

## SECTION 14240 - HYDRAULIC ELEVATORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes hydraulic passenger elevators.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for excavation to accommodate plunger-cylinder assembly.
  - 2. Division 3 Section "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
  - 3. Division 4 Section "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry.
  - 4. Division 5 Section "Structural Steel" for the following:
    - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
    - b. Divider beams.
  - 5. Division 5 Section "Metal Fabrications" for the following:
    - a. Attachment plates and angle brackets for supporting guide-rail brackets.
    - b. Divider beams.
    - c. Pit ladders.
  - 6. Division 9 Section "Painting" for field painting of hoistway entrances.
  - 7. Division 9 Section "<Insert Section title>" for finish flooring in elevator cars.
  - 8. Division 13 Section "Fire Alarm" for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
  - 9. Division 16 Section "Premises Telephone Wiring" for telephone service to elevators.

#### 1.3 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.

#### 1.4 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, hoistway 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. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- E. 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.
- F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An elevator manufacturer who has completed elevator installations locally, similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance for the last 10 years. A manufacturer's representative does not meet these requirements.
- 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: Project is located in Zone **2**
- 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)."] [Section 407 in ICC A117.1.]

#### 1.6 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 hole, and casing on a firm price basis.
- C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

#### 1.7 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.

#### 1.8 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.
  - 3. If this elevator requires special diagnostic or programming tools to perform maintenance and trouble shooting, these tools must be furnished to the owner at no additional cost. If the tools must be maintained and/or upgraded on a periodic basis to keep them operational, than 20 years of upgrade/maintenance must be included in the elevator price. Written instructions and eight hours training are to be furnished to the owner or his designate.
    - a. Response Time: Two hours or less.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide hydraulic elevators by one of the following:
  - 1. Otis Elevator Company.
  - 2. Montgomery KONE Inc.
  - 3. ThyssenKrupp Elevator Systems..

#### 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.
- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsation.
  - 1. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
  - 2. Solid-state starting.
- 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. 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: sealed PVC cylinder protection system shall be installed. The system shall provide a means to monitor the space between the PVC sleeve and cylinder wall and evacuate unwanted fluids, so as to prevent such fluids from remaining in contact with the cylinder.
- G. Provide 20-year warranty with maintenance contract on hydraulic cylinder.

### 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: Provide "selective collective automatic operation" as defined in ASME A17.1.
  - 2. Multiple-Car Group: Provide "group 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. Battery-Powered Lowering: When power fails, cars are lowered to the lowest floor, open their doors, and shut down. System includes rechargeable battery and automatic recharging system.
  - 2. Independent Service: Key switch in car control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from key switch when car is in independent service. When in independent service, doors close only in response to the door close button.
  - 3. Automatic Dispatching of Loaded Car: When carload exceeds a predetermined weight, doors will begin closing.

## 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, non-yellowing translucent plastic.
- B. Car Control Stations: Provide manufacturer's standard satin stainless steel car control station. Mount in 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)."] [ICC A117.1.
- C. 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 telephone cabinet, with identification, instructions for use, and battery backup power supply.
- D. 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.
- E. In-Car-Lanterns: Provide direction lanterns and audible signal indicating car arrival and directions of travel located in the car doorjamb.
- F. Hall Push-Button Stations: Provide hall push-button stations at each landing for each elevator or group of elevators as indicated.
- G. 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 40 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.

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 car enclosures with applied wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, thresholds, lighting, and ventilation.
1. Floor finish is specified in another Section.
  2. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 3/4-inch fire-retardant-treated particleboard with plastic-laminate panel backing and manufacturer's standard protective edge trim.
  3. Fabricate car with recesses and cutouts for signal equipment.
  4. Fabricate car doorframe integrally with satin stainless steel front wall of car.
  5. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
  6. Sills: Extruded aluminum metal, with grooved surface, 1/4 inch (6.4 mm) thick
  7. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic complying with flammability requirements.
  8. Handrails: Manufacturer's standard stainless steel handrail across the rear (and or sides).

## 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 hoistway wall construction.
1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.
- B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
1. **White Powder Painted Steel or Stainless Steel Frames and Doors:** Flush, hollow-metal construction
  2. Sills: Extruded metal, with grooved surface, 1/4 inch (6.4 mm) thick. Provide aluminum finish.
  3. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.
  4. Where gypsum board wall construction is indicated, provide fire-resistance-rated, hollow-metal, door-and-frame hoistway entrances. Provide self-supporting frames with reinforced head sections.
- C. Materials and Fabrication: Provide selections indicated; provide manufacturer's standards but not less than the following:

## 2.8 PASSENGER ELEVATORS

- A. Elevator Nos.:

1. Rated Load: \_\_\_\_\_ lb
2. Rated Speed: \_\_\_\_\_ fpm
3. Operation System: **Selective collective automatic operation**
4. Auxiliary Operations:
  - a. **Battery-powered lowering.**
  - b. Independent service.
5. Car Enclosures: As follows:
  - a. Inside dimensions: **’-\_-“ x ’-\_-“**
  - b. Front Walls: Satin stainless steel with integral car door frames.
  - c. Car Fixtures: Satin stainless steel
  - d. Side and Rear Wall Panels: ¾”Plastic laminate
  - e. Reveals: Enameled steel.
  - f. Door Sills: Aluminum.
  - g. Ceiling: **Six Down light Suspended Ceiling.**
  - h. Handrails: Satin stainless steel, at rear **(and or/side)** walls.
  - i. **Floor prepared to receive carpet** (specified in Division 9 Section "Carpet").
6. Hoistway Entrances: As follows:
  - a. **\_\_\_\_\_ x \_\_\_\_\_” inches**
  - b. Type: **Single-speed side sliding; center opening; two-speed**
  - c. Frames and doors: **White Powder Paint/ Satin Stainless Steel**
  - d. Sills: Aluminum.
7. Hall Fixtures Satin stainless steel
8. Additional Requirements: As follows:
  - a. Provide protective blanket hooks in all four 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.

### 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 well casings as necessary to retain walls of well hole.

- B. Install cylinders in protective casings of PVC with built in evacuation ports. Delete subparagraph below if local authorities having jurisdiction require space left empty.
- C. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor.
- 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 underground piping in Schedule 40 PVC pipe casing, provided by general contractor, assembled with solvent-cement fittings.
- G. Lubricate operating parts of systems as recommended by manufacturers.
- H. 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.
- I. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- J. 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