

1 ASSEMBLY - GENERAL

- 1.1 The work of this section includes the provision of all design, labour, materials, equipment and services required to fabricate and install elevators as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
- 1.1.1 Passenger Elevators
- 1.2 Reference Standards: Do hydraulic elevator work to *[CAN3 B44 M90]*, including supplement no. 1 1992, local codes and regulations
- 1.3 The elevator sub-contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expense for, or on account of, any unpatented or patented invention, process, article, or appliance manufactured or used in the performance of the contract, including its use by the Owner.
- 1.4 The *[Design Builder]* shall obtain and pay for necessary Municipal or Provincial inspections and permits and make such tests as are called for by the regulations of such authorities. These tests shall be made in the presence of the authorized representatives of such authorities.
- 1.5 The *[Design Builder]* shall ensure the following response time shall be the average elapsed response time measures from time Owner calls contractor or contractor's answering service until the arrival on site of a responding service technician:
- 1.5.1 Within 60 minutes for a call back during regular working hours.
- 1.5.2 Within 90 minutes for a call back occurring after normal working hours between Monday and Friday.
- 1.5.3 Within 120 minutes for a call back occurring during weekends and on holidays.
- 1.5.4 Within 30 minutes for a call back involving release of trapped passengers during normal working hours.
- 1.5.5 Between 45 and 60 minutes for a call back involving release of trapped passengers outside of normal working hours.

2 ASSEMBLY DESIGN CRITERIA

- 2.1 Description of Systems: Provide hydraulic passenger elevator, as follows:
- 2.1.1.1 Car platform: 2032mm wide x 1600mm deep, front to back, overall.
- 2.1.1.2 Rated load: 1588kg (3500lbs) exclusive of complete car and plunger.
- 2.1.1.3 Travel: serving all levels.
- 2.1.1.4 Openings: front openings at all levels.

- 2.1.1.5 Speed: 38.1m/s (125fpm), up and down, based upon full car load, maximum speed variation under other load conditions shall be limited to - 5% to +10%.
- 2.1.1.6 Door opening size: 1066mm x 2135mm high.
- 2.1.1.7 Door frame finish and mini-trim frame: stainless steel all levels.
- 2.1.1.8 Type of controls: selective collective automatic operation with special features including independent service operation and emergency lowering.
- 2.2 The equipment as provided under these specifications must be capable of affording reliable and safe operation.
- 2.3 Consider the use of tempered glazing in elevator cabs for personal security and safety reasons.
- 2.4 Ensure design of elevators and sizes of elevator cabs/access meet the requirement for material handling (i.e. furniture). Coordinate requirements with Owner on specific projects.
- 2.5 Handicapped accessibility: Comply with *[NBC, Supplement No. 5, 1975, Building Standards for Handicapped, Section 3.5 and Appendix E of the CAN/CSA-B44-M90]* Safety Code for Elevators, as well as the following:
 - 2.5.1.1 Locate upper most buttons in elevator cab control panel and centre-line of telephone instrument not more than 1370mm above floor level.
 - 2.5.1.2 Furnish 38 dia. stainless steel handrails on three sides of car with ends returned close to panels and removable from inside car.
 - 2.5.1.3 Sound audible soft-toned signal in car when car is passing or stopping at a floor.
 - 2.5.1.4 Where hall lanterns with gongs are provided, sound gongs once for "up" stops and twice for "down" stops.
 - 2.5.1.5 Provide Arabic numerals 16mm in height raised 0.8mm immediately to left of floor buttons.
 - 2.5.1.6 Provide infrared or multiple light beam door reversing edge control systems on all levels.
- 2.6 Include selective collective automatic elevator operation, as follows:
 - 2.6.1 Provide one flush mounted operating device in car with stainless steel faceplate containing pushbuttons to correspond with landings served, switch for car light arranged for restricted operation, alarm buttons and emergency stop key switch.

- 2.6.2 Mount single pushbuttons at each terminal landing and "UP" and "DOWN" buttons with stainless steel faceplates at each intermediate landing.
- 2.6.3 Start car upon momentary pressure of one or more car or landing buttons, other than those for landing at which car is standing, and cause car to stop at first landing for which car or landing button is pressed, corresponding to direction in which car is travelling.
- 2.6.4 Stop car at landings for which calls are registered and make these stops in order in which landings are reached, irrespective of sequence in which buttons are pressed, provided button for given landing is pressed sufficiently in advance of arrival of car at that landing to permit stop to be made.
- 2.6.5 If no car buttons are pressed and car starts "up" in response to several "down" calls, proceed first to highest "down" call and reverse to collect other "down" calls. Collect "up" calls similarly when car starts "down" in response to such calls.
- 2.6.6 If car stops for landing call and car button is pressed within predetermined interval after stop for landing corresponding to direction car was travelling, proceed in same direction regardless of other landing calls registered.
- 2.6.7 If "down" landing buttons are pressed while car is travelling "up", do not stop car at these landings but allow calls to remain registered.
- 2.6.8 After highest car and landing calls have been answered reverse car automatically and respond to "down" car and landing calls.
- 2.6.9 When travelling "down", do not permit car to respond to "up" landing calls, but allow these calls to remain registered to be answered on next "up" trip.
- 2.6.10 At each stop in response to either car or corridor call, hold car at landing for adjustable time interval to permit passengers "on" or "off". Cancel interval upon registration of car call or pressure on door close button.
- 2.7 Construction a fire rated machine room with concrete floor. Paint the floor, walls, and ceiling to reduce dust. Provide heating and ventilation of the machine room to maintain a adequate temperature control. Provide fluorescent lighting in the machine room. Provide a duplex receptacle in the machine room. Arrange equipment in machine room so that equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- 2.8 Provide an electrical power main line supply in the machine room with fused disconnect switch, connected to the terminals of the elevator controller. Provide an auxiliary logic contact and wire from mainline disconnect to elevator controller to indicate that the disconnect is in the "OFF" position. Use Commander "HD" type. Provide one fused disconnect switch in the machine room connected to the terminals on the elevator controller for car lighting.

- 2.9 Provide a duplex receptacle and protected light fixture in the elevator pit. Provide a light switch easily accessible from the access door and located near the pit ladder.
- 2.10 Provide a communication system in the car. The Owner is responsible to have the communication system connected to a 24 hour service and/ or the Owner Protection Services .
- 2.11 Provide stainless steel entrance panels at all levels.
- 2.12 Provide smooth acceleration and deceleration of car without perceptible steps so adjusted as not to cause passenger discomfort. Adjust elevator to travel between typical floors in not more than 14s. Measure time in up direction under full car load from instant doors start to close until car has stopped level with next floor and the doors are three quarters open.
- 2.13 Include emergency lighting in each car as follows:
- 2.13.1 Use battery operated emergency lighting equipment, to [CSA C22.2No. 141-M1985], to provide general illumination and 10 x minimum illumination in car at operating panels and telephone cabinet for four hours minimum.
 - 2.13.2 Include means for convenient manual operation and testing of each unit from within car. Means shall consist of spring return or momentary position key switch mounted inside the car service cabinet.
 - 2.13.3 Design battery unit of sufficient strength to support 90kg person without causing malfunction or damage. Include means of containing any leakage or spillage of electrolyte. Arrange battery unit as a source of power for alarm bell during power failure.
- 2.14 Include means to automatically return the elevator to the lowest landing upon failure of normal power supply. Include door operation. Include battery device. Provide intercom system to main security desk.
- 2.15 Automatically return car to bottom landing and open power operated doors if car should stall as result of relay failure, valve failure or low oil in system while ascending.
- 2.16 Include automatic two-way leveling device. Approach landing stops at reduced speed from either direction of travel. Level with accuracy of +/-6mm under varying load conditions.
- 2.17 Interlock cab lighting with load sensing device such that they are shut off after adjustable time delay.

3 ASSEMBLY COMPONENTS

3.1 PASSENGER ELEVATOR

- 3.1.1 **General:**
- 3.1.1.1 Submittals: Submit two samples of elevator finishes in accordance with Section 01340 for floor material, cab interior, cab ceiling, cab door, hoistway entrance doors and frames.
 - 3.1.1.2 Submit shop drawings in accordance with Section 01340. Indicate on general arrangement drawings:
 - 3.1.1.2.1 Hoistway entrances and doors showing method of operation, details of construction and method of fastening to structural members of building.
 - 3.1.1.2.2 Car design, showing details of construction, fastening to platform, lighting, ventilation and location of car equipment.
 - 3.1.1.2.3 Include catalogue illustrations of operating and signal fixtures.
 - 3.1.1.3 Quality Assurance: All elevator work shall be performed by properly trained and skilled mechanics.
 - 3.1.1.4 Testing/Inspections: Perform and meet tests required by *[CAN3 B44 M90]*. Furnish test and approval certificates issued by jurisdictional authorities to the Owner.
 - 3.1.1.5 Warranties: The Elevator Contractor shall guarantee that the materials and workmanship of the apparatus installed under these specifications are first-class in every respect and will make good any defects, not due to ordinary wear and tear or improper use or care, which may develop within one (1) year from the date of acceptance. Any use of elevator during construction period shall not affect this guarantee.
 - 3.1.1.6 Provide maintenance data for elevator maintenance. Incorporate into maintenance manual specified in Section 01730. Include in maintenance data:
 - 3.1.1.6.1 Parts catalogue giving complete list of repair and replacement parts with cuts and identifying numbers.
 - 3.1.1.6.2 Legible schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus. Cover one copy in plastic and laminate to wood backboard, mount on wall in machine room.
 - 3.1.1.6.3 Operation of cathodic protection system including optimum control settings.

3.1.1.6.4 Lubrication chart, plastic covered, laminated and affixed to wooden backboard, mount in the elevator machine room.

3.1.2 **Design:**

3.1.2.1 Acceptable elevator manufacturers include:

3.1.2.1.1 Dover Elevator

3.1.2.1.2 Montgomery Kone

3.1.2.1.3 Otis Elevator

3.1.2.1.4 Schindler Elevator

3.1.2.2 Use of prototype or first time equipment and equipment combinations will not be acceptable. Selected elevator equipment, including control and operational systems, must have minimum of three years tested and proven working experience in applications similar to that associated with this project.

3.1.3 **Materials/Finishes:**

3.1.3.1 Use major elevator components from standard product line of one manufacturer unless otherwise approved. Use components only which have performed satisfactorily together under conditions of normal use in not less than two other elevator installations of similar design and for a period of at least one year. Furnish names and addresses of Owners or managers of buildings, in which proposed combination of major components has so performed. Major components means cylinder and plunger, motor, pumping unit, muffler, controller, operation and control systems.

3.1.3.2 Passenger Car Enclosure:

3.1.3.2.1 Provide removable panels retained securely with hidden fastenings. Design for removal of panels from inside car. Face panels with 22 ga stainless steel XL Blend S finish and balancing veneer with flame spread rating of 25 or less and trim edges with stainless steel where possible.

3.1.3.2.2 Fabricate car enclosure with sides of glass in aluminum framing above handrail height and 1.9mm thick steel for attachment of removable stainless steel panels below handrail.

- 3.1.3.2.3 Provide two fluorescent recessed downlights: 150mm dia. black baffle cone, horizontal lamp installation with stainless steel trim, voltage -347, lamps 2PL-13DTT 13W. Fluorescent pot lights to use rapid start, high power factor ballasts, sound rated A, recessed in perforated stainless steel ceiling panels, supported on baked enamel hung type ceiling frame. Design for light intensity measured 0.75m above floor of 215 x maximum. Totally enclose and conceal wiring and ballasts from view within the car and finish ceiling cavity black.
- 3.1.3.2.4 Fabricate front return panels, 15E sloped soffit and entrance columns of integral stainless steel. Provide front return with hinged integral car operating panel.
- 3.1.3.2.5 Ventilate by an exhaust air handling unit through roof and through concealed perforations at base.
- 3.1.3.2.6 Limit total fan noise to 55 dB on "A" scale of General Radio Sound Level meter type 1551A from reading 0.9m above floor with fan on high speed.
- 3.1.3.2.7 Mount air handling unit on top of car and effectively sound isolate system from car to prevent transmission of vibration to car structure.
- 3.1.3.2.8 Include two speed operation of ventilation system: approximately 330 dm³/s on high speed; approximately 165 dm³/s on low speed.
- 3.1.3.2.9 Provide pad hooks in car and one complete set of protective pads for elevator.
- 3.1.3.2.10 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.
- 3.1.3.2.11 Fabricate car enclosure of metal with minimum of ledges, projections and corners.
- 3.1.3.2.12 Construct of one piece panels from floor to soffit, securely bolted together and to adjoining members with lightproof joints and reinforced to provide rigidity.
- 3.1.3.2.13 Provide perforations in base on three sides and in ceiling on four sides to allow air to circulate as car travels through hoistway.

- 3.1.3.2.14 Provide 2135mm clear height under hung car ceiling.
- 3.1.3.2.15 Provide clear car entrance height of 2.1m.
- 3.1.3.2.16 Design floor to floor finish, flush with sill.
- 3.1.3.2.17 Where required by enforcing authority, furnish stainless steel license holder integral with return panel in elevator car to suit certificate issued by enforcing authority. Design holder with hidden or tamperproof fastening.
- 3.1.3.2.18 Provide extruded aluminum threshold.
- 3.1.3.2.19 Provide an emergency exit on top of the car of suitable size, equipped with an electrical device which will prevent operation of the elevator if the exit cover is open more than 2" and designed to comply with elevator code.
- 3.1.3.2.20 Finish outside of cab enclosure on exposed sides with stainless steel panels.
- 3.1.3.2.21 Provide top cowling to two exposed sides c/w steel railing to 1070 high with stainless steel top rail.
- 3.1.3.2.22 Finishes underside of car enclosure with prefinished steel panels to conceal floor framing. Provide clean straight cut-outs for cylinder and bumper pads.
- 3.1.3.3 Bilingual markings: Engrave identification and instructions at least 0.25mm deep on operating panels and on all signal equipment in both English and French except where design is such that inference is obvious and readily understood. Submit markings and designs for approval.
- 3.1.3.4 Communications:
 - 3.1.3.4.1 Provide "hands free" talk listen speaker unit, mounted within elevator cab. Telephone unit shall be equivalent to *[Sentry*Plus ET201 K-Phone]* or *[Viking K-1500-EHF]* models. Telephone units shall be provided with call initiation button. Telephone model shall be vandal resistant type, including call initiation button.
 - 3.1.3.4.2 Provide car with hands free speaker/microphone unit, mounted behind car front operating station. Accommodate speaker and microphone unit behind perforated grille. Grille shall be flush mounted into car operating station, located above the car push button controls.

- 3.1.3.4.3 Two way voice communication shall be established by pressing a button, mounted within the car operating station. This button shall be clearly marked and provided with associated engraved signage indicating a message, which is equivalent to "Press for Assistance".
- 3.1.3.5 Include extruded aluminum sills with anti-slip wearing surfaces.
- 3.1.3.6 Provide flush horizontal single slide door faced with 16 gauge stainless steel, satin finish. Wrap stainless steel around door.
- 3.1.3.7 Include two light direction sign with stainless steel faceplate on each car entrance column. Indicate direction for which car is set to travel by illumination of respective light.
- 3.1.3.8 Include, over top of entrance, in car, electric position indicator with stainless steel faceplate and flush characters at least 25mm high.
- 3.1.3.9 Include electric position indicator over door on main floor consisting of stainless steel faceplate with flush characters 25mm high.
- 3.1.3.10 Include integral illumination of each button in each landing and car operating fixture.
- 3.1.3.11 Illuminate corresponding "up" or "down" button and car button whenever call is registered. Extinguish illumination when call has been answered.
- 3.1.3.12 Illuminate signal fixtures with sufficient intensity to produce distinct and well-defined indications under ambient lighting conditions.
- 3.1.3.13 Combination Car Station and Service Cabinet:
 - 3.1.3.13.1 Provide a car station arranged for handicapped.
 - 3.1.3.13.2 Use stainless steel cover, use raised characters on the face of buttons, use international symbols.
 - 3.1.3.13.3 Use illuminated stainless steel floor buttons, one for each floor served.
 - 3.1.3.13.4 The top button to be no more than 54" above floor.
 - 3.1.3.13.5 Provide a key operated stop switch, an alarm button, door open and door close buttons.
 - 3.1.3.13.6 Provide in the locked service cabinet, keyed operated switches for fan, emergency light test, lighting, out of service and independent service.
 - 3.1.3.13.7 All keyed switches and locks to be Medeco or Yale.

3.1.3.13.8 Permanent labels, trademarks, and nameplates on materials and components are not acceptable in prominent locations except where required for operating instructions.

3.1.4 **Fabrication/Installation:**

3.1.4.1 Install elevator as per manufacturer's recommended installation procedures.

3.1.4.2 Include complete maintenance of elevator equipment for a period of 12 months from the date of the Final Certificate of Completion as follows:

3.1.4.2.1 Regularly, systematically monthly examine, clean, adjust and lubricate equipment.

3.1.4.2.2 Repair or replace electrical and mechanical parts of elevator equipment as required due to defect and normal wear and tear.

3.1.4.3 Owner assumes responsibility for cleaning, repairs or replacements of car enclosure, hoistway enclosure, hoistway doors and door frames due to other than defect and normal wear and tear.

3.1.4.4 Use only genuine standard parts produced by manufacturer of equipment.

3.1.4.5 Perform work by competent personnel under supervision and in direct employ of elevator manufacturer or manufacturer's licensed agent.

3.1.4.6 Perform work during regular trade working hours to approved schedule.

3.1.4.7 Maintain locally adequate stock of parts for replacement or emergency purposes and provide qualified men to ensure fulfillment of this service without undue loss of time in reaching job site.

3.1.4.8 Include 24 hour call-back service due to elevator stoppage or malfunction at all times at no additional cost. The elevator must not be out of service longer than 24 hours - the Owner is to be completely informed on a continuous basis.

3.1.4.9 Maintain a standard type locked metal cabinet, in machine room with a supply of parts known to require frequent replacement, acceptable lubricants and cleaning materials together with schematic wiring diagrams.

3.1.4.10 The amount included in this contract for maintenance after project completion is to be stated as a separate sum and payment for the maintenance will be on a monthly basis. The Contractor is to advise the maintenance cost for the second year, to be used as a basis for subsequent years.

- 3.1.4.11 Provide a log book in machine room, record all callbacks and repairs, as work is carried out. Provide an "acknowledgment of inspection" form at each inspection.

End of Section