

SECTION 14240 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hydraulic passenger elevators.
- B. Unit Prices: Rock excavation for jack holes will be paid for under the unit price indicated in the Contract and as specified in Division 1 Section "Unit Prices."

1.2 DEFINITIONS

- A. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.3 SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
- B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples: For exposed finishes of cars, hoist way doors and frames, and signal equipment; 3-inch- (75-mm-) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.
- D. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout as specified in Division 1.
- E. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators."
 - 1. Seismic Risk Zone: As applicable to Project location.
- C. Accessibility Requirements: In addition to local governing regulations, comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."

1.5 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.6 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.
 1. Warranty Period: 12 months from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.
 1. Perform maintenance, including emergency callback service, during normal working hours.
 2. Include 24-hour-per-day, 7-day-per-week emergency callback service.
 - a. Response Time: Two hours or less.
- B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
- C. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner with terms, conditions, and obligations as set forth in, and in the same form as, "Draft of Elevator Maintenance Agreement" at end of this Section, starting on date initial maintenance service is concluded.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering hydraulic elevators that may be incorporated into the Work include, but are not limited to, the following:
 1. Montgomery KONE Inc.
 2. Schindler Elevator Corp.
 3. Thyssen Elevator Group North America.
 4. **Otis Elevator [Add7-19.b]**

2.2 MATERIALS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.
 1. ***If providing load capacity and functional characteristics indicated in the specifications, both "holed" and "hole-less" elevators are acceptable for this project. Elevator pits shown were developed for a particular manufacturer's holed model. If a "hole-less" elevator is bid, include all costs to adapt the pits to the manufacturer and equipment. Shop drawings shall indicate modifications needed for the selected equipment and be executed at no additional***

cost to the Owner, including but not limited to excavation, concrete, structural, and electrical. [Add7-19.a]

- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations. Provide either of the following:
 - 1. Pump, with fan-cooled squirrel-cage induction motor, mounted on top of oil tank with vibration isolation mounts. Enclose pump in prime-painted steel enclosure lined with 1-inch- (25-mm-) thick, glass-fiber insulation board.
 - 2. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
 - 3. Provide motor with wye-delta or solid-state starting.
 - 4. Provide variable-voltage variable-frequency motor control.
- C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.
- D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.
 - 1. Provide dielectric couplings at plunger/cylinder units.
 - 2. Casing for Underground Piping: PVC pipe complying with ASTM D 1785 joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.
- F. Protective Cylinder Casings: PVC pipe casings complying with ASME A17.1, of sufficient size to provide not less than 1-inch (25-mm) clearance from cylinder, and extending above pit floor.
- G. Protective Cylinder Coating: Three layers of glass-fiber cloth each weighing not less than 5.6 oz./sq. yd. (190 g/sq. m), applied by saturating with catalyzed polyester resin.
- H. Protective Cylinder Coating: Two or more layers of PVC tape with a total thickness not less than 0.040 inches (1.0 mm) or other coating complying with ASME A17.1.
- I. Corrosion Protective Filler: A solventless, petroleum-based gel formulated for filling the space between hydraulic cylinders and protective casings. Filler is heavier than water, electrically nonconductive, and liquefies at approximately 150 deg F (66 deg C).
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Diversified Enterprises; No-Ox-Id R-R #6110A.
 - b. Pacific Standard Chemical Co.; Union-Gard 160.
- J. Car Frame and Platform: Welded steel units.
- K. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoist way entrance doors and frames, and signal equipment as indicated:
 - 1. Satin Stainless Steel: ASTM A 666, Type 304, with No. 4, directional satin finish.
 - 2. Nickel Silver Extrusions: ASTM B 151 (ASTM B 151M), alloy UNS No. C74500.
 - 3. Enameled-Steel Sheet: Cold-rolled steel sheet complying with ASTM A 366/A 366M, matte finish, stretcher-leveled standard of flatness; hot-rolled steel sheet complying with ASTM A 569/A 569M may be used for doorframes. Provide with factory-applied enamel finish; colors as selected by Architect.
 - 4. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications; color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range of products.

2.3 OPERATION SYSTEMS

- A. Passenger Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.
 - 1. Single Elevator, Two Stops: Provide "automatic operation" as defined in ASME A17.1.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated.
 - 1. Standby Powered Lowering: On activation of standby power, cars are lowered to the lowest floor, open their doors, and shut down.
- C. Security Features: In addition to above operational features, provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.
 - 1. Car-to-Lobby Feature: Feature, activated by a key switch at main lobby that causes all cars in a group to return immediately to lobby and open doors for inspection. On deactivation by key switch, cars complete calls registered before key switch activation and resume normal operation.
 - 2. Card-Reader Operation: For access to restricted landings. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Allow space in car as indicated for card reader.
 - a. When system is activated, car calls to restricted landings do not register until card is accepted by security access system. Security access system determines which landings are restricted and which of those are accessible to cardholder.
 - b. Card readers and other security access system equipment are specified in Division 17.
 - 3. **Provide for access control card reader installation to restrict access to 2nd floor. Coordinate with equipment being provided under Section 17400. Final location and style of device is subject to review and approval of the Architect. [Add6-3]**

2.4 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, no yellowing translucent plastic.
- B. Car Control Stations: Provide manufacturer's standard semirecessed car control stations. Mount in return panel adjacent to car door, if not otherwise indicated.
- C. Car Control Stations: Provide fully recessed car control stations with applied metal faceplates. Mount in return panel adjacent to car door, if not otherwise indicated.
- D. Swing-Return Car Control Stations: Provide car control stations fully recessed in hinged return panel adjacent to car door.
 - 1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
 - 2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
 - 3. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
 - 4. ~~Provide two car control stations in each passenger elevator; equip only one with required key switches, if any.~~ **Delete the requirement for two car control stations in each elevator. One per elevator is acceptable. [Add3-14.a]**
- E. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- F. Fire Department Communication System: Provide flush-mounted cabinet in each car and required conductors in traveling cable for fire department communication system specified in Division 16 Sections.

- G. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
 - 1. Include travel direction arrows if not provided in car control station.
- H. Hall Push-Button Stations: Provide one hall push-button station at each landing for each elevator or group of elevators, but not less than one station for each four elevators in a group. For each group of passenger elevators, locate between two elevators at center of group or at location most convenient for approaching passengers.
- I. Hall Push-Button Stations: Provide hall push-button stations at each landing for each elevator or group of elevators as indicated.
 - 1. Provide units with direction-indicating buttons; two buttons at intermediate landings; one button at terminal landings.
- ~~J. Hall Lanterns: **Delete the requirement for hall lanterns. [Add3-14.b]** Provide units with illuminated arrows, but provide single arrow at terminal landings.~~
 - ~~1. Provide units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.~~
 - ~~2. Place lanterns either above or beside each hoist way entrance, unless otherwise indicated. Mount at a minimum of 72 inches (1829 mm) above finished floor.~~
 - ~~3. Place lanterns in both jambs of entrance frame for each elevator. Mount at a minimum of 72 inches (1829 mm) above finished floor.~~
 - ~~a. At manufacturer's option, for single elevators or for only two cars in a group, lanterns may be located in car door jambs instead of entrance jambs.~~
 - ~~4. With each lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.~~
 - ~~a. At manufacturer's option, audible signals may be placed on each car.~~
- ~~K. Hall Position Indicators: **Delete the requirement for hall position indicators. [Add3-14.c]** Provide illuminated signal type or digital display type, located above each hoist way entrance at ground floor. Provide units with flat faceplate for mounting with body of unit recessed in wall.~~
 - ~~1. Integrate ground floor hall lanterns with hall position indicators.~~
- L. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

2.5 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door-reopening devices with a uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.
- B. Door Edge Device: Provide retractable edge shoes on elevator entrance doors that cause doors to stop and reopen upon contacting an obstruction. Include photoelectric device with timed cutout that projects dual-light beams across car entrance at 5- and 29-inch (127- and 737-mm) heights; the beams, when interrupted, cause doors to stop and reopen.
 - 1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.6 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard enameled-steel car enclosures with removable wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.
 - 1. Floor finish is specified in another Section.
 - 2. Metal Wall Panels: Flush hollow-metal construction, fabricated from metal indicated.

3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch (13-mm) fire-retardant-treated particleboard with plastic-laminate panel backing complying with NEMA LD 3, Type BKV and manufacturer's standard protective edge trim. Panels have a flame-spread rating of 25 or less, when tested according to ASTM E 84.
4. Fabricate car with recesses and cutouts for signal equipment.
5. Fabricate car doorframe integrally with front wall of car.
6. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
7. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish on nickel silver.
8. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic complying with flammability requirements.
9. Handrails: Manufacturer's standard handrails, of metal indicated.

2.7 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoist way wall construction.
- B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
 1. Stainless-Steel Frames: Formed stainless-steel sheet.
 2. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
 3. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide polished finish on nickel silver.
 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.8 PASSENGER ELEVATORS

- A. Elevator No.: 1
 1. Type: Under-the-car single cylinder.
 2. Rated Load: 3500 lb (1589 kg).
 3. Rated Speed: 100 fpm (0.51 m/s).
 4. Auxiliary Operations:
 - a. Standby powered lowering.
 5. Security Features: Car-to-lobby feature and Card-reader operation.
 6. Car Enclosures: As follows:
 - a. Inside Height: 88 inches (2235 mm).
 - b. Front Walls: Satin stainless steel with integral car door frames.
 - c. Car Fixtures: Satin stainless steel.
 - d. Side and Rear Wall Panels: Plastic laminate.
 - e. Reveals: Satin stainless steel.
 - f. Door Faces (Interior): Satin stainless steel.
 - g. Door Sills: Nickel silver.
 - h. Ceiling: Luminous ceiling.
 - i. Handrails: Satin stainless steel, at side and rear walls.
 - j. Floor prepared to receive sheet vinyl (specified in Division 9 Section "Sheet Vinyl Floor Coverings").
 7. Hoist way Entrances: As follows:
 - a. Width: 48 inches (1219 mm).
 - b. Height: 84 inches (2134 mm).
 - c. Type: Single-speed side sliding.
 - d. Frames: Satin stainless steel.
 - e. Doors: Satin stainless steel.
 - f. Sills: Nickel silver.
 8. Hall Fixtures: Satin stainless steel.
 9. Additional Requirements: As follows:

- a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 - b. Provide protective blanket hooks in all four cars and two complete sets of full-height blankets.
- 10. Locate elevator machine for Elevator 1 in Mechanical Room 200D. Coordinate placement with mechanical equipment. [Add3-14.d]**

B. Elevator No.: 2

- 1. Type: Under-the-car single cylinder.
- 2. Rated Load: 5000 lb (2270 kg).
- 3. Rated Speed: 100 fpm (0.51 m/s).
- 4. Auxiliary Operations:
 - a. Standby powered lowering.
- 5. Security Features: Card-reader operation.
- 6. Car Enclosures: As follows:
 - a. Inside Height: 108 inches (2743 mm).
 - b. Front Walls: Satin stainless steel with integral car door frames.
 - c. Car Fixtures: Satin stainless steel.
 - d. Side and Rear Wall Panels: Plastic laminate.
 - e. Reveals: Satin stainless steel.
 - f. Door Faces (Interior): Satin stainless steel.
 - g. Door Sills: Nickel silver.
 - h. Ceiling: Luminous ceiling.
 - i. Handrails: Satin stainless steel, at side and rear walls.
 - j. Floor prepared to receive sheet vinyl (specified in Division 9 Section "Sheet Vinyl Floor Coverings").
- 7. Hoist way Entrances: As follows:
 - a. Width: 48 inches (1219 mm).
 - b. Height: 84 inches (2134 mm).
 - c. Type: Single-speed side sliding.
 - d. Frames: Satin stainless steel.
 - e. Doors: Satin stainless steel.
 - f. Sills: Nickel silver.
- 8. Hall Fixtures: Satin stainless steel.
- 9. Additional Requirements: As follows:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 - b. Provide protective blanket hooks in both cars and two complete sets of full-height blankets.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify critical dimensions, and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. For the record, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance.

3.2 INSTALLATION

- A. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of cylinders; comply with applicable requirements in Division 2 Section "Earthwork."
 - 1. Provide waterproof well casings as necessary to retain walls of well hole.
- B. Install cylinders in protective casings within well casing. Before installing protective casing, remove water and debris from well casing and provide permanent waterproof seal at bottom of well casing. Fill void space between protective casing and cylinder with corrosion-protective filler.

1. Align cylinders and fill space between well casing and protective casing with fine sand.
- C. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between well casing and pit floor with 4 inches (100 mm) of nonshrink, nonmetallic grout.
- D. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- E. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.
- F. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.
- G. Install piping above the floor, where possible. Where not possible, cover underground piping with permanent protective wrapping before backfilling.
- H. Lubricate operating parts of systems as recommended by manufacturers.
- I. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- J. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- K. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.4 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

3.5 PROTECTION

- A. Temporary Use: Do not use elevators for construction purposes unless cars are provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damage.
 1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation

at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.

2. Provide protective coverings, barriers, devices, signs, and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

END OF SECTION 14240