

**14**  
**DIVISION**

**CONVEYING SYSTEMS**

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**SECTION 14 2423**  
**HYDRAULIC ELEVATORS - PASSENGER**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial, standard pre-engineered hydraulic passenger elevators.
- B. Elevator car enclosures, hoistway entrances and signal equipment.
- C. Jacks.
- D. Operation and control systems.
- E. Accessibility provisions for physically disabled persons.
- F. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
- G. Materials and accessories as required to complete the elevator installation.

**1.02 RELATED SECTIONS**

- A. Division 3 Sections: Installing inserts, sleeves and anchors in concrete.
- B. Division 4 Sections: Installing inserts, sleeves and anchors in masonry.
- C. Division 5 Sections:
  - 1. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
  - 2. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
- D. Division 9 Sections: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
- E. Division 22 Sections:
  - 1. Sump pit and oil interceptor.
  - 2. Heating and ventilating hoistways and machine rooms.
- F. Division 26 Sections:
  - 1. Providing electrical service to elevators, including fused disconnect switches.
  - 2. Emergency power supply, transfer switch and auxiliary contacts.
  - 3. Heat and smoke sensing devices.
  - 4. Convenience outlets and illumination in machine room, hoistway and pit.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product data: Submit product data for the following:
  - 1. Elevator car enclosures and hoistway entrances.
  - 2. Operation, control, and signal systems.
- C. 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.
- D. Color selection: Submit color charts of exposed finishes and materials for color selection.
- E. Submit samples of exposed finishes and materials selected for the elevator system materials and components.
- F. Certificates: Inspection and acceptance certificates of elevator system installation.

- G. Operation and maintenance data. Include the following:
  - 1. Operation and maintenance instructions.
  - 2. Parts list, with recommended parts inventory.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Madison Local School District's name and registered with manufacturer.

#### **1.04 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.
  - 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. National Building Code.
  - 3. NFPA 70 National Electrical Code.
  - 4. NFPA 80 Fire Doors and Windows.
  - 5. Americans with Disabilities Act - Accessibility Guidelines (ADAAG).
  - 6. 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).
  - 7. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
    - a. Arrange for inspections and make required tests.

#### **1.05 DELIVERY, STORAGE, AND PROTECTION**

- 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.

#### **1.06 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.
  - 3. Provide the hole for the jack unit if required by the type of jack provided remove excavation spoils deposited in the elevator pit.

#### **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. 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 2 years from date of Substantial Completion.

## **1.08 MAINTENANCE SERVICE**

- A. Furnish maintenance and call back service for a period of 2 years 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 75 mile radius of the project site.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. ThyssenKrupp Elevator, Memphis, TN
- B. Acceptable Manufacturers:
  - 1. Kone
  - 2. Otis
- C. Substitutions: See Section 01 6000 - Product Requirements

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

### **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 auxiliary 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.
- M. Normal and emergency terminal stopping devices shall not control the same controller switches unless two or more separate and independent switches are furnished, two of 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.
  1. Mounted on oil tank in steel enclosure
- 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.
  1. Solid-state starting
- 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.
- B. 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.
- C. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer's requirements.
- D. 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.
- E. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway sliding door.
- F. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
- G. Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
- H. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

I. Elevator

1. Hoistway Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness
  - a. Aluminum: ASTM B 221 Aluminum, mill finish.
2. Doors: Flush construction
  - a. Stainless steel: ASTM A 167, Type 304 stainless steel panels, No. 4 brushed finish.
3. Frames: Formed construction.
  - a. Stainless steel: ASTM A 167, Type 304 stainless steel panels, No. 4 brushed finish.

**2.06 CAR ENCLOSURE**

A. Elevator

1. Walls: Cab type DS, reinforced 16 gauge cold-rolled steel with two coats factory applied baked enamel finish - Baked Enamel.
2. Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit. Finish: Two coats factory applied reflective baked enamel.
3. Ceiling: Suspended type, fluorescent lighting with translucent diffuser mounted in a metal baked enamel frame at 7'-4" (2235 mm) above the finished floor.
4. Metal finish: Steel, factory applied baked enamel finish.
5. Cab Columns, Front, and Transom: Stainless steel: ASTM A 167, Type 304 stainless steel panels, No. 4 satin finish.
6. 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.
7. Door Finish: Steel, factory applied baked enamel finish.
8. Cab Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness.
  - a. Aluminum: ASTM B 221 aluminum, mill finish.
9. Handrail: metal bar, 2" wide, stainless steel no. 4. Provide at rear and side walls.
10. Ventilation: Two speed exhaust fan mounted on the car top.
11. Pad Buttons: Provide pad buttons on cab front(s) and walls.
  - a. Provide one set of vinyl protection pads for the project.
12. Base: no base
13. Finished Floor: Finished floor by Division 9
14. 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.
9. 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 an 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.
  5. 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.
  6. 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.
  7. 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. Verify compatibility with the telephone company.
  8. 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.
  9. Special Accessories:
    - a. Inspection switch.
    - b. Two speed fan/light switch.
    - c. 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. 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.
- D. 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 terminal shall be key operated. Provide 25 keys.
  - 3. Each intermediate station shall consist of two illuminating pushbuttons, one for the up direction and one for the down position.
  - 4. 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 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.

- D. Hall Position Indicator: all floors.
- E. 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, and manufacturer's installation instructions.
  - 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.
  - 3. 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.
- E. 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.
- F. 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 to ensure dimensional coordination of the work.

- G. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.
- H. 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.
- I. 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.
- J. 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.
- K. 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 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
  1. Elevator Model: Seville 35
  2. Rated Capacity: 3500 LBS.
  3. Rated Speed: 100 feet per minute.
  4. Operation System: ThyssenKrupp Elevator TAC20
  5. Travel: Distance shown on the drawings
  6. Openings: Two (2) front

7. Clear Car Inside: 6'-8" wide x 5'-5"
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: 25 HP motor, 208 volts, 3 Phase, 60 Hz.

**END OF SECTION**

