

CONSTRUCTION STANDARD SPECIFICATION

SECTION 14240

HYDRAULIC ELEVATORS

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SECTION 14240-S

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes the following:
 - 1. Hydraulic passenger elevators.
- B. The following sections contain requirements that relate to this Section:
 - 1. Section 02200, "Earthwork" for excavation to accommodate plunger-cylinder assembly. Where indicated, furnish well casing and coordinate delivery with related excavation work.
 - 2. Section 03300, "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
 - 3. Section 05120, "Structural Steel" for attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
 - 4. Section 05500, "Metal Fabrications" for attachment plates, angle brackets, divider beams, other steel framing for supporting guide-rail brackets, hot-rolled steel subsills and entrance frames, and pit ladders.
 - 5. Section 09900, "Painting" for field painting of hoistway.
 - 6. Sections 09300, for finish flooring in elevator cars.
 - 7. Division 15 Sections for ventilating hoistways and machine rooms.
 - 8. Sections 16001, "Electrical Work" for electrical service to elevators, including fused disconnect switches, standby power source, and transfer switch.

1.02 DEFINITIONS

- A. Hydraulic Elevators: Elevators in which cars are hoisted either directly or indirectly by action of a hydraulic plunger and cylinder (jack); with other components of the Work, including fluid storage tank, pump, piping, valves, car enclosures, hoistway entrances, operation systems, signal equipment, guide rails, electrical wiring, buffers, and devices for operations, safety, security, required performance at rated speed and capacity, and for complete elevator installation.
- B. 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.

1.03 SUBMITTALS

- A. General: Submit each item in this section according to the provisions of Section 01330, "Submittal Procedures".
- B. Product Data for each elevator including capacities, sizes, performances, operations, safety features, controls, finishes, and similar information.
- C. Shop Drawings for each elevator showing plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, and relationships with other construction. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and locations of signals. Include maximum and average power demands.
- D. Samples of exposed finishes for car, hoistway doors, and signal equipment; 3-inch (75-mm) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members and product literature describing profile and finish for grab bars.
- E. Maintenance manuals for each different hydraulic elevator, including operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include all diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Sandia Designated Representative's information at project closeout as specified in Section 01770, "Closeout Procedures".
- F. Inspection and acceptance certificates and operating permits as required by governing authorities for normal, unrestricted elevator use.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage the elevator manufacturer or an experienced Installer approved by the 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 the applicable provisions of the following:
 - 1. ASME A17.1, "Safety Code for Elevators and Escalators," referred to as the "Code."
 - 2. Seismic Zone: Comply with code requirements for seismic risk zone 2.
 - 3. ADA and ABA Accessibility Guidelines for Buildings and Facilities, Part II: ABA Application and Scoping.

1.05 WARRANTY

- A. General Warranty: The elevator warranty specified in this Article shall not deprive the Sandia Designated Representative of other rights the Sandia Designated Representative may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Standard Elevator Warranty: Submit a written warranty signed by manufacturer agreeing to repair, restore, or replace defective elevator equipment, cab, and controls work within the 12 months from date of Construction Completion.

1.06 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Construction Completion, provide 12 months' full maintenance service by skilled, competent 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. Use 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.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering hydraulic elevators that may be incorporated in the Work are the following:
 - 1. Permian Elevator Corp.
 - 2. Kone Elevator Co.
 - 3. ThyssenKrupp Elevator Co.

2.02 MATERIALS AND COMPONENTS

- A. General: Provide standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard preengineered elevator systems and as required for a complete system.

- B. Hydraulic Machines and Elevator Equipment: Provide hydraulic plunger-cylinder units of type indicated below, with electric pump-tank-control system equipment in machine room as indicated.
 - 1. Hydraulic Machines: Single-acting, under the car, hydraulic plunger cylinder units.
 - 2. Pump Unit: Positive displacement pump with a maximum of 10 percent variation between no load and full load and fan-cooled squirrel cage induction motor.
- C. Power Supply: Unless otherwise specified, 480V, 60HZ, 3Phase.
- D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide isolation couplings to prevent sound/vibration transmissions from power unit.
- E. Inserts: Furnish required concrete 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. Cylinder Casings: Protective casings 2 inches (50 mm) larger than cylinders made from Schedule 80 PVC pipe complying with ASTM D 1785, with bottoms of casings sealed with end caps complying with ASTM D 2467 and attached with solvent cement complying with ASTM D 2564.
- G. PVC Pipe: ASTM D 1785.
 - 1. Fittings for PVC Pipe: ASTM D 2466.
 - 2. Solvent Cement for PVC Pipe and Fittings: ASTM D 2564.
- H. Car Frame and Platform: Welded steel units.

2.03 OPERATION SYSTEMS

- A. General: Provide standard microprocessor operation system for each elevator or group of elevators of the type of operation indicated.
- B. Single Elevator--Passenger: Provide "Selective-Collective Automatic Operation" as defined in ASME A17.1.
- C. Passenger Service: Provide modular microprocessor to control car movements in a zoned operation. Provide automatic dispatching of car in a regulated sequence in response to hall calls, with automatic response of system to changes in demand for different traffic conditions including heavy incoming, heavy 2-way, heavy outgoing, and light off-hours as variations of normal 2-way traffic.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Elevator Controls Corp.
 - b. Motion Control Engineering Inc.

2.04 AUXILIARY OPERATIONS

- A. General: In addition to primary operation system features, provide the following operational features for passenger elevators, except where otherwise indicated.
 1. Battery powered lowering.
 2. Independent service for each car of a group.
 3. Loaded car bypass.
 4. Automatic dispatching of loaded car.
 5. Nuisance call cancel.

2.05 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators complying with requirements indicated below.
 1. Illuminated hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate of acrylic or other permanent translucent plastic.
 2. Buttons and phone panels shall have braille or other tactile surfaces for seeing impaired individuals.
 3. Except for buttons and illuminated elements, fabricate signal equipment with exposed surfaces as follows:
 - a. Car Fixtures: Satin stainless steel.
 - b. Hall Fixtures: Satin stainless steel.
- B. Swing-Return Car Control Stations: Provide car control station fully recessed in hinged return panel adjacent to door of each car. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation. Provide operating device symbols as required by the "Code." Mark other buttons and switches with manufacturer's standard identification for required use or function.
 1. Mount controls as shown or scheduled and at heights complying with .ADA and ABA Accessibility Guidelines for Buildings and Facilities, Part II: ABA Application and Scoping.
 2. Provide 1 car control station in each passenger elevator; equip only 1 with required keyswitches, if any.

- C. Emergency Communication System: Provide hands-free audio and visual 2-way emergency communication between each car and a 24-hour monitoring service. System automatically dials preprogrammed number of monitoring service and identifies elevator location to monitoring service. System is contained in flush-mounted cabinet complete with identification, instructions for use, and battery back-up power supply, and complies with ADA and ABA Accessibility Guidelines for Buildings and Facilities, Part II: ABA Application and Scoping. regulations.

- D. Car Position Indicator: For passenger elevator cars, provide either illuminated-signal type, digital-display type, or segmented type, located above the car door or above the 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. 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 flat faceplate designed for mounting on wall with body of units recessed in wall: 2-button stations at intermediate landings; 1-button stations with direction indication at terminal landings.

- F. Hall Lanterns: Provide units with illuminated arrows, but provide single arrow at terminal landings. Match materials, finishes, and mounting method of hall push-button stations.
 - 1. Provide units projecting from faceplates for ease of angular viewing.
 - 2. Place lanterns beside each hoistway entrance, unless otherwise shown. Mount at minimum of 72 inches (1829 mm) above finished floor.
 - 3. 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.

2.06 DOOR SAFETY DEVICES

- A. Infrared Array: Provide safety device with a uniform array of 36 or more microprocessor-controlled infrared light beams projecting across car entrance. Interruption of one of the light beams shall cause the doors to stop and reopen.

2.07 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide standard car enclosures of the selections indicated. Include ventilation, lighting, access doors, doors, power door operators, sills (thresholds), trim, accessories, and wall and ceiling finishes. Provide manufacturer's standard flush-panel horizontal-sliding doors of type indicated. Provide standard protective edge trim system for door and wall panels, except as otherwise indicated.
 - 1. Floor finish is specified in Section 09300 "Tile".
- B. Materials and Fabrication: Provide selections indicated for each car enclosure surface; provide manufacturer's standards, but not less than the following:
 - 1. Satin Stainless Steel: ASTM-A-167, Type 302 or 304, with No.4 satin finish.
 - 2. Aluminum Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thickness, satin finish.
 - 3. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type GP-50; color, texture, and pattern as selected by the SDR from plastic laminate manufacturer's full range of products.
 - 4. Fabricate car door frame integrally with front wall of car.
 - 5. Fabricate car with recesses and cutouts for signal equipment.
 - 6. Brushed Stainless-Steel Ceiling: Flush panels with 6 low-voltage downlights in the center of each panel.
 - 7. Handrails: Provide satin finish, stainless-steel handrails on side walls and back wall, unless otherwise indicated.
 - 8. Provide elevator blankets and hooks to protect interior finish when elevator is used for equipment delivery.

2.08 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide standard hollow-metal, sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Match car doors for size, number of panels, and door movement. Provide frame size and profile to coordinate with hoistway wall construction.
 - 1. Where gypsum board wall construction is indicated, fabricate frames with reinforced head sections.
- B. Materials and Fabrication: Provide selections indicated; provide manufacturer's standards, but not less than the following:

1. Satin Stainless-Steel Frames: Formed stainless-steel sheet, ASTM A 167, Type 302 or 304, with No. 4 satin finish.
2. Satin Stainless-Steel Panels: Flush construction, fabricated from ASTM-A-167, Type 302 or 304 stainless steel, with No.4 satin finish.
- 3.
4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for grouting door sills and similar applications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of elevator work. Examine hoistways, hoistway openings, pits, and machine rooms, as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed. Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. For the record, prepare a written report, endorsed by the Installer, listing dimensional discrepancies and conditions detrimental to the performance of elevator work.

3.02 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations.
- B. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of plunger-cylinder units; comply with applicable requirement of Section 02200 "Earthwork."
- C. Install plunger cylinder directly in well casings. Align plunger cylinder and fill void space with fine sand.
- D. Install plunger-cylinder units plumb and accurately centered for elevator car position and travel; anchor securely in place, supported at the pit floor.
- E. 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.

- F. Coordination: Coordinate elevator work with work of other trades for proper time and sequence to avoid construction delays. Use established benchmarks, lines, and levels to ensure dimensional coordination of the Work.
- G. 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.
- H. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent cement fittings.
- I. Lubricate operating parts of systems as recommended by manufacturers.
- J. 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.
- K. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- L. Set sills flush with finished floor surface at landings. Fill space under sills solidly with nonshrink, nonmetallic grout by G.C.

3.03 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of elevator installation, and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by the "Code" and by governing regulations and agencies.
- B. Advise Sandia Designated Representative and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

3.04 DEMONSTRATION

- A. Instruct Sandia Designated Representative'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 failure in operation and other building emergencies. Train Sandia Designated Representative's

personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Sandia Designated Representative on requirements for a complete elevator maintenance program.

- B. Make a final check of each elevator operation with Sandia Designated Representative's personnel present and just prior to date of Construction Completion. Determine that operation systems and devices are functioning properly.

3.05 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 the 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 parts and supplies as used in the manufacture and installation of original equipment.
 - 2. Provide protective coverings, barriers, devices, signs, or 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.
- B. Provide final protection and maintain conditions, in a manner acceptable to elevator manufacturer and Installer, that ensure elevators are without damage or deterioration at the time of Construction Completion.

3.06 HYDRAULIC PASSENGER ELEVATOR SCHEDULE

- A. Elevator
 - 1. Type: Under-the-car single cylinder
 - 2. Quantity: 1
 - 3. Elevator Model: Refer to the Drawings
 - 4. Operation: Microprocessor based Simplex Collective or Microprocessor Control or approved equal.
 - 5. Capacity: 2500 lbs.

6. Clear inside: Refer to the Drawings or Contract documents.
 7. Platform Size: Refer to the Drawings or Contract documents.
 8. Entrance Size: Height: 7'-0"
Width: 3'-6"
 9. Speed: 125 FPM
 10. Net Elevator Travel: Refer to the Drawings or Contract documents.
 11. Openings - Front: Refer to the Drawings or Contract documents.
 12. Cab Height: 8'-0" nominal, 7'-5" clear inside under ceiling.
 13. Door Type: Center opening
 14. Power Characteristics: Unless otherwise noted, 480 VAC, 3 Phase, 60 Hz, and 120 VAC, 1 Phase, 60 Hz for lighting.
 15. Special Features: Fire Fighter's Operation Phase I & II
IBC Seismic Zone II Requirements
- B.
1. Battery operated lowering.
 2. Independent service.
 3. Loaded car bypass.
 4. Automatic dispatching of loaded car.
 5. Nuisance call cancel.
 6. Keyswitch operation feature.
- C. Car Enclosures: As follows:
1. Inside dimensions as follows:
 - a) Width: Refer to the Drawings or Contract documents.
 - b) Depth: Refer to the Drawings or Contract documents.
 - c) Height: Refer to the Drawings or Contract documents.
 2. Front Walls: Stainless steel with satin finish and with integral car door frames.
 3. Side and Rear Walls: Plastic laminate.

4. Door Faces (Interior): Stainless steel with satin finish.
 5. Ceiling: Refer to the Drawings or Contract documents.
 6. Handrails at side and rear walls, 1 ½" cylindrical stainless steel with satin finish.
 7. Floor prepared to receive tile (specified in Section 09300 " Tile ").
- D. Hoistway entrances as follows:
1. Size: Refer to the Drawings or Contract documents.
 2. Type: Center opening.
 3. Frames: Stainless steel with satin finish.
 4. Doors: Stainless steel with satin finish.
- E. Additional Requirements: As follows:
1. Provide local code inspection certificate in each car, mounted under acrylic cover with stainless-steel frame.

- END OF SECTION -