour schemes, 300 x 300 mm in size, illustrating: floor material, car interior, car ceiling, car door, hoistway entrance door and frame finishes.
 - .2 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Instructions: submit manufacturers installation instructions.
 - .5 Manufacturers Field Services: submit copies of manufacturers field reports.
- .5 Closeout Submittals:
 - .1 Submit the following in accordance with Section 01 78 00 - Closeout Submittals.
 - .1 Project Record Documents: record actual locations of equipment, names of equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects.
 - .2 Operation and Maintenance Data:
 - .1 Include description of elevator system's method of operation and control including motor control system, door operation, signals, emergency power operation, and special or non-standard features provided.
 - .2 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
 - .3 Legible schematic wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
 - .4 Instruct Departmental Representative in maintenance of special finishes.
 - .3 Manufacturers extended warranty: submit for Departmental Representative's acceptance, manufacturers extended warranty document executed by authorized company official.

1.6 QUALITY ASSURANCE

- .1 Health and Safety: Do construction occupational health and safety in accordance with Section 01 35 29 – Health and Safety Requirements.
- .2 Installer Qualifications: the company and persons installing the passenger elevators shall be experienced in performing work similar to that required for this Project and be approved by elevator systems manufacturer.

- .3 Must be the manufacturer of the power unit, controller, signal fixtures, door operators, cab, fixtures, and all other major parts of the elevator operating equipment and shall meet the following requirements:
 - .1 The major parts of the elevator equipment shall be from one manufacturer and not be an assembled system.
 - .2 The manufacturer shall have a documented, on-going quality assurance program.
 - .3 The manufacturer shall be ISO-9001:2000 Manufacturer Certified.
- .4 Inspection and Testing: Include in tender all costs for required inspections, tests, permits and fees for elevator installation.
 - .1 Arrange for inspections and make required tests.
 - .2 Contractor shall deliver to Departmental Representative the results of all inspections and tests performed on or relating to the passenger elevator.
 - .3 Elevator Inspector to confirm and certify to elevator manufacturer the sump pump performance to meet the elevator company's performance requirements.

1.7 PRE-INSTALLATION MEETING

- .1 Convene pre-installation meeting two weeks prior to start of work of this Section in accordance with Section 01 14 10 – Scheduling and Management of Work.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's written installation instructions and warranty requirements.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle all materials, components for the Work of this Section in accordance with Section 01 61 00 – Common Product Requirements and written requirements of elevator manufacturer.
- .2 Packing, Shipping, Handling and Unloading: deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .3 Storage and Protection: store materials protected from exposure to weather conditions and as temperature conditions required by manufacturer.

1.9 EXTENDED WARRANTY

- .1 For elevator materials, components and systems, the 12 month manufacturer's is extended to 36 months.
 - .1 Warranty to cover defective material and workmanship for the stated warranty period commencing from the date of Substantial Performance of the Work.

1.10 MAINTENANCE AND SERVICE

- .1 Furnish complete service and maintenance of elevator system components during elevator extended warranty period.
- .2 Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor after the elevator has been turned over to Departmental Representative.
- .3 This service shall not be subcontracted but shall be performed by the elevator contractor.
- .4 All work shall be performed by competent employees during regular working hours of regular working days.
- .5 This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.
- .6 The periodic lubrication of elevator components shall not be required, including: Sheaves, Rails, Belts, Ropes, Car and CWT guides, etc
- .7 The elevator control system must:
 - .1 Provide in the controller the necessary devices to run the elevator on inspection operation.
 - .2 Provide on top of the car the necessary devices to run the elevator in inspection operation.
 - .3 Provide in the controller an emergency stop switch. This emergency stop switch when opened disconnects power from the brake and prevents the motor from running.
 - .4 Provide in the event of a power outage, means from the controller to electrically lift and control the elevator brake to safely bring the elevator to the nearest available landing.
 - .5 Provide the means from the controller to reset the governor over speed switch and also trip the governor.
 - .6 Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
- .8 Provide system capabilities to enable a remote expert to create a live, interactive connection with the elevator system to enable the following functions:
 1. Remotely diagnose elevator issues with a remote team of experts
 2. Remotely return an elevator to service
 3. Provide real-time status updates via email

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4. Remotely make changes to selected elevator functions including:
 - .1 Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak/down peak mode, activate independent service
 - .2 Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)
 - .3 Improve passenger experience: Extend door open times, change parking floor, activate auto car full, activate anti-nuisance, advance door opening, door nudging, extend specific floor extended opening time, release trapped passengers

PART 2 - PRODUCTS

2.1 DESIGN AND SPECIFICATIONS

- .1 Provide electrically operated, machine-roomless traction passenger elevator from following acceptable manufacturers:
 - .1 Gen2 Gearless Machine-Roomless Elevator, by Otis Elevator Company.
 - .2 Schindler 3300 MRL Traction Elevator, by Schindler Corporation.
 - .3 Synergy 85S, Machine Roomless Traction Elevator, by ThyssenKrupp Elevator.
- .2 The system shall consist of the following components:
 - .1 Controller located entirely inside the hoistway. No extra machine room or control closet space required.
 - .2 An AC gearless machine using embedded permanent magnets mounted at the top of the hoistway.
 - .3 Polyurethane Coated-Steel Belts for elevator hoisting purposes.
 - .4 Regenerative drive that captures normally wasted energy and feeds clean power back into the building's power grid.
 - .5 LED lighting standard in ceiling lights and elevator fixtures.
 - .6 Sleep mode operation for LED ceiling lights and car fan.

2.2 CONTROLLER COMPONENTS

- .1 Controller: Microcomputer based control system to perform all 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 shall be protected from accidental contact when 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).

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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"
5. Controller shall be located inside the wall next to the top landing entrance frame. Emergency access shall be provided through an access panel in the entrance frame secured by a key lock.
6. A separate control room or cabinet should not be required.

- .2 Drive: Variable Voltage, Variable Frequency, AC drive system. The drive shall be set up for regeneration of AC power back to the building grid.

2.3 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 car-mounted governor.
- .3 Buffers, Car and Counterweight: Polyurethane type buffers shall be used.
- .4 Hoistway Operating Devices:
 1. Emergency stop switch in the pit
 2. Terminal stopping switches.
- .5 Positioning System: Consisting of 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 Coated-Steel Belts:
 - .1 Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords and flat profile on running surface and backside of belt.
 - .2 All driving sheaves and deflector sheaves to have crowned profile to ensure center tracking of the belts.
 - .3 Continuous (24/7) monitoring system to monitor integrity of coated steel belts and provide advanced notice of belt wear.
- .8 Governor Rope: Steel rope consisting of at least eight strands wound about a sisal core center.
- .9 Fascia: Galvanized sheet steel at front of the hoistway.
- .10 Hoistway Entrances:
 1. Frames: Entrance frames of bolted construction for complete one-piece unit assembly.
 2. Frames to be securely fastened to fixing angles mounted in the hoistway and to be of UL fire rated steel.
 3. Sills: Extruded aluminum.

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4. Doors: Entrance doors of metal construction with vertical channel reinforcements.
5. Fire Rating: Entrance and doors shall be UL fire rated to match hoistway rating (45 min.)
6. Entrance Finish: satin finish stainless steel
7. Entrance marking plates: Entrance jambs shall be marked with 4" x 4" (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.
8. Sight Guards: Black sight guards will be furnished with all doors.

.11 Elevator Pit Ladder: By Section 05 50 00 – Metal Fabrications.

2.4 CAR COMPONENTS

- .1 Car Frame and Safety: Provide car frame fabricated from formed or structural steel members with adequate bracing to support platform and car enclosures. Car safety shall be integral to car frame.
- .2 Cab:
 - .1 Standard Cab Options:
 - .1 Steel Shell Cab with laminated vertical removable panels
 - .2 Paints and laminate to be selected from standard manufacturer's catalog of choices.
 - .3 Brushed Stainless Steel finished base plate located at top and bottom
 - .2 Car Front Finish: Satin Stainless Steel.
 - .3 Car Door Finish: Satin Stainless Steel.
 - .4 Ceiling Type:
 - .1 Standard Flat steel ceiling; colour "white" with 4 LED lights.
- .3 Emergency Car Lighting: Emergency power unit employing 6-volt sealed rechargeable battery and static circuits to be provided to illuminate elevator car in the event of building power failure.
- .4 Fan: One-speed 120 VAC fan mounted to ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. Fan to be rubber mounted to prevent transmission of structural vibration and to include baffle to diffuse audible noise. Provide switch in car-operating panel to control fan.
- .5 Handrail: Provide handrails on rear wall of the car enclosure.
 - .1 Handrails to be 9.5 mm x 51 mm flat tubular handrail with a Brushed Steel Finish.
- .6 Threshold: Extruded Aluminum, clear anodized.
- .7 Emergency Exit Contact: Electrical contact to be provided on car-top exit.

- .8 Guides: The car shall have 75mm diameter roller guides at top and bottom and the counterweight shall have slide type guides at the top and the bottom.
- .9 Platform: to be constructed of metal. Load weighing device to be mounted on belts at top of hoistway. Floor finish (LINO-1) by Section 09 65 16.
- .10 LED ceiling lights and fan should automatically shut off when system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.5 SIGNAL DEVICES AND FIXTURES

- .1 Car Operating Panel: A car operating panel to be provided which contains all push buttons, key switches, and message indicators for elevator operation. Car operating panel to have satin stainless steel finish.
- .2 Standard car operating panel to contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with:
 - .1 Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo.
 - .2 The car operating panel to be equipped with the following features:
 - .1 Raised markings and Braille to the left hand side of each push-button.
 - .2 Car Position Indicator at top of and integral to the car operating panel.
 - .3 Door open and door close buttons.
 - .4 Inspection key-switch.
 - .5 Elevator Data Plate marked with elevator capacity and car number.
 - .6 Help Button: The help button will initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available to take appropriate action. Visual indicators are to be provided for call initiation and call acknowledgement.
 - .7 Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
- .3 Car Position Indicator: Digital, LED car position indicator integral to the car operating panel.

- .4 Hall Fixtures: Hall fixtures to be provided with necessary push buttons and key switches for elevator operation.
 - .1 Standard Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face. Therefore, separate wiring and installation of electrical boxes inside the wall for the hall buttons are not required. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel finish.
 - .2 Buttons: Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo.
- .5 Car Lantern and Chime: directional lantern visible from corridor to be provided in the car entrance. When car stops and doors are opening, lantern shall indicate the direction in which car is to travel and sound a chime.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for the Work of this Section in accordance with manufacturer's written instructions.
- .3 Visually inspect substrate in presence of Departmental Representative.
- .4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions, and data sheet.

3.3 INSTALLATION

- .1 Install hoistway, machine room, and all other elevator materials and components in accordance with CSA-B44, Applicable Laws and manufacturer's written instructions.

3.4 DEMONSTRATION AND ADJUSTMENTS

- .1 The elevator contractor shall make a final check of each elevator operation with the Departmental Representative present prior to turning each elevator over for use.

- .2 The elevator contractor shall determine that control systems and operating devices are functioning properly.
 - .1 Adjust elevator door opening and closing times to suit handicapped users in accordance with Departmental Representative's instructions.
 - .2 Adjust control system to cause elevators to answer hall calls during working day within performance criteria specified.

3.5 FIELD QUALITY CONTROL

- .1 Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work set out in this section.
- .2 Obtain reports, within 3 days of review, and submit, immediately, to Departmental Representative.

3.6 SITE TESTS

- .1 Perform and meet tests required by CSA-B44.

3.7 CLEANING

- .1 Remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components ready for inspection.

END OF SECTION