

SECTION 14 20 00

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies hydraulic elevators.
- B. Work Required:
 - 1. The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as herein specified.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.
- C. Related work not specified herein: The following sections contain requirements that relate to this section and are performed by trades other than the elevator manufacturer/installer.
 - 1. Division 01: Protection of floor openings and personnel barriers; temporary power and lighting.
 - 2. Section 03 30 00 - Cast-In-Place Concrete: elevator pit, elevator motor and pump foundation, and grouting thresholds.
 - 3. Section 04 20 00 - Unit Masonry: masonry hoistway enclosure, building-in and grouting hoistway door frames, grouting thresholds.
 - 4. Section 05 50 00 - Metal Fabrications: divider beams, support for entrances and rails, hoisting beam at top of hoistway.
 - 5. Section 07 14 00 - Fluid-Applied Waterproofing: waterproofing at elevator pit.
 - 6. Section 16 10 00 - Electrical: Section 16100 - Electrical:
 - a. Main disconnects for each elevator.
 - b. Electrical power for elevator installation and testing.
 - c. Disconnecting device to elevator equipment prior to activation of sprinkler system.
 - d. The installation of dedicated GFCI receptacles in the pit and overhead.
 - e. Lighting in controller area, machine area and pit.
 - f. Wiring for telephone service to controller.
 - 7. Section 31 22 00 - Earthwork and Site Grading: excavation for cylinder well casing.
- D. Applicable Codes: Comply with applicable building and elevator codes at the project site, including but not limited to the following:
 - 1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
 - 2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
 - 3. ANSI/NFPA 70, National Electrical Code.
 - 4. ANSI/NFPA 80, Fire Doors and Windows.
 - 5. ASME/ANSI A17.7, Safety Code for Elevators and Escalators.
 - 6. ANSI/UL 10B, Fire Tests of Door Assemblies.
 - 7. CAN/CSA C22.1, Canadian Electrical Code.
 - 8. CAN/CSA-B44, Safety Code for Elevators and Escalators.
 - 9. EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
 - 10. Local Building Codes.
 - 11. All other local applicable codes.

1.02 SYSTEM DESCRIPTION

- A. Basis of Design: Hydrofit 2110 by Otis or approved equal.
- B. Equipment Description: Holeless Hydraulic elevator with remote Machine-Room Less application, refer to drawings for remote location.
- C. Equipment Control: Elevonic® Control System.
- D. Quantity of Elevators: 1
- E. Elevator Stop Designations: [Enter Appropriate elevator designations]
- F. Stops : 2
- G. Openings: [Select one] In line or Front & rear openings.
- H. Travel (maximum): 26'-6".
- I. Rated Capacity: 2100 lb.
- J. Rated Speed: 100 fpm
- K. Platform Size: [2100 front] 5'-9 1/2" W x 4'-11 1/8" D
- L. Clear Inside Dimensions: [2100 front] 5'-8 5/16" W x 4'-3 9/16" D
- M. Cab Height: 7'-9" or 9'-9"
 - 1. Clear Cab Height:
 - a. 7'-9" with 5/16" floor recess and 4 LED ceiling
 - b. 7'-4 3/8" with 5/16" floor recess and dropped 6 LED ceiling or perimeter lit ceiling.
 - c. 8'-0 1/16" with 1 1/4" floor recess and 4 LED ceiling
 - d. 7'-3 3/8" with 1 1/4" floor recess and dropped 6 LED ceiling or perimeter lit ceiling.
[add 2' for 9'-9" cabs].
- N. Entrance Type and Width: [Select one]:
 - 1. Single-Slide Door 3'0" (914mm) 2100
- O. Entrance Height: 7' 0" (2134 mm) or 8'-0" (2438 mm)
- P. Main Power Supply: [Select one] 208 - Volts, 3-Phase, 60Hz + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.
- Q. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.
- R. Machine and Controller Location: No machine-room required, tank and controller in hoistway pit.
- S. Signal Fixtures: Manufacturer's standard with stainless steel metal button targets (exc. CA).
- T. Controller Location: Inside hoistway, accessible by a door in a side hoistway wall on the 1st or 2nd landing. (1st landing only if rear entrance)
- U. Stopping Accuracy: ±1/4" (6.4 mm) under any loading condition or direction of travel.
- V. Operation:
 - 1. [Simplex] 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.
 - 2. [OR]
 - 3. [Duplex] Duplex Collective Operation: Using a microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons. In the absence of system activity, one car can be made to park at the pre-selected main landing. The other (free) car shall remain at the last landing served. Only one car shall respond to a hall call. If either car is removed from service, the other car shall immediately answer all hall calls, as well as its own car calls.
- W. Operating Features – Standard

1. Full Collective Operation
 2. Fan and Light Protection.
 3. Full Collective Operation.
 4. Firefighters' Service Phase I and Phase II (USA only); or Special Emergency Service Phase I and II – Emergency Recall and In-Car Emergency Operation (Canada only).
 5. Top of Car Inspection.
 6. [Include the following operations for duplex or multi-car Operation, delete for Simplex.]
 7. Zoned Car Parking.
 8. Relative System Response Dispatching.
- X. 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.
 4. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.
- Y. Provide equipment according to seismic zone: [Enter appropriate zone for project: 0, 1, 2, 3, 4,]

1.03 SUBMITTALS

- A. 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.
- B. Shop Drawings: Submit approval layout drawings. Include the following:
1. Car, guide rails, buffers and other components in hoistway.
 2. Maximum rail bracket spacing.
 3. Maximum loads imposed on guide rails requiring load transfer to building structure.
 4. Clearances and travel of car.
 5. Clear inside hoistway and pit dimensions.
 6. Location and sizes of access doors, hoistway entrances and frames.
- C. Operations and Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Elevator manufacturer shall be ISO 9001 certified.
- B. Installer: Elevators shall be installed by the manufacturer.
- C. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the General Contractor will be responsible to provide a proper and suitable storage area on or off the premises.
- B. Should the storage area be off-site and the equipment not yet delivered, then the elevator contractor, upon notification from the General Contractor, will divert the elevator equipment to the storage area. If the equipment has already been delivered to the site, then the General Contractor shall transport the elevator equipment to the storage area. The cost of elevator equipment taken to storage by either party, storage, and redeliver to the job site shall not be at the expense of the elevator contractor.

1.06 WARRANTY

- A. The elevator contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship. The warranty period shall not extend longer than one (1) year from the date of completion or acceptance thereof by beneficial use, whichever is earlier, of each elevator. The warranty excludes: ordinary wear and tear, improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the elevator contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

1.07 MAINTENANCE AND SERVICE

- A. Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of [Select the appropriate new installation maintenance period: <three (3)> <six (6)> <nine (9)> <twelve (12)>] months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. 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.
- B. 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. [Optional] Provide the means from the controller to reset elevator earthquake operation.
- C. 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
 - 4. Remotely make changes to selected elevator functions including:
 - a. Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak / down peak mode, activate independent service
 - b. Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)
 - c. 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**2.01 DESIGN AND SPECIFICATIONS**

- A. Provide machine-roomless holeless hydraulic elevators from Otis Elevator Company or approved equal. The control system and car design based on materials and systems manufactured by Otis Elevator Company or approved equal. Specifically, the system shall consist of the following components:
 - 1. The entire hydraulic system and the controller shall be located inside the hoistway. No extra machine room or control closet space is required.
 - 2. Sleep mode operation for LED ceiling lights and car fan.
 - 3. LED lighting standard in ceiling lights and elevator fixtures.
 - 4. Sleep mode operation for LED ceiling lights and car fan.
- B. Approved Installer: Otis Elevator

2.02 EQUIPMENT: MACHINE COMPONENTS

- A. The hydraulic system shall be of compact design suitable for operation under the required pressure. The power component shall be mounted in the hydraulic-fluid storage tank. The control valve shall control flow for up and down directions hydraulically and shall include an integral check valve. A control section including control solenoids shall direct the main valve and control: up and down starting, acceleration, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. System to be provided with a low-pressure switch and a shut-off valve.
 - 1. The entire hydraulic system with hydraulic-fluid storage tank, power component and valves shall be located in the hoistway pit and be easily accessible for maintenance through an access door in the hoistway wall.
- B. A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading.
 - 1. The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system.
- C. A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- D. Pressure Switch
- E. Tank Heater.
- F. Low-oil control [where required].

2.03 EQUIPMENT: HOISTWAY COMPONENTS

- A. Plunger(s) and Cylinder(s): Each cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure. The top of each cylinder shall be equipped with a cylinder head with a drip ring to collect any oil seepage as well as an internal guide ring and self-adjusting packing. Each plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. Each plunger shall be provided with a stop ring electrically welded to it to prevent the plunger from leaving the cylinder. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.
- B. Car Guide Rails: Tee-section steel rails with brackets and fasteners.
- C. Polyurethane type buffers shall be used.

- D. Wiring: Wiring for hoistway electrical devices included in scope of the elevator system, hall panels, pit emergency stop switch, and the traveling cable for the elevator car.
- E. 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 or bronze finish, or nickel silver finish.
 - 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:
 - a. Select finish:
 - 1) Color to be selected by Director's Representative from the manufacturer's color standard chart.
 - b. 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.
 - c. Sight Guards: sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel and gold satin doors.
- F. Fascia: Galvanized sheet steel shall be provided at the front of the hoistway

2.04 EQUIPMENT: CAR COMPONENTS

- A. Cab
 - 1. Cab Options:
 - a. Steel Shell Cab with painted vertical panels
 - b. Steel Shell Cab with laminated vertical panels
 - c. Steel Shell Cab with stainless steel vertical panels
 - 1) Paints and laminate to be selected from manufacturer's catalog of choices.
 - (a) Brushed Stainless Steel finished base plate located at top and bottom
- B. Ceiling Type:
 - 1. Dropped flat steel ceiling: Finish to be selected by Director's Representative, with 6 LED lights.
- C. 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 in the event of building power failure.
- D. Fan: A one-speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
- E. Handrail: Handrails shall be provided on the side and rear walls of the car enclosure. Handrails shall be 3/8" x 2" (9.5 mm x 51 mm) flat tubular handrail with a Brushed Steel.
- F. Threshold: Extruded Aluminum.
- G. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- H. Guides: Car roller type guides at the top and the bottom.
- I. Platform: Car platform shall be constructed of metal.
- J. [Optional] Certificate frame: Provide a Certificate frame with a satin stainless steel finish.
- K. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.05 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. 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. [An optional Luxury Swing COP is available. A second COP is available]
 - 1. A car operating panel shall be furnished. It shall 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:
- B. <Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo or gold satin button with white LED illuminating halo>
- C. <1/8" (3mm) satin stainless steel projecting button with blue or white illuminating halo or gold satin button with white illuminating halo>
- D. <Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel>
- E. <Lexan 1/8" (3mm) projecting fully illuminated button with white LED> (required by some local California codes)
- F. The car operating panel shall 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 the 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 shall 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 who can take the appropriate action. Visual indicators are 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.
Standard for USA, Optional in Canada
 - 8. In car stop switch (toggle or key unless local code prohibits use)
 - 9. Firefighter's hat (standard USA)
 - 10. Firefighter's Phase II Key-switch (standard USA)
 - 11. Call Cancel Button (standard USA)

Optional

 - 1. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2.
 - 2. Please Exit Symbol: provided with emergency hospital service, Seismic Zones =2 or express priority in the hall.
- G. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.
- H. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Hall fixtures shall have a [This paragraph may be written as needed to indicate specific fixture finishes by opening. Clearly indicate landing/opening designations for each finish]
 - 1. 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 or the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel.
 - 2. Button Options:

- a. <Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo or gold satin button with white LED illuminating halo>
 - b. <1/8" (3mm) satin stainless steel projecting button with blue or white illuminating halo or gold satin button with white illuminating halo>
 - c. <Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel>
 - d. <Lexan 1/8" (3mm) projecting fully illuminated button with white LED> (required by some local California codes)
- I. 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.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Installation of all elevator components except as specifically provided for elsewhere by others.

3.03 DEMONSTRATION

- A. The elevator contractor shall make a final check of each elevator operation with the Director's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION