

## **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 16 – 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 MG1-2011, Motors and Generators.
- 2. Canadian Standards Association (CSA)
  - .1 CAN/CSA C22.1-12, Canadian Electrical Code.
  - .2 CAN/CSA-B44-13, Safety Code for Elevators and Escalators.
  - .3 CAN/CSA-B651-2012, Accessible Design for the Built Environment.
  - .4 CAN/CSA Z320-11, Building Commissioning Standards, include all sections, processes, annexes and tables associated with vertical transportation systems.
- 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 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation Meetings:
  - .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.

## **1.5 ACTION AND INFORMATION SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for passenger elevator and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia.
  - .2 Drawing Format: Submit electronic file in AutoCad format and five (5) copies of each shop drawing for review. Format for printing as 280mm x 432 mm (11" x 17").
  - .3 Drawings to indicate, project layout to scale, including details and information as follows:
    - .1 Size and location of machine and controller in plan view.
    - .2 Size and location of car, hoisting beam, guide rails, buffer stand, pit ladder and other components in hoistway in plan view.
    - .3 Section view of hoistway including elevation of each floor served, pit depth and overhead required.
    - .4 Rail bracket spacing and maximum loads on guide rails.
    - .5 Reactions at points of support.
    - .6 Weights of principal components.
    - .7 Top and bottom clearance and over travel of elevator car.
    - .8 Wiring diagrams with location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points.
    - .9 Location in hoistway for connection of travelling cables for elevator car light and communication system.
    - .10 Location and size of access doors.
    - .11 Loads on hoisting beams.
    - .12 Expected heat generation of equipment.
    - .13 Seismic design data and detailed calculations.
    - .14 Include on general arrangement drawings:
      - .1 Type, size, location of hoistway entrances showing details of fastening to hoistway structure.
      - .2 Show all fixtures, position indicators, push buttons, car operating stations, corridor control panels, and other special features pertaining to the project.
      - .3 Include catalogue illustrations of operating and signal fixtures.
      - .4 Provide detailed elevator cab interior drawings.

- .3 Shop Drawings (continued)
  - .4 Do not commence manufacture or order materials before shop drawings have been reviewed and returned by Departmental Representative, and shop drawings have been submitted to the provincial safety authority.
- .4 Samples:
  - .1 Submit duplicate 150 mm. x 150 mm. size samples, complete with colour schemes for each of the following: floor material, car interior, car ceiling, car door, hoistway entrance door and frame finishes.
- .5 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .6 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions: submit manufacturer's written installation instructions.
- .8 Manufacturers Field Services: submit copies of manufacturer's field reports.

## **1.6 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Project Record Documents:
  - .1 Record actual locations of equipment, names of equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects.
  - .2 Before final acceptance of equipment, provide three (3) sets of reproducible as-built wiring diagrams and three (3) sets of all final issue shop drawings, including General Arrangement drawings, hoistway plan and section.
    - .1 Laminate drawings or enclose in plastic protectors and mark "As-Built". Drawings marked "As-Built" to be stamped by a Professional Engineer registered in Nova Scotia.
  - .3 Mark up all field changes or changes to original wiring diagrams in red.
  - .4 Provide electronic file(s) of the As-Built drawings in AutoCad format. Insert As-Built into building architectural and structural drawings provided by Departmental Representative.
- .3 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual. Include the following data:
  - .1 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.

3 (continued)

- .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 Maintenance: Use clear drawings, diagrams or manufacturer's literature which details the following:
    - .1 Lubrication products and schedules.
    - .2 Trouble-shooting procedures.
    - .3 Adjustment techniques.
    - .4 Operational checks.
  - .5 Spare Parts:
    - .1 List recommended spares to be maintained on site.
    - .2 List all special tools and appropriate unique applications.
    - .3 Detail manufacturer and supplier names and addresses.
  - .6 Include in manuals a copy of the registered design submission and safety authority inspection reports.
  - .7 Instruct Departmental Representative in maintenance of special finishes.
- .4 Manufacturers extended warranty: submit for Departmental Representative's acceptance, manufacturers extended warranty document executed by authorized company official.
- .5 For a period of fifteen (15) years following acceptance of Work, provide further information required for the safe and efficient maintenance of the elevator equipment, equipment and devices supplied under this Section.

**1.7 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 Inspection and Testing: Include 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.

## **1.8 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 manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect elevator components from nicks, scratches and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop construction waste management practice in accordance with Section 01 74 21 – Construction Waste Management and Disposal.

## **1.9 MAINTENANCE AND SERVICE**

- .1 Include at no extra cost maintenance of equipment for the extended warranty period noted in Paragraph 1.10 of this Section.
- .2 Carry out maintenance inspections and tests in accordance with provincial regulations, Section 8.6 of the ASME 17.1/CSA B44-13 Safety Code for Elevators and Escalators, CSA Standard B44.2-10 Maintenance Requirements and on Monthly Intervals as a minimum.
- .3 Systematically clean, lubricate and adjust all of the equipment as required.
- .4 Repair or replace electrical and mechanical parts of any equipment as required, whether due to defect or normal wear and tear.
- .5 Use only genuine standard parts of manufacturer of equipment.
- .6 Perform work by competent personnel under supervision and in direct employ of manufacturer, or manufacturer's licensed agent.
- .7 Schedule work during regular Elevator Trade working hours with Departmental Representative.
- .8 Maintain locally an adequate stock of parts for replacement or emergency purposes and have qualified staff available to ensure fulfilment of parts requirements in a timely fashion.
- .9 Include 24 hour call-back service required by equipment stoppage or malfunction at all times at no additional cost. Provide staffing to ensure 30 minute response to emergency calls throughout interim and warranty maintenance. Provide full coverage of monitoring system including modem and internet elements with 48 hour deadline to restore system to full operation.

- .10 Ensure no unit is out of service longer than 12 hours - keep Departmental Representative completely informed of equipment malfunctions on a continuing basis.
- .11 Remove waste monthly.

#### **1.10 EXTENDED WARRANTY**

- .1 For Work of this Section, the 12 month warranty period prescribed in GC3.13 of General Conditions is extended to 36 months.
  - .1 Warranty to cover defective material and workmanship for the stated warranty period commencing from the date of Final Certificate of Completion of the project.

#### **1.11 NON-PROPRIETARY REQUIREMENTS**

- .1 The elevator control system is to be considered Non-Proprietary. The following provisions represent compliance with established non-proprietary required for Universal Serviceability and Maintainability.
- .2 Spare Parts:
  - .1 Upon request, spare parts shall be made available for purchase as replacement for repairs or stock to be maintained at building site, or other location as designated by Departmental Representative. No exchange-only provisions shall limit any parts provided by the equipment supplier for purchase.
  - .2 The equipment supplier shall provide Departmental Representative a published spare parts list complete with established reasonable pricing available in the local area.
- .3 Tools and diagnostic devices: For this project provide all required:
  - .1 Special tools, diagnostic devices for the elevator controls, and the elevator system monitoring system;
  - .2 All associated inspection(s), trouble-shooting, adjusting and monitoring device tools;
  - .3 All related equipment with all available diagnostic tool functions manuals, either onboard or in a separate device. This includes manufacturer recommended belt-monitoring devices.
  - .4 Such maintenance, adjustment and troubleshooting device or control systems shall provide unrestricted access to all parameters, levels of adjustment, monitory and flags necessary for maintenance of equipment.
  - .5 No expiring software, degrading operation or key shall be accepted.
  - .6 All tools and diagnostics devices shall be available for replacement purchase at reasonable cost by any maintenance elevator contractor or persons designated by Departmental Representative.
- .4 Technical Support Hotline: A technical support hotline to be provided by original equipment manufacturer whereby anyone designated by building owner shall be able to obtain assistance for maintenance or trouble-shooting.

- .5 Documentation: Manuals, engineering drawings, circuit diagrams and prints shall be provided with the equipment at time of delivery. All documentation shall be available for replacement purchase at a reasonable cost by any installing or maintaining elevator contractor or person designated by Departmental Representative.

#### **1.12 SITE QA & COMMISSIONING**

- .1 Provide competent and co-operative mechanics for QA and Cx process performed by system specialists, for inspections and acceptance tests as the system specialists reasonably requires.
- .2 Allow up to 8 hours of on-site assistance. Expect to have work briefly interrupted during QA & Cx progress verifications by system specialists.

#### **1.13 DEMONSTRATION OF OPERATION**

- .1 In the presence of the Departmental Representative, during silent hours of the building, prepare site written specific procedures to properly demonstrate and train site O&M personnel.
  - .1 Independent Service Operation.
  - .2 Emergency power operation;
  - .3 Emergency recall and in-car emergency service;
  - .4 Audio Equipment;
  - .5 Independent services.
  - .6 Monitoring and Control features.
- .2 Train Building forces on site on operation of system in one (8) hour session, conducted by a qualified elevator system trainer who is fully trained in all user interfaces of the elevator system. Seek approval of training person by Departmental Representative prior to scheduling and conducting the training session.

### **PART 2 - PRODUCTS**

#### **2.1 SYSTEM DESCRIPTION**

- .1 Provide electrically operated, machine-roomless (MRL) traction passenger elevator. Acceptable manufacturers are:
  - .1 Otis Elevator Company.
  - .2 KONE Inc.
  - .3 ThyssenKrupp Elevator.
  - .4 Global-Tardiff, distributed by CKG Inc.
  - .5 or other acceptable manufacturer.
- .2 Controller located either entirely inside the hoistway or in closet adjacent to hoistway. No separate machine room.
- .3 Accessible design in accordance with CSA B651.

- .4 Bilingual Markings: Engrave identification and instructions at least 0.03 mm. deep on operating panels and on signal equipment in English and French, except where design is such that inference is obvious and readily understood. Submit markings and designs to Departmental Representative for approval.
- .5 Design and construct elevator in accordance with ASME A17.1/CSA B44, local codes and regulations.

## **2.2 PERFORMANCE REQUIREMENTS**

- .1 Select and install electric traction passenger elevator components to form complete, operating elevator system meeting the following performance characteristics:
  - .1 Service: general purpose.
  - .2 Operation: microprocessor, single car.
  - .3 Quantity: one (1)
  - .4 Rated net capacity: 1134 kg.
  - .5 Rated speed: 0.75 m/sec.
  - .6 Travel distance (nominal): 8.0 m. (from basement to second floor)
  - .7 No. of stops: three (3)
  - .8 No. of openings: three (3), front opening.
  - .9 Inside car dimensions: 2032 mm. wide x 1295 mm. front to back.
  - .10 Car door width: 1067 mm.
  - .11 Door type: single, side opening.
  - .12 Machine room-less elevator where controller equipment is either located entirely within hoistway or in controller closet adjacent to hoistway. For this project, controller closet is located adjacent to hoistway on basement level.
- .2 Elevator operation: manual key access required.
  - .1 Function mode:
    - .1 Manual key access required to call elevator from all hall stop locations (basement, ground floor and second floor).
    - .2 When unlocked by key, hall button call is able to call elevator to that floor level.
    - .3 Key access is not required in cab.
    - .4 After use, key once again locks elevator from responding to hall calls.
- .3 Roller guides: include guide operation which is inaudible to passengers in car or outside hoistway with car operating at rated speed and car fan turned off.
- .4 Compensation: select compensating chain materials to minimize noise.
- .5 Gearless traction Machine: include gearless traction machine as follows:
  - .1 Use gearless traction machine composed of slow speed direct current motor, traction driving sheave and direct current electromagnetic brake and steel supporting beam or channels.
  - .2 Conform to NEMA Standards MG1-18-426 to MG1-18-436 inclusive.



- .6 Include automatic self-levelling feature which will automatically bring car to floor landings.
- .7 Home landing: ground floor landing will be home station by key operation.
- .8 Light Intensity: 215 lx maximum measured 0.75 M. above the floor. Totally enclose and conceal wiring and ballasts from view within car and finish ceiling cavity white.
- .9 Ventilation: ventilate by fan to exhaust air through roof and through concealed perforations at base. Limit fan noise.
- .10 Tolerances: car movement on guide rails: smooth movement with no perceptible lateral or oscillating movement or vibration.
- .11 Seismic Design Criteria: 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.

## **2.3 MATERIALS**

- .1 Materials: As required to achieve specified performance criteria: functionally compatible with adjacent materials and components.
- .2 Elevator Pit Ladder: By Section 05 50 00 – Metal Fabrications.

## **2.4 CAR COMPONENTS**

- .1 Enclose car sides except entrance suitable for removing or resurfacing for maintenance purposes.
- .2 Panels: removable, retained securely with hidden fastenings. Design for removal of panels from inside car.
  - .1 Face panels with materials of flame spread rating of 25 or less and trim edges.
- .3 Floor and ceiling: 19mm. fire retardant treated surfaces and edges.
  - .1 Attach with flush mechanical fasteners. Double thickness floor sheathing - allow for thickness of floor finish material.
- .4 Finish Floor: to accept resilient sheet flooring specified in Section 09 65 17. Install flush with sill, securely fastened at front edge and all sides.
- .5 Threshold: Extruded aluminum, clear anodized.
- .6 Walls: stainless steel with No. 4 satin finish.
- .7 Ceiling: suspended flat, translucent panels with frame on all sides and concealed lighting in ceiling cavity above. Exposed frame stainless or aluminum.
- .8 Operating panel and face plate: with illuminated call buttons.

- .9 Indicator panel: above operating panel with illuminated position indicators.
- .10 Bumper rail: 13 mm x 50 mm flat stainless steel No. 4 satin finish.
- .11 Provide pad hooks mounted 100 mm. below level of suspended ceiling panels.
- .12 Wall mats: one set canvas covered and padded with fill material and sewn.
- .13 Furnish license holder in elevator car to suit the certificate issued by elevator licensing authority.
- .14 Provide telephone cabinet in car with telephone symbol 75 mm. in height with wording in both official languages " In case of emergency, lift receiver, wait for answer" / En cas d'urgence, décrochez le récepteur et attendez qu'on vous réponde". Engraved letters to be at least 6 mm. high on orange phosphorescent paint.
  - .1 Identify elevator and name of building on back of cabinet cover. Include telephone wiring within elevator hoistway.
  - .2 Telephone in cab to communicate with central, 24/7 manned control station. For this project telephone communicates with telephone console at Reception Desk (102).
- .15 Emergency lighting: Provide battery operated emergency lighting in care to CSA C22.2 No.141.
  - .1 Lamps to be immediately energized in event of power failure.
  - .2 Install unit out of view above the suspended ceiling.
- .16 Car doors and frames: doors of sandwich panel construction. Frames of rolled sections, rigid construction.
- .17 Clear height under cab suspended ceiling: 2.4 m.
- .18 Clear car entrance height: 2.1 m.

## **2.5 ACCESSIBLE DESIGN FEATURES**

- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons. Meet requirements of Appendix E of CAN/CSA-B44 Safety Code for Elevators.
- .2 Provide hall lanterns above each hoistway entrance with stainless steel faceplates, lexan covers over new LED illuminated bulbs and new electronic chimes to sound once for "UP" direction and twice for "DOWN". Chime volume to be adjustable.
- .3 Provide voice annunciation indication of each floor, when served and of car direction. Provide volume control adjustable from behind car station. Provide high-power speakers, minimum of two (2) per car so no distortion is readily noticeable to passengers. Provide sample of annunciations, to be in English and French languages, with shop drawings.

- .4 Provide new metal hall braille / tactile plates.

## **2.6 POWER SUPPLY**

- .1 Equipment power: 600 V., 3 phase.
- .2 Lighting: 120 V, single phase.
- .3 Protect elevator equipment against damage or malfunction due to change to or from normal power supply and emergency power supply.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .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.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 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 ASME A17.1 / CSA-B44, local codes, regulations and standards, and manufacturer's written instructions.

### **3.4 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .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 with contract.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

- .3 Schedule site visits, to review Work at stages listed:
  - .1 After delivery of products but before installation begins.
  - .2 Twice during progress of work at 30% and 60% complete.
  - .3 Upon completion of the Work after cleaning is carried out.
- .4 Obtain reports, within 3 days of review, and submit, immediately, to Departmental Representative.

### **3.5 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.

### **3.6 SITE TESTS**

- .1 Perform and meet tests required by CSA-B44.
- .2 Supply instruments and execute specific tests.
- .3 Furnish test and approval certificates issued by jurisdictional authorities.

### **3.7 COMMISSIONING**

- 1. Designate one staff person as Contractor's commissioning manager for the project. Manager to be of Adjuster, Supervisor or Manager level or higher. Attend job site meetings pertaining to the Work.
- 2. Undertake commissioning to CSA Z320-11, Building Commissioning Standards, as a minimum. Prepare, fill out all required commissioning related checklists as directed by Departmental Representative. Provide documentation to Departmental Representative when requested.
- 3. After Provincial inspection of each elevator and before turn-over for customer use, test elevators in continuous simulated automatic operation without passenger access.
  - 1. Test for at least (1) hour with no load operating from floor to floor, with or without door operation.
  - 2. Test for at least (1) hour with 100% load operating from floor to floor, with or without door operation.
  - 3. Test for two (2) consecutive hours operating from floor to floor with door operation. Provide barricades and signage to indicate that an elevator test is in progress.

- .4 Before turn-over for customer use, test elevators as following:
  - .1 Running current in up direction with 42% car load.
  - .2 Running current in down direction with 42% car load.
  - .3 Governor overspeed setting.
  - .4 Safety trip setting.
  - .5 Door timings and dwell settings.
  - .6 Operating speed up.
  - .7 Operating speed down.
  - .8 Door close force.
  - .9 Door time-out.
- .5 During warranty maintenance period closely monitor equipment for malfunctions and track reliability. Achieve a target rate of no more than 0.5 malfunction per elevator per month. Not achieving a reliability rate of 1.0 malfunction per elevator per month during the three month period preceding the expiration of the warranty maintenance period will extend the warranty maintenance, including full parts and labour, on the malfunctioning elevator(s) only until the (moving window) 90 day reliability target has been achieved.

### **3.8 ADJUSTING**

- .1 Adjust door opening and closing times to suit disabled 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 Adjust for smooth acceleration and deceleration of car so as not to cause passenger discomfort.
- .4 Adjust automatic floor levelling feature at each floor.

### **3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove protective coverings from finished surfaces and components.
  - .2 Clean surfaces and components ready for inspection.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction Waste Management and Disposal.

### **3.10 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by passenger elevator installation.

**3.11 MAINTENANCE**

- .1 Furnish complete service and maintenance of elevator system and components for duration of extended warranty period.

**END OF SECTION**