

DIVISION 14

CONVEYING SYSTEMS

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SECTION 14210

ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes electric traction passenger elevator and passenger elevator used for service as indicated drawings.
- B. See Division 09 Section "Ceramic Tile" for finish flooring in elevator cars and as noted on the Finish Legend.

1.2 PERFORMANCE REQUIREMENTS

- A. Car Performance
 - 1. Car Speed +/- 5% of contract speed under any loading condition or direction of travel.
 - 2. Car Capacity: Safely lower, stop and hold (per code) up to 125% of rated load.
- B. System Performance
 - 1. Vertical Vibration (maximum): 25 mg
 - 2. Horizontal Vibration (maximum): 25 mg
 - 3. Jerk Rate (maximum): 1.3 ft/sec³
 - 4. Acceleration (maximum): 1.3 ft/sec²
 - 5. In Car Noise: = 55 dB(A)
 - 6. Leveling Accuracy: +/- 0.2 inches
 - 7. Starts per hour (maximum): 120

1.3 SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
- B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples: For exposed finishes.
- D. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- E. Operation and maintenance data.
- F. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with ASME A17.1.
- B. Installer: The elevator equipment manufacturer shall install the elevator.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain require permits, inspections and tests.

- D. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.5 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective elevator work within specified warranty period.
 - 1. Warranty Period: One year from date of Substantial Completion.

1.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide one year's full maintenance service by skilled employees of 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.
 - 1. Maintenance service shall be performed during regular working hours of regular working days and shall include emergency 24 hour call back service.
 - 2. Temporary use for the elevator if required shall be in accordance with terms and conditions of the elevator contractors temporary use agreement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. KONE Inc.; EcoSpace (Basis-of-design)
 - 2. Otis Elevator Co.; Gen2 Product
 - 3. Schindler Elevator Corp.; 400A Product

2.2 SYSTEMS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems, including standard components published by manufacturer as included in standard pre-engineered elevator systems and as required for complete system.
- B. Elevator Machines: Provide AC gearless machine room-less elevator systems as recommended per manufacturer.
- C. Auto-transformer: Provide auto-transformer to adjust the main-line supply to the 400V required by the controller and drive.
- D. Drive: Provide variable voltage variable frequency drive system to develop high starting torque with low starting current.
- E. Controller:
 - 1. Provide microprocessor-based control system with AC Drive to perform the functions of safe elevator motion. Included shall be all the hardware required to connect, transfer and interrupt power, and to protect the motor against overloading. The system shall also perform car and duplex operational control.

2. Each controller cabinet containing memory equipment shall be properly shielded from line pollution. The microcomputer system shall be designed to accept reprogramming with minimum system down time.
3. All high voltage contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
4. Location: Integral closet.

2.3 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard operation system for each elevator as required to provide type of operation system indicated.
- B. Single-Car Auxiliary Operations:
 1. Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby.
 2. Battery-Powered Lowering: If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to the next floor below, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 3. Emergency Sirens: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
 4. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
- C. Simple Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. The car shall park at the last landing served.
- D. Car Operating Features:
 1. Fan/Light Switch.
 2. Car-Stall Protection.
 3. Firefighters' Service Phase I and Phase II Special Emergency Service Phase I and II - Emergency Recall.
 4. Ascending Car uncontrolled movement protection.
 5. Access key-switch at all floors in entrance jamb.
 6. Top of Car inspection station.
 7. Automatic Standby Power Operation with Manual Override.
- E. Elevator control system for inspections and emergency:
 1. Provide devices within controller to run the elevator in inspection operation.
 2. Provide devices on car top to run the elevator in inspection operation.
 3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
 4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
 5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
 6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.

2.4 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening devices with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.5 DOOR OPERATOR EQUIPMENT

- A. Door Operator: A closed loop permanent magnet high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro-mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by the local codes.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Door hangers and tracks shall be provided by each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane e tires and pre-lubricated sealed for life bearings.
- E. Electronic Door Safety Device: The elevator car shall be equipped with an electronic protective device extending the full height of the car. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

2.6 FINISH MATERIALS

- A. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- B. Stainless-Steel Bars: ASTM A 276, Type 304.
- C. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

2.7 CAR ENCLOSURES

- A. General: Provide steel-framed car enclosures with nonremovable wall panels, with car roof, access doors, power door operators, and ventilation.
 - 1. Provide standard railings complying with ASME A17.1 on car tops where required by ASME A17.1.
 - 2. Cab: 14 gage brushed stainless steel.
 - 3. Base Board: Brushed stainless steel finish.
 - 4. Stainless-Steel Wall Panels: Flush, hollow-metal construction.
 - 5. Stainless-Steel Doors: Flush, hollow-metal construction.

6. Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thick.
7. Luminous Ceiling: Fluorescent light fixtures and ceiling panels as specified. Basis-of-Design: LF-2 by Kone, Inc.
 - a. Ceiling shall be suspended and removable translucent closed-cell vinyl grid pane. Ceiling support frame shall be clear anodized aluminum frame.
 - b. Fluorescent light fixtures shall be provided above the suspended ceiling. Fixtures shall be provided in sufficient number to meet minimum code requirements.
8. Handrail: Round tube brushed stainless steel of 3/8 inch thick by 2 inches wide.
- B. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- C. Car Safeties: Device will be provided and mounted under the car platform, securely bolted to the Car Frame. The Safety will be actuated by a centrifugal governor mounted at the top of the hoistway. The Safety is designed to operate in case the car attains excessive descending speed.
- D. Platform, Heavy Loading Type: The car platform shall be arranged to accommodate one-piece loads weighing up to 25% of the rated capacity.
- E. Car guides shall be provided and mounted to the top and bottom of both the car and counterweight frame. Each roller guide assembly shall be arranged to maintain constant contact on the rail surfaces.
- F. Canopy: Reinforced 16 gage milled steel. White baked enamel standard finish.
- G. Emergency Car Signals:
 1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
 2. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
 3. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- H. Ventilation: Fan.

2.8 HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories.
 1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.
- B. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the car guide rail at the top of the hoistway.
- C. Governor: Friction type over-speed governor rated for the duty of the elevator specified.
- D. Buffers: Car and counterweights.
- E. Hoistway Operating Devices:
 1. Emergency stop switch in the pit.
 2. Terminal stopping switches.
 3. Emergency stop switch on the machine.
- F. Positioning System: System consisting of magnets and proximity switches.
- G. Guide Rails and Attachments: Steel rails with brackets and fasteners.

- H. Materials and Fabrication: Provide manufacturer's standards, but not less than the following:
1. Stainless-Steel Frames: Formed from steel sheet, bolted construction.
 2. Stainless-Steel Doors: Flush, hollow-metal construction with vertical internal channel reinforcements.
 3. Entrance Finish: Brushed stainless steel.
 4. Lobby Finish: Brushed stainless steel.
 5. Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thick.
 6. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.
 7. Fire Rating: Entrance doors shall be UL fire-rated for 1-1/2 hour.

2.9 SIGNAL EQUIPMENT

- A. General: Provide car operating panel with all push buttons, key switches and message indicators for elevator operation. Fixture finish to be brushed stainless steel.
- B. Swing car operating panel shall contain a bank of round, mechanical illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection and exhaust fan. Buttons have white illumination (halo) and shall be flat flush 1/4-inch projecting target. All buttons to have raised text and Braille marking on left hand side. The car operating display panel shall be white LCD. All texts, when illuminated shall be white. The car operating panel shall have a brushed stainless steel finish.
- C. Additional features of the car operating panel shall include:
1. Car position indicator within operating panel.
 2. Elevator date plate marked with elevator capacity and car number on car top.
 3. Provide Help button markings with raised markings.
 4. Firefighter's Phase II emergency in-car operating instructions and Key-switch.
 5. Call cancel button.
 6. Emergency two way communication device.
- D. Car Control Stations: Provide manufacturer's standard car control stations. Mount in return panel adjacent to car door, unless otherwise indicated.
- E. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- F. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.
- G. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
1. Include travel direction arrows if not provided in car control station.
- H. Hall Push-Button Stations: Provide hall push-button stations at each landing.
- I. Hall Lanterns: Units with illuminated arrows.
1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.

- J. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
- K. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations, with text and graphics as required by authorities having jurisdiction.

2.10 ELEVATORS

- A. Elevator Description:
 - 1. Basis-of-design: Kone; EcoSpace gearless electric traction elevator.
 - 2. Equipment Control: KCM831
 - 3. Machine Location: Integral Closet.
 - 4. Rated Capacity: 2500 lb (1134 kg).
 - 5. Rated Speed: 150 fpm.
 - 6. Operation System: Selective simplex automatic operation.
 - 7. Machine Location: Inside the hoistway mounted on car guide rail.
 - 8. Main Power Supply: 480 Volts + 5% of normal, 3 phase with a separate equipment grounding conductor.
 - 9. Auxiliary Operations:
 - a. Standby power operation.
 - b. Battery-powered lowering.
 - c. Automatic dispatching of loaded car.
 - d. Nuisance call cancel.
 - e. Emergency hospital service at all floors.
 - f. Loaded-car bypass.
 - g. Distributed parking.
 - 10. Car Enclosures:
 - a. Clear Inside Dimensions: (W x D): 6'-8" x 4'-3"
 - b. Clear height under suspended ceiling: 8'-7"
 - c. Cab Height: 9'
 - d. Entrance Width & Type: 3'-6" and Left Opening.
 - e. Entrance Height: 7'
 - f. Travel: 11'-0"
 - g. Landings: 2
 - h. Openings: 2 Front Openings, 0 Back Openings
 - i. Front Walls (Return Panels): Satin stainless steel, No. 4 finish.
 - j. Car Fixtures: Satin stainless steel, No. 4 finish.
 - k. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
 - l. Door Faces (Interior): Satin stainless steel, No. 4 finish.
 - m. Handrails: 1/2 by 2 inches (13 by 50 mm) rectangular satin stainless steel, No. 4 finish, at sides and rear of car.
 - n. Floor prepared to receive ceramic tile (specified in Division 09 Section "Ceramic Tile").
 - 11. Hoistway Entrances: As follows:
 - a. Width: 48 inches (1219 mm).
 - b. Height: 84 inches (2134 mm).
 - c. Type: Single-speed center opening.
 - d. Frames at Other Floors: Satin stainless steel, No. 4 finish.
 - e. Doors at Other Floors: Satin stainless steel, No. 4 finish.
 - 12. Hall Fixtures at Other Floors: Satin stainless steel, No. 4 finish.

13. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide blanket hooks in all cars and one complete set(s) of full-height protective blankets.
 - c. Control Space Location: Remote Closet
 - d. Maintenance Service Period: 12 months

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.
- B. Leveling Tolerance: 1/8 inch (3 mm), up or down, regardless of load and direction of travel.
- C. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

3.2 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.

3.3 PROTECTION

- A. Temporary Use: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for each elevator used for construction purposes:
 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 2. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 3. Engage elevator Installer to provide full maintenance service.
 4. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. 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.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).

END OF SECTION