SECTION 14240 – HYDRAULIC ELEVATOR

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.01 SUMMARY

A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
   1. Commercial, standard pre-engineered hydraulic passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Jacks.
   4. Operation and control systems.
   5. Accessibility provisions for physically disabled persons.
   6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   7. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 3 Sections: Installing inserts, sleeves and anchors in concrete.
   2. Division 4 Sections: Installing inserts, sleeves and anchors in masonry.
   3. Division 5 Sections:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   4. Division 9 Sections: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   5. Division 15 Sections:
      a. Sump pit and oil interceptor.
      b. Heating and ventilating hoistways and machine rooms.
   6. Division 16 Sections:
      a. Providing electrical service to elevators, including fused disconnect switches.
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in machine room, hoistway and pit.

1.02 SUBMITTALS

A. Product data: When requested, submit product data for the following:
   1. Elevator car enclosures and hoistway entrances.
   2. Operation, control, and signal systems.

B. Shop drawings:
   1. Show equipment arrangement in the machine room, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
   2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
   3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
   4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Color selection: Submit color charts of exposed finishes and materials for color selection.
   1. When requested, submit samples of exposed finishes and materials selected for the elevator system materials and components.

D. Certificates: Inspection and acceptance certificates of elevator system installation.

E. Operation and maintenance data. Include the following:
   1. Operation and maintenance instructions.
   2. Parts list, with recommended parts inventory.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer regularly engaged in manufacturing, installing, and servicing elevators of the type required for the project.
   1. The manufacturer of the machine, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
      a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
   2. The manufacturer shall have a documented, on-going quality assurance program.

B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than five years of satisfactory experience installing elevators equal in character and performance to the project elevators.

C. Regulatory Requirements:
   1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. International Building Code.
   3. NFPA 70 National Electrical Code.
   4. NFPA 80 Fire Doors and Windows.
   5. Americans with Disabilities Act - Accessibility Guidelines (ADAAG).

D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).

E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
   1. Arrange for inspections and make required tests.
   2. Deliver to the Owner upon completion and acceptance of elevator work.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver elevator materials, components and equipment in manufacturer's protective packaging.

B. Store materials in a dry protected area provided by others. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.

1.05 PROJECT CONDITIONS

A. Prohibited Use: Elevators shall not be used for any purpose during the construction period before Substantial Completion.

B. Painting:
   1. Except as otherwise specified, paint all metal work provided by the elevator manufacturer and installer.
   2. Provide all ferrous metals installed in the hoistway shop primed with a rust inhibitive primer.

C. Provide the hole for the jack unit if required by the type of jack provided, based on excavation through normal soil or clay which can be removed by manual digging or by standard truck-mounted regular drilling unit. Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.
   1. If a physical obstruction or hindrance is encountered below the ground surface, including boulders, rock, gravel, wood, metal, pilings, sand, water, quick sand, caves, public utilities or any other foreign material, obtain written authorization to proceed with excavating using special excavation equipment.
   2. Maintain a daily log of time and material costs involved.
   3. Elevator contractor will be compensated on a time and material basis for additional costs incurred after encountering the physical obstruction or hindrance, including the cost of the special excavation equipment.

1.06 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion.

1.07 MAINTENANCE

A. Furnish maintenance and call back service for a period of 3 months months for each elevator from date of Substantial Completion. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
   1. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
   2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
   3. Manufacturer shall have a service office and full time service personnel within a 50 mile radius of the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: ThyssenKrupp Elevator, Memphis, TN.

2.02 MATERIALS, GENERAL

A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

B. Steel:
   1. Shapes and bars: ASTM A 36.
   2. Sheet: ASTM A 366, cold-rolled steel sheet, commercial quality, Class 1, matte finish, stretcher leveled.
   3. Finish: Factory-applied baked enamel.

C. Stainless steel:
   1. Shapes and bars: ASTM A 276, Type 304 (18-8).
   2. Tubing: ASTM A 269, Type 304 (18-8).

D. Bronze:
   1. Drawn pipe: ASTM B 43, alloy UNS C23000, red brass.
   2. Sheet: ASTM B 36, alloy UNS C28000, muntz metal.
   3. Extrusions: ASTM B 455, alloy UNS C38500, architectural bronze.

E. Aluminum:
   1. Sheet and plate: ASTM B 209, alloy 6063-T52.
   2. Extrusions: ASTM B 221, alloy 6063-T52.

F. Nickel silver: ASTM B 151 extrusions, alloy UNS No. C74500, polished finish.

G. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness.

H. Wood:

I. Glass: Clear laminated safety glass, complying with ANSI Z97.1, nominal 9/16" thickness.

J. Carpet: Manufacturer's standard Herculon IV color fast, stain and soil resistant, jute-backed carpet. Class B fire-resistance rating when tested in accordance with ASTM E 84. Available in four colors.

2.03 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed.

B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

C. Guide Rails: Steel, omega shaped, fastened to the building with steel brackets.

D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.

E. Guide Rail Lubricators: Provide a leakproof reservoir on top of upper guide shoes. Wool felt wiper shall apply an even, uniform flow of lubricant which shall thoroughly cover face of guide rail.

F. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

G. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction. Jack unit shall consist of the following components:
   1. Heavy seamless steel tubing plunger accurately turned and polished.
   2. Stop ring shall be electrically welded to the plunger to prevent plunger leaving the cylinder.
   3. Internal guide bearing.
   4. Packing or seal of suitable design and quality.
   5. Drip ring around cylinder top.
   6. Cylinder made of steel pipe and provided with a pipe connection and air bleeder.
   7. Weld brackets to the jack cylinder for supporting the elevator on pit channels.
   8. An auxiliary safety bulkhead shall be provided in the lower end of the cylinder.
   9. Corrosion protection for the jack cylinder by encasing the entire length of the cylinder below ground with plastic auxilliary casing.

H. Automatic Terminal Limits: Place electric limit switches in the hoistway near the terminal landings. Limit switches shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

I. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

J. Failure Protection: Design electrical control circuit so if a malfunction occurs, due to motor starter failure, oil becoming low in the system, or the car failing to reach a landing in the up direction within a pre-determined time, the elevator car will automatically descend to the lowest terminal landing. If power operated doors are used, the doors will automatically open when the car reaches that landing to allow passengers to depart. The doors will then automatically close and all control buttons, except the "door open" button in the car station, shall be made inoperative.

K. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary pipe and fittings shall connect the power unit to the jack unit. Provide proper grade oil.

L. Emergency Terminal Stopping Device: Provide emergency terminal stopping devices for speeds over 100 FPM. The emergency terminal stopping device shall operate independently of the normal terminal stopping device if it fails to slow down the car at the terminal as intended. Stopping devices shall not be prevented from functioning by a single short circuit caused by a combination of grounds or by other conditions.
   1. Normal and emergency terminal stopping devices shall not control the same controller switches unless two or more separate and independent switches are furnished, two or which shall be closed in either direction of travel to complete the circuit to the control valve solenoids in the down direction and to complete the circuit to the pump motor for the up direction of travel.

2.04 POWER UNIT

A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit consisting of the following items:
   1. Oil reservoir with tank cover and controller compartment with cover.
   2. An oil hydraulic pump.
   3. An electric motor.
   4. Oil control unit with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and magnetic controller.

B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.

C. Drive: Drive shall be by direct coupling with the pump and motor submerged in the oil reservoir or by multiple V-belts and sheaves of number and size to insure maximum factor of safety. Drive type shall be determined based primarily on the load on the car, travel, and speed.

D. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall comply with specified speeds and loads.

E. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
   1. Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.

2. Up start and stop valve shall be externally adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
4. Lowering valve and leveling valve shall be externally adjustable for drop-away speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling when slowdown is initiated.

F. Power controller shall contain electrical contactors, electro-mechanical switches and thermal overload relays. Mount components in a NEMA 1 enclosure. Logic control system shall be microprocessor based and protected from environmental extremes and excessive vibrations.

G. Starting: Provide solid state.

2.05 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening.
1. Manufacturer's standard entrance design consisting of 14 gauge frames with 2 inch (50 mm) profile, 16 gauge doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
2. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer's requirements.
3. Doors: Flush construction
   a. Bronze: Primed steel panels faced with ASTM B 36, bronze sheet, alloy UNS No. C28000 (muntz metal), natural satin finish, lacquered.
4. Frames: Formed construction.
   a. Bronze: Primed steel panels faced with ASTM B 36, bronze sheet, alloy UNS No. C28000 (muntz metal), natural satin finish, lacquered.
5. Transom: No transom.

B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway sliding door.
1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
2. Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness
1. Bronze: ASTM B 455 architectural bronze, alloy UNS C38500, polished finish.

2.06 CAR ENCLOSURE

A. Car Enclosure:
1. Walls: Cab type DLP, durable wood core finished on both sides with high pressure plastic laminate
2. Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit. Finish: Two coats factory applied reflective baked enamel.
3. Ceiling: Downlight type, 16 gauge metal pans with halogen downlights suspended and dimmer switch 7'-4" (2235 mm) above the finished floor. Number of downlights shall be dependent on platform size with a minimum of six.
   a. Metal finish: Bronze, natural satin finish, lacquered.

4. Cab Columns, Front, and Transom: Bronze: Primed steel panels faced with ASTM B 36, bronze sheet, alloy UNS No. C28000 (muntz metal), natural satin finish, lacquered.finish
5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic shoes sliding in a smooth threshold groove.
   a. Door Finish: Bronze: Primed steel panels faced with ASTM B 36, bronze sheet, alloy UNS No. C28000 (muntz metal), natural satin finish, lacquered.
   b. Cab Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness.
      1) Bronze: ASTM B 455 architectural bronze, alloy UNS C38500, polished finish.
6. Handrail: metal bar, 2" wide, satin bronze. Provide at rear wall only.
7. Ventilation: Two speed exhaust fan mounted on the car top.
8. Pad Buttons: Provide pad buttons on cab front(s) and walls.
   a. Provide one set of vinyl protection pads for the project.
9. Base: satin bronze
10. Finished Floor: Manufacturer's standard carpet

B. Car Top Inspection: Provide a car top inspection station with an "emergency stop" switch and constant pressure "up-down" direction buttons to make the normal operating devices inoperative and give the inspector complete control of the elevator. Mount the car top inspection station in the door operator assembly.

2.07 DOOR OPERATION

A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, AC controlled units with oil checks, or other deviations are not acceptable.
   1. No Un-Necessary Door Operation: Car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as the next car up.
   2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
   3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
   4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a field programmable time, a buzzer will sound and the doors will close at reduced speed. If the infra-red door protection system detects a person or object while closing, the doors will stop and resume closing after the obstruction has been removed.
   5. Limited Door Reversal: If the doors are closing and an infra-red beam is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
   6. Door Open Sentinel: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then open six times to try and correct the fault.
   7. Door Close Sentinel: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then close six times to try and correct the fault.
   8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door Protection Devices: Provide a door protection system using 40 microprocessor controlled infra-red

light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen. A mechanical reopening device is not acceptable.

2.08 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in satin bronze integral swing return panel requiring no applied faceplate. The panel shall consist of a series of modules, inclined 20 degrees from vertical for optimum viewing and accessibility.
   1. The lowest module shall contain the "door open," "door close," "alarm" buttons and a keyed "emergency stop" switch.
   2. Intermediate modules shall contain floor buttons which illuminate when a call is registered and remain illuminated until the call is answered. Raised floor indications and handicap symbols shall be located immediately adjacent to the floor buttons and be fully integrated in the module design. No applied symbols or floor indications or symbols on the buttons shall be permitted.
   3. The next module shall contain required switches.
   4. The top module shall contain fire service features in accordance with ASME A17.1, Rule 211.3, including operating instructions.

B. Position Indicator: An electronic dot matrix position indicator inclined 20 degrees from vertical and mounted in a module matching the control panel for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped or passing.

C. Emergency Light: An emergency light and capacity plate shall be integrated into a module inclined 20 degrees from vertical. Emergency light shall illuminate automatically upon loss of the building's normal power supply.

D. Emergency Communications System: Provide an emergency communications device mounted in the swing return. Emergency communications device shall comply with Americans with Disabilities Act (ADA) requirements.

E. Auxillary Operating Panel: not applicable in this application.

F. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

G. Special Accessories:
   1. Independent service switch.
   2. Inspection switch.
   3. Two speed fan/light switch.
   4. Telephone jack.
   5. Certificate frame.

2.09 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented and be linked together for purposes of communication by a serial communications link. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
   1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the

buttons are pressed. Each landing call shall be canceled when answered.

2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.
3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.

B. Microprocessor: Locate the main microprocessor and car controller in the elevator machine room.
1. Microprocessor door operator shall reside in the door operator and control all functions of the elevator door(s).
2. Electronic selector shall reside on the car top and contain hall effect transducers that detect magnetic fields. Magnets, corresponding to floor positions and top/bottom of hoistway are mounted on a perforated metal tape that runs the length of the hoistway.

C. Group Operation: The system shall operate on a real time response, demand basis, constantly scanning and calculating the most efficient car assignment. Hall call assignments shall be based on the availability of each car in the group and shall be based primarily on the principle of the nearest car selection and priority call assignment. Car available status is determined based on the following input:
1. Car position.
2. Direction of car travel.
3. Car calls registered.
4. Direction and unanticipated delay.
5. Perform new calculation and reassignment for each occurrence.

D. Provide a key operated switch in the elevator for the purpose of removing the car from normal operation. When the switch is in the "independent service" position, the elevator will bypass all landing calls and answer only car calls. The operator will have complete control over the operation of the car.

E. Emergency Power 10D-OC: In the event of a normal power supply failure, the elevator system shall be arranged to lower from an emergency power supply. The emergency power supply shall consist of a battery furnished by the elevator contractor. The elevator contractor shall provide circuitry so after normal power failure and establishment of emergency power, each elevator shall lower to a field adjustable return landing and park with the doors closed. If the designated return landing is above the current position, the elevator shall run down to the next lower landing and park with the doors closed.

2.10 HALL STATIONS

A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction. Faceplates shall be satin bronze. Provide one set of risers.
1. Each terminal station shall contain one illuminating push button.
2. Each intermediate station shall consist of two illuminating pushbuttons, one for the up direction and one for the down position.
3. Phase 1 firefighters service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Hall Lanterns: No applicable in this application

D. Hall Position Indicator: A dot matrix position indicator shall be provided and inclined 20 degrees from vertical and mounted in a module for optimum viewing. As the car travels, its' position in the hoistway shall be indicated by the illumination of the alpha/numeric character corresponding to the landing which the elevator is stopped or passing. When hall lanterns are provided, the position indicator shall be combined with the hall lanterns in the same faceplate.
   1. Hall Position Indicator: Located at floor(s) [identify].
   2. Faceplates shall match hall stations.

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

A. Oil Hydraulic Silencer: Install an oil hydraulic silencer (muffler device) at the power unit location. Silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line. Rubber hose without blowout proof features will not be acceptable.

B. Vibration Pads: Mount vibration pads under the power unit assembly to isolate the unit from the building structure.

C. Sound Insulating Panels: When pump and motor are not submerged, provide panels manufactured of reinforced 14 gauge steel with 1 inch (25 mm) thick 1-1/2 pound fiberglass core attached to interior and mounted on all four open sides of the power unit frame.

D. Sound Isolating Couplings: When pump and motor are not submerged, install a minimum of two couplings in the oil line in the machine room between pump and jack.

PART 3 EXECUTION

3.01 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.

C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

D. Jack unit excavation: Drill or otherwise excavate below elevator pit construction as required to install the jack unit.
   1. Install casing for jack unit.
   2. Set casing for jack unit assembly plumb, and fill water-settled sand, eliminating voids.

E. Set jack unit-cylinder assembly plumb, centered accurately and shimmed to proper elevation, using centering lugs to prevent dislocation during filling. Fill space between casing and cylinder with clean, dry, compacted sand.

F. Welded construction: Provide welded connections for installation of 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 qualification of welding operators.

G. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

H. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

I. Sound isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent the transmission of vibrations to the structure, and eliminate sources of structure-borne noise from the elevator system.

J. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

K. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascias and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.

L. Lubricate operating parts of system, including ropes, as recommended by manufacturer.

3.03 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.06 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective

coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 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 failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

A. Elevator Qty. 1.
   1. Elevator Model: Marquis 25
   2. Rated Capacity: 2500 LBS.
   3. Rated Speed: 125 feet per second.
   4. Operation System: ThyssenKrupp Elevator TAC20
   5. Travel: 30ft 2 in.
   6. Openings:
      a. Front: 1
      b. Rear: 0
   7. Clear Car Inside: 6'-8" wide x 4'-3"
   8. Cab Height: Nominal 8'-0"
   9. Hoistway Entrance Size: 7'-0" high x 3' -6" wide.
   10. Door Type: One speed single slide
   11. Door Operation: Automatic, direct current powered.
   12. Power Characteristics: 460 volts, 3 Phase, 60 Hz.
   13. Seismic requirements for zone 2

END OF SECTION 14240

COMFORT SUITES

SECTION 14560 - CHUTES

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions, Division-1, Division-7, Division-9, Division-15 and Division-16 Specification sections apply to work of this section.

SUMMARY:

Extent and location of each chute is indicated on drawings and by provisions of this section.

Types of chutes required include the following:

24" diameter soiled linen chute

REFERENCE STANDARDS:

NFPA Code: Comply with applicable portions of National Fire Protection Association (NFPA) No. 82 Standard on "Incinerators, Waste and Linen Handling Systems and Equipment".

SUBMITTALS:

Product Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations for total pre-engineered chute system. Mark-up data sheets to indicate actual selections for sizes and other details of installation.

Shop Drawings: Submit 1/4" scale section/elevation drawing, 1/2" scale typical landing plans, and 1-1/2" scale details of chute fabrication and installation including roof flashing. Distinguish between factory fabrication and field assembly work. Show required piping, and wiring connections and conduit runs for wiring.

QUALITY ASSURANCE:

Fabricator Qualifications: Firm with at least 5 years of experience in fabrication of chutes similar to those required for project.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Cutler-Federal, Inc.; Eaton Park, FL
Midland Metalcraft Corp.; Joliet, IL
U.S. Chutes Corp.; Brookfield, CT
Wilkinson Chutes, Inc.; Stow, OH

MATERIALS AND FABRICATION:

General: Provide manufacturer's standard chute system of type, service, sizes and shapes indicated. Fabricate of metals and finishes as indicated; include support units, expansion joint materials; roof counterflashing and retainer band, roof- termination vent unit; intake chute throat sections located where indicated to accommodate door units as specified, discharge door units of type indicated; sanitizing or flushing units as specified, sprinkler heads where indicated, and manufacturer's standard accessories, fasteners and installation materials.

Chute Metal: Aluminum-coated cold rolled commercial quality, steel sheet ASTM A 463, Type 1 with T1-40 coating, gages as indicated.

Gage: U.S. No. 16 (0.062" thick).

Chute Intake Door/Frame Units: Provide self-closing units at each landing and at heights above floor as indicated. Use manufacturer's recommended heights if not otherwise shown. Intake door: stainless steel, 21" wide x 21" high, side hinged, with the full 180 degree opening swing. Equip doors with positive latch and latch handle. Provide manufacturer's standard stainless steel door units, AISI Type 304/304 with standard satin finish or No. 3 directional polish.

Discharge: U.S. #16 gauge aluminized steel type "H" hopper with 24" wide x 30" high, top hinged, hand operated doors with 165 deg. F. fusible link. Provide reinforced bottom with #13 gauge impact plate. Hopper to be supported with 2" pipe pedestal and equipped with 2" IPS drain flange for connection by plumber, as required by city or state and/or fire codes.

UL Labeled Door Units: Provide UL "B" labeled door units (1.0
hour with 30-min temp. rise of 250 deg F. (139 deg. C), complete with closers.

Electrical Interlocks: Equip intake door units of each chute with manufacturer's standard electrical interlocks; normally unlocked, locked when energized to prevent opening of door until unenergized. Design door lock units for wiring together (for each chute), and for connection to power source and control elements as indicated (if any). Conduit for wiring is not work of this section.

Fire Protection: Provide interlock system with temperature- rise elements which lock all doors of chute at predetermined, adjustable temperature in chute.

Manual Control Switch: Provide interlock system with manual control stations where indicated, with switch to lock all doors of chute during shut-down hours and service operations.

Roof-Termination Vent Units: Provide vent unit with roof-deck flange. Comply with NFPA requirements for full-sized chute extension to 4'-0" above roof, with full diameter screened vent area and metal safety cap or glass explosion-release cap. Provide nonferrous metal roof counterflashing and clamping ring, compatible with chute metal.

Fire Sprinklers: Equip chute with sprinkler heads in accordance with NFPA Standard No. 13, ready for piping connections (as work of another specification section). Provide access for maintenance of heads. Except as otherwise indicated or required by governing regulations, provide 1/2" I.P.S. heads, one located in chute above highest intake door, and one located at intake door on alternate floors and at lowest service level.

Flushing Spray Unit: Provide 3/4" I.P.S. spray head unit in chute above highest intake door, ready for hot water piping connection (as work of another specification section). Provide access for maintenance of head and piping.

Equip spray unit with disinfecting and sanitizing unit, including 1-gal tank and adjustable proportioning valve with by-pass for manual control of sanitizing and flushing operation.

PART 3 - EXECUTION

INSTALLATION:

General: Comply with chute manufacturer's instructions and recommendations. Assemble components with tight, nonleaking joints; and anchor securely to supporting structure with sufficient anchorages to withstand impact and wind loading stresses on vent units. Provide for thermal expansion movement of chute sections. Except as otherwise indicated, install chutes plumb, without offsets or obstructions, for free fall of materials within chutes. Install chute systems complete with doors, and with safety, sanitizing and fire-resistive components and accessories.

Coordination with Roofing: Where roof deck curb units are not shown to receive chute roof-termination vent units, anchor vent unit support flange directly to deck before installation of roofing/insulation system. Install counterflashing after roofing/flashing system has been installed.

Intake and Discharge Doors: Install doors at heights and locations indicated. Provide anchorages, wall/chute interfaces, self- closing operation, self-latching and similar features of installation to comply with labeling and fire-resistive requirements for fire-resistive door construction. Interface door units with throat sections of chutes in a manner which will ensure safe, snag-proof, sanitary depositing of materials in chutes by users.

Sanitizer Unit: Install sanitizer unit where indicated, cutting and patching chute wall only to extent necessary for installation; maintain fire-resistive construction. Interconnect sanitizer control with door interlock system.

Interlock System Wiring: Install electrical wiring for operation and control of door interlock system; comply with applicable NECA standards and recommendations.

TESTING, ADJUSTING, CLEANING:

Test operate components of chute system upon completion of installation; demonstrate use and safety features to Owner's personnel. Operate doors, locks and interlock system to demonstrate that hardware is adjusted and electrical wiring is connected correctly. Where possible, complete test operations prior to installation of shaft enclosures.

Provide heat/smoke test to demonstrate that heat/smoke sensing devices and sprinkler heads are operable.

Operate sanitizing equipment through one complete cycle of use and cleanup, and demonstrate replenishment of chemicals or cleaning fluids in containers of unit.

Cleaning: Following completion of enclosure walls and ceilings, clean exposed surfaces of finished metal components of chute system. Remove foreign substances and repair imperfections in finishes, but do not remove UL labels.

END OF SECTION 14560