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# Construction Specification Manual

## Salt River Project

Technical Specification Index – September 2021

### Division 14

Division	Title	Updated
<b>DIVISION 14: CONVEYING SYSTEMS</b>		
<b>142126</b>	MRL Elec-Traction Passenger Elevators	Revised 08/21
<b>142146</b>	MRL Elec-Traction Service Elevators	Revised 08/21

## SECTION 14 21 26

### MRL ELECTRIC TRACTION PASSENGER ELEVATORS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Machine-room-less electric traction passenger elevators.
2. Machine-room-less electric traction service elevators.

###### B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for temporary use of elevators for construction purposes.
2. Section 03 30 00 "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
3. Section 04 20 00 "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry and for grouting elevator entrance frames installed in masonry walls.
4. Section 05 12 00 "Structural Steel Framing" for the following:
  - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
  - b. Divider beams.
  - c. Hoist beams.
  - d. Structural-steel shapes for subsills.
5. Section 05 50 00 "Metal Fabrications" for the following:
  - a. Attachment plates and angle brackets for supporting guide-rail brackets.
  - b. Divider beams.
  - c. Hoist beams.
  - d. Structural-steel shapes for subsills.
  - e. Pit ladders.
  - f. Metal grate sump covers and perimeter edge angles in elevator pits.
  - g. Cants made from steel sheet in hoistways.
6. Section 05 52 13 "Steel Pipe and Tube Railings" for railings between adjacent elevator pits.
7. Section 10 22 13 "Wire Mesh Partitions" for guards between adjacent elevator pits.
8. Section 22 14 29 "Sump Pumps" for sump pumps, sumps, and sump covers in elevator pits.
9. Section 27 15 13 "Communications Copper Horizontal Cabling" for twisted pair cable for telephone service for elevators.

10. Section 28 46 21 "Addressable Fire-Alarm Systems" for smoke detectors in elevator lobbies to initiate emergency recall operation, for heat detectors in shafts and machine rooms to disconnect power from elevator equipment before or on sprinkler activation, and for connection to elevator controllers.

## 1.2 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.
- B. Service Elevator: A passenger elevator that is also used to carry freight.

## 1.3 COORDINATION

- A. Coordinate installation of inserts, sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, inserts, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of work specified in other Sections that relates to electric traction elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways and pits.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  1. Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
  2. Include Product Data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings:
  1. Include plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.
  2. Include large-scale layout of car-control station and standby power operation control panel.
  3. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples for Initial Selection: For each type of exposed finish involving color selection.
- D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch- (75-mm-) square Samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway and pit layout and dimensions, as indicated on Drawings, and electrical service including standby power generator, as shown and specified, are adequate for elevator system being provided.
- D. Sample Warranty: For special warranty.

## 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Deliver elevator keyswitch keys to Owner by registered mail or overnight package service.
- D. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard three-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

## 1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
  - 2. Warranty Period: Two year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Fujitec America, Inc.
  - 2. KONE Inc.
  - 3. Mitsubishi Electric Corporation.
  - 4. Otis Elevator Co.
  - 5. Schindler Elevator Corp.
  - 6. ThyssenKrupp Elevator.
- B. Source Limitations: Obtain elevators from single manufacturer.
  - 1. Major elevator components, including driving machines, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with requirements for accessible elevators in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.
- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.
  - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified.
  - 2. Project Seismic Design Category: B, unless otherwise indicated on Drawings.
  - 3. Elevator Component Importance Factor: 1.0.

4. Design earthquake spectral response acceleration short period (Sds) for Project is as indicated on Drawings
5. Provide earthquake equipment required by ASME A17.1/CSA B44.
6. Provide seismic switch required by ASCE/SEI 7.

## 2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturer's standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
  1. Basis of Design Manufacturer: ThyssenKrupp Elevator.
  2. Group Number: **[1 and 2]**. (Adjust as required to suit project)
  3. Passenger Elevator Numbers: **[1, 2, 3]**. (Adjust as required to suit project)
  4. Service Elevator Number: **[4]**. (Adjust as required to suit project)
  5. Designated Emergency Elevator: **[Adjacent]** Service Elevator.
  6. Rated Load:
    - a. Passenger Elevator: 3500 lb (1589 kg).
    - b. Service Elevator: 4500 lb (2043 kg).
    - c. Freight Loading Class for Service Elevator(s): Class A.
  7. Rated Speed: 150 fpm (0.75 m/s).
  8. Operation System: Group automatic operation.
  9. Auxiliary Operations:
    - a. Standby power operation.
    - b. Standby-powered lowering.
    - c. Battery-powered automatic evacuation.
    - d. Automatic dispatching of loaded car.
    - e. Nuisance-call cancel.
    - f. Loaded-car bypass.
    - g. Distributed parking.
    - h. Off-peak operation.
    - i. Automatic operation of lights and ventilation fans.
    - j. Priority service at all floors.
    - k. Independent service for service elevator.
  10. Security Features: Card-reader operation, Keyswitch operation, and Car-to-lobby feature.
  11. Dual Car-Control Stations: Provide two car-control stations in Service elevator; equip only one with required keyswitches if any.
  12. Car Enclosures:
    - a. Passenger Elevators:

- 1) Inside Width: Not less than 80 inches (2032 mm) from side wall to side wall.
  - 2) Inside Depth: Not less than 66 inches (1676 mm) from back wall to front wall (return panels).
  - 3) Inside Height: 108 inches to underside of ceiling.
  - b. Service Elevator:
    - 1) Inside Width: Not less than 66 inches (1676 mm) from side wall to side wall.
    - 2) Inside Depth: Not less than 96-1/2 inches (2451 mm) from back wall to front wall (return panels).
    - 3) Inside Height: Not less than 108 inches (2743 mm) to underside of ceiling.
  - c. Front Walls (Return Panels): Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - d. Car Fixtures: Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - e. Side and Rear Wall Panels:
    - 1) Passenger Elevators: Satin stainless steel, ASTM A480/480M, No. 4 finish.
    - 2) Service Elevator: Textured stainless steel
  - f. Reveals: Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - g. Door Faces (Interior): Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - h. Door Sills: Nickel silver.
  - i. Ceiling: Flush satin stainless steel panels, ASTM A480/480M, No. 4 finish.
  - j. Handrails: 1/2 by 2 inches (13 by 50 mm) rectangular satin stainless steel, at sides and rear of car.
  - k. Floor prepared to receive finish as indicated in Interior Finish Schedule on Drawings, and as specified in applicable Division 09 Section.
13. Hoistway Entrances:
- a. Passenger Elevators:
    - 1) Width: 42 inches (1067 mm).
    - 2) Height: 96 inches (2438 mm).
    - 3) Type: Single-speed center opening.
  - b. Service Elevator:
    - 1) Width: 48 inches (1219 mm).
    - 2) Height: 96 inches (2438 mm).
    - 3) Type: Two-speed center opening.
  - c. Frames: Satin stainless steel, No. 4 finish.
  - d. Doors: Satin stainless steel, No. 4 finish.
  - e. Sills: Nickel silver.
14. Hall Fixtures: Satin stainless steel, ASTM A480/480M, No. 4 finish.
15. Additional Requirements:
- a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, ASTM A480/480M, No. 4 finish.
  - b. Provide hooks for protective pads in Service car, and two complete sets of full-height protective pads.

## 2.4 TRACTION SYSTEMS

- A. Elevator Machines: Permanent magnet, variable-voltage, variable-frequency, ac-type hoisting machines and solid-state power converters.
  - 1. Provide regenerative or nonregenerative system.
  - 2. Provide regenerative system that complies with the IgCC.
  - 3. Limit total harmonic distortion of regenerated power to 5 percent per IEEE 519.
  - 4. Provide means for absorbing regenerated power when elevator system is operating on standby power.
  - 5. Provide line filters or chokes to prevent electrical peaks or spikes from feeding back into building power system.
- B. Fluid for Hydraulic Buffers: If using hydraulic buffers, use only fire-resistant fluid.
- C. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.
- D. Machine Beams: Provide steel framing to support elevator hoisting machine and deflector sheaves from the building structure. Comply with Section 05 50 00 "Metal Fabrications" for materials and fabrication.
- E. Car Frame and Platform: Bolted- or welded-steel units.
- F. Guides: Roller guides. Provide guides at top and bottom of car and counterweight frames.

## 2.5 OPERATION SYSTEMS

- A. Provide manufacturer's standard microprocessor operation systems as required to provide type of operation indicated.
- B. Non-Proprietary Operation: Elevator control equipment must be non-proprietary, or a site-specific service tool which renders the control equipment non-proprietary must be provided with the elevator (i.e. map unit type, diagnostic service tool).
  - 1. Controller interface/service tool shall allow full access to fault codes and maintenance related parameters, and shall allow complete and thorough maintenance to be performed by any properly qualified and licensed elevator service company.
  - 2. Provide a user's manual with controller interface/service tool that effectively communicates how to use the controller interface/service tool to a qualified mechanic, and also defines and explains all respective error codes, including required repairs.
  - 3. Controller interface/service tool shall be replaced at no cost should it ever cease to function properly, and shall become the property of the building Owner.



- C. Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching program designed to minimize passenger wait time. System automatically adjusts to demand changes for different traffic conditions including heavy incoming, heavy two-way, heavy outgoing, and light off-hours as variations of normal two-way traffic.
- D. Auxiliary Operations:
1. Group Standby Power Operation:
    - a. On activation of standby power, cars are returned to a designated floor and parked with doors open. One car is returned at a time, with priority given to loaded cars. If a car cannot be returned after two attempts, it is removed from the system. When all cars have been returned or removed from the system, one car is automatically placed in service. If car selected for service cannot operate within 60 seconds, the system removes car from service and places another car in service. Cars 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 or fire-command station. Manual operation causes automatic operation to cease.
    - b. On activation of standby power, cars are returned, one at a time, to a designated floor and parked with doors open. If a car cannot be returned, it is removed from the system. When all cars have been returned or removed from the system, one car can be put in service on standby power by a selector switch in control panel located at main lobby or fire-command station.
  2. Group Battery-Powered Automatic Evacuation: If power fails, cars that are at a floor remain at that floor, open their doors, and shut down. Cars that are between floors are moved one at a time to the next floor above or below, open their doors, and shut down. System includes rechargeable battery and automatic recharging system.
  3. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors begin closing.
  4. Nuisance-Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.
  5. Loaded-Car Bypass: When car load exceeds 80 percent of rated capacity, car responds only to car calls, not to hall calls.
  6. Distributed Parking: When cars are not required for response to calls, they are parked with doors closed and distributed in predetermined zones throughout the building. One zone shall include the main floor and adjacent floors; remaining floors shall be divided into approximately equal zones.
  7. Off-Peak Operation: During periods of low traffic, half of the elevators in a group shall be taken out of service and switched to sleep, low power mode.
  8. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after five minutes and are re-energized before car doors open.

9. Independent Service: Keyswitch in car-control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from keyswitch when car is in independent service. When in independent service, doors close only in response to door close button.
10. Priority Service: Service is initiated by a keyswitch or card reader at designated floors. One elevator is removed from group operation and directed to the floor where service was initiated. On arriving at the floor, elevator opens its doors and parks. Car is placed in operation by selecting a floor and pressing door close button or by operating keyswitch to put car in independent service. After responding to floor selected or being removed from independent service, car is returned to group operation. If car is not placed in operation within a preset time after being called, it is returned to group operation.
11. Buildings Without Area of Refuge / Rescue Assistance: Provide Priority Service.
  - a. Service is initiated by a keyswitch or card reader at any designated floors. Elevator is placed in Standby Power Operation and directed to the floor where rescue service was initiated. On arriving at the floor, elevator opens its doors and parks.
  - b. Car is placed in operation by selecting a floor and pressing door close button, or by operating keyswitch to put car in independent service.
  - c. After responding to floor selected or being removed from independent service, elevator opens its doors, and shuts down.

E. Security features shall not affect emergency firefighters' service.

1. Card-Reader Operation: System uses card readers at car-control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Allow space for card reader in car.
  - a. Security access system equipment is specified in applicable Division 28 Sections.
2. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car-control stations. Key is removable in either position.
3. Car-to-Lobby Feature: Feature, activated by keyswitch at main lobby, that causes all cars in a group to return immediately to lobby and open doors for inspection. On deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

## 2.6 DOOR REOPENING DEVICES

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

## 2.7 CAR ENCLOSURES

- A. Provide enameled or powder-coated steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
  - 1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
  - 1. Subfloor: Exterior, C-C Plugged grade plywood, not less than 7/8-inch (22.2-mm) nominal thickness.
  - 2. Floor Finish: As indicated in Interior Finish Schedule or Finish Plans on Drawings, and as specified in applicable Division 09 Section.
  - 3. Wall Panels:
    - a. Passenger Elevators: Flush, hollow-metal construction; fabricated from smooth stainless-steel sheet.
    - b. Service Elevator: Stainless Steel Wall Panels: Flush, formed-metal construction; fabricated from textured stainless steel sheet.
  - 4. Fabricate car with recesses and cutouts for signal equipment.
  - 5. Fabricate car door frame integrally with front wall of car.
  - 6. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.
  - 7. Sight Guards: Provide sight guards on car doors.
  - 8. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
  - 9. Metal Ceiling: Flush panels, with LED downlights in the center of each panel. Align ceiling panel joints with joints between wall panels.
  - 10. Light Fixture Efficiency: Not less than 35 lumens/W.
  - 11. Ventilation Fan Efficiency: Not less than 3.0 cfm/W (1.4 L/s per W).
  - 12. Handrails: Manufacturer's standard, of shape, material, and finish indicated.

## 2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
  - 1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
  - 1. Fire-Protection Rating: Match rating of wall assembly in which hoistway entrances are installed, with 30-minute temperature rise of 450 deg F (250 deg C).

- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
  - 1. Stainless Steel Frames: Formed from stainless steel sheet.
  - 2. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches (76 mm) high, on both jambs of hoistway door frames.
  - 3. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.
  - 4. Sight Guards: Provide sight guards on doors matching door edges.
  - 5. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
  - 6. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

## 2.9 SIGNAL EQUIPMENT

- A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide buttons and lighted elements illuminated with LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
  - 1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
  - 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet and telephone jack in each car, and required conductors in traveling cable for firefighters' two-way telephone communication service as specified in applicable Division 28 Fire-Alarm System specification section.
- E. 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. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each landing for each single elevator or group of elevators, but not less than one station for each four elevators in a group.
  - 1. Provide manufacturer's standard units with flat faceplate for mounting with body of unit recessed in wall.
  - 2. Equip units with buttons for calling elevator and for indicating desired direction of travel.

- a. Provide for connecting units to building security access system so a card reader can be used to register calls.
  3. Provide telephone jack in each unit for firefighters' two-way telephone communication service specified in applicable Division 28 Fire-Alarm System specification section.
- G. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide the following:
1. Manufacturer's standard wall-mounted, flat-faceplate units, for mounting with body of unit recessed in wall above entrance frames.
- H. 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.
1. At manufacturer's option, audible signals may be placed on cars.
- I. Hall Position Indicators: Provide illuminated, digital-display-type position indicators, located above hoistway entrance at each floor. Provide units with flat faceplate and with body of unit recessed in wall.
1. Integrate ground-floor hall lanterns with hall position indicators.
- J. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.
- K. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.
- L. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used, unless facility has no Area of Refuge / Rescue Assistance, and AHJ allows elevator to be used as fire egress. Provide one sign at each hall push-button station unless otherwise indicated.
- 2.10 FINISH MATERIALS
- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
  - B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
  - C. Stainless Steel Sheet: ASTM A240/A240M, Type 304.

- D. Textured Stainless Steel Sheet: ASTM A240/A240M, Type 304 with embossed texture rolled into exposed surface.
  - 1. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
  - 2. Metal Surface: Satin relieved after texturing, color as selected by Architect from sheet manufacturer's full range of colors.
- E. Stainless Steel Bars: ASTM A276, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- G. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500 or UNS No. C77600.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Examine hoistways, hoistway openings, and pits as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions.
- B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- D. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.

- E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- F. Leveling Tolerance: 1/8 inch (3 mm), up or down, regardless of load and travel direction.
- G. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- H. Locate hall signal equipment for elevators as follows unless otherwise indicated:
  - 1. For groups of elevators, locate hall push-button stations between two elevators at center of group or at location most convenient for approaching passengers.
  - 2. Place hall lanterns above each hoistway entrance.
  - 3. Mount hall lanterns at a minimum of 72 inches (1829 mm) above finished floor.

### 3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Operating Test: Load one elevator of each type, capacity, speed, and travel distance to rated capacity and operate continuously for 30 minutes over full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machine during 30-minute test period. Record failure to perform as required.
- C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

### 3.4 PROTECTION

- A. Temporary Use: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for 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 strippable protective film on entrance and car doors and frames.
  - 3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
  - 4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
  - 5. Do not load elevators beyond their rated weight capacity.
  - 6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed

and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

7. 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.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator(s).
- B. Check operation of each elevator with Owner's personnel present before date of Substantial Completion, and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

### 3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 24 months' full maintenance may want to consider expanding this to 24 months to match the warranty time period 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. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
  1. Perform maintenance during normal working hours.
  2. Perform emergency callback service during normal working hours with response time of two hours or less.

**END OF SECTION**



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## SECTION 14 21 46

### MRL ELECTRIC TRACTION SERVICE ELEVATORS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Machine-room-less (MRL) electric traction service elevators.

###### B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for temporary use of elevators for construction purposes.
2. Section 03 30 00 "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
3. Section 04 20 00 "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry and for grouting elevator entrance frames installed in masonry walls.
4. Section 05 12 00 "Structural Steel Framing" for the following:
  - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
  - b. Hoist beams.
  - c. Structural-steel shapes for subsills.
5. Section 05 50 00 "Metal Fabrications" for the following:
  - a. Attachment plates and angle brackets for supporting guide-rail brackets.
  - b. Hoist beams.
  - c. Structural-steel shapes for subsills.
  - d. Pit ladders.
  - e. Metal grate sump covers and perimeter edge angles in elevator pits.
  - f. Cants made from steel sheet in hoistways.
6. Section 22 14 29 "Sump Pumps" for sump pumps in elevator pits.
7. Section 27 15 13 "Communications Copper Horizontal Cabling" for twisted pair cable for telephone service for elevators.
8. Section 28 46 21 "Addressable Fire-Alarm Systems" for smoke detectors in elevator lobbies to initiate emergency recall operation, for heat detectors in shafts to disconnect power from elevator equipment before or on sprinkler activation, and for connection to elevator controllers.

##### 1.2 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.

### MRL ELECTRIC TRACTION SERVICE ELEVATORS

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- B. Service Elevator: A passenger elevator that is also used to carry freight.

### 1.3 COORDINATION

- A. Coordinate installation of inserts, sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, inserts, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of work specified in other Sections that relates to electric traction elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways and pits.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
  - 2. Include Product Data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.
  - 2. Include large-scale layout of car-control station and standby power operation control panel.
  - 3. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples for Initial Selection: For each type of exposed finish involving color selection.
- D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch- (75-mm-) square Samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway and pit layout and dimensions, as indicated on Drawings, and electrical service including standby power generator, as shown and specified, are adequate for elevator system being provided.
- D. Sample Warranty: For special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Deliver elevator keyswitch keys to Owner by registered mail or overnight package service.
- D. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard three-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

#### 1.9 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Warranty Period: Two year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Fujitec America, Inc.
  2. KONE Inc.
  3. Mitsubishi Electric Corporation.
  4. Otis Elevator Co.
  5. Schindler Elevator Corp.
  6. ThyssenKrupp Elevator.
- B. Source Limitations: Obtain elevators from single manufacturer.
  1. Major elevator components, including driving machines, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with requirements for accessible elevators in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.
- C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.
  1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified.
  2. Project Seismic Design Category: B, unless otherwise indicated on Drawings.
  3. Elevator Component Importance Factor: 1.0.
  4. Design earthquake spectral response acceleration short period (Sds) for Project is as indicated on Drawings.
  5. Provide earthquake equipment required by ASME A17.1/CSA B44.

## 2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturer's standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
1. Basis of Design Manufacturer: ThyssenKrupp Elevator.
  2. Service Elevator Number: As indicated on Drawings.
  3. Rated Load: 4500 lb (2043 kg).
  4. Freight Loading Class for Service Elevator(s): Class A.
  5. Rated Speed: 150 fpm (0.75 m/s).
  6. Operation System: Selective-collective automatic operation.
  7. Auxiliary Operations:
    - a. Standby power operation.
    - b. Standby-powered lowering.
    - c. Battery-powered automatic evacuation.
    - d. Automatic dispatching of loaded car.
    - e. Nuisance-call cancel.
    - f. Automatic operation of lights and ventilation fans.
  8. Security Features: Card-reader operation, Keyswitch operation, and Car-to-lobby feature.
  9. Dual Car-Control Stations: Provide two car-control stations; equip only one with required keyswitches if any.
  10. Car Enclosures:
    - a. Inside Width: Not less than 66 inches (1676 mm) from side wall to side wall.
    - b. Inside Depth: Not less than 96-1/2 inches (2451 mm) from back wall to front wall (return panels).
    - c. Inside Height: Not less than 108 inches (2743 mm) to underside of ceiling.
    - d. Front Walls (Return Panels): Satin stainless steel, ASTM A480/480M, No. 4 finish.
    - e. Car Fixtures: Satin stainless steel, ASTM A480/480M, No. 4 finish.
    - f. Side and Rear Wall Panels: Textured stainless steel.
    - g. Reveals: Satin stainless steel, ASTM A480/480M, No. 4 finish.
    - h. Door Faces (Interior): Satin stainless steel, ASTM A480/480M, No. 4 finish.
    - i. Door Sills: Nickel silver.
    - j. Ceiling: Flush satin stainless steel panels, ASTM A480/480M, No. 4 finish, with LED downlights in the center of each panel.
    - k. Handrails: 1/2 by 2 inches (13 by 50 mm) rectangular satin stainless steel, at sides and rear of car.
    - l. Floor prepared to receive finish as indicated in Interior Finish Schedule on Drawings, and as specified in applicable Division 09 Section.

11. Hoistway Entrances:
  - a. Width: 48 inches (1219 mm).
  - b. Height: 96 inches (2438 mm).
  - c. Type: Two-speed center opening.
  - d. Frames: Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - e. Doors: Satin stainless steel, ASTM A480/480M, No. 4 finish.
  - f. Sills: Nickel silver.
12. Hall Fixtures: Satin stainless steel, ASTM A480/480M, No. 4 finish.
13. Additional Requirements:
  - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, ASTM A480/480M, No. 4 finish.
  - b. Provide hooks for protective pads and two complete set(s) of full-height protective pads.

## 2.4 TRACTION SYSTEMS

- A. Elevator Machines: Permanent magnet, variable-voltage, variable-frequency, ac-type hoisting machines and solid-state power converters.
  1. Provide regenerative or nonregenerative system.
  2. Provide regenerative system that complies with the IgCC.
  3. Limit total harmonic distortion of regenerated power to 5 percent per IEEE 519.
  4. Provide means for absorbing regenerated power when elevator system is operating on standby power.
  5. Provide line filters or chokes to prevent electrical peaks or spikes from feeding back into building power system.
- B. Fluid for Hydraulic Buffers: If using hydraulic buffers, use only fire-resistant fluid.
- C. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.
- D. Machine Beams: Provide steel framing to support elevator hoisting machine and deflector sheaves from the building structure. Comply with Section 05 50 00 "Metal Fabrications" for materials and fabrication.
- E. Car Frame and Platform: Bolted- or welded-steel units.
- F. Guides: Roller guides. Provide guides at top and bottom of car and counterweight frames.

## 2.5 OPERATION SYSTEMS

- A. Provide manufacturer's standard microprocessor operation systems as required to provide type of operation indicated.

- B. Non-Proprietary Operation: Elevator control equipment must be non-proprietary, or a site-specific service tool which renders the control equipment non-proprietary must be provided with the elevator (i.e. map unit type, diagnostic service tool).
1. Controller interface/service tool shall allow full access to fault codes and maintenance related parameters, and shall allow complete and thorough maintenance to be performed by any properly qualified and licensed elevator service company.
  2. Provide a user's manual with controller interface/service tool that effectively communicates how to use the controller interface/service tool to a qualified mechanic, and also defines and explains all respective error codes, including required repairs.
  3. Controller interface/service tool shall be replaced at no cost should it ever cease to function properly, and shall become the property of the building Owner.
- C. Auxiliary Operations:
1. Single-Car 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 unless otherwise indicated on Drawings. Manual operation causes automatic operation to cease.
  2. Single-Car Standby-Powered Lowering: On activation of standby power, if 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.
  3. Single-Car Battery-Powered Automatic Evacuation: 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 moves to the next floor above or below, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
  4. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors begin closing.
  5. Nuisance-Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.
  6. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after five minutes and are re-energized before car doors open.
  7. Buildings Without Area of Refuge / Rescue Assistance: Provide Priority Service.
    - a. Service is initiated by a keyswitch or card reader at any designated floors. Elevator is placed in Standby Power Operation and directed to the floor where rescue service was initiated. On arriving at the floor, elevator opens its doors and parks.
    - b. Car is placed in operation by selecting a floor and pressing door close button, or by operating keyswitch to put car in independent service.
    - c. After responding to floor selected or being removed from independent service, elevator opens its doors, and shuts down.



- D. Security features shall not affect emergency firefighters' service.
1. Card-Reader Operation: System uses card readers at car-control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Allow space for card reader in car.
    - a. Security access system equipment is specified in applicable Division 28 Sections.
  2. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car-control stations. Key is removable in either position.
  3. Car-to-Lobby Feature: Feature, activated by keyswitch at main lobby, that causes car to return immediately to lobby and open doors for inspection. On deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

## 2.6 DOOR REOPENING DEVICES

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

## 2.7 CAR ENCLOSURES

- A. Provide enameled or powder-coated steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
  1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
  1. Subfloor: Exterior, C-C Plugged grade plywood, not less than 7/8-inch (22.2-mm) nominal thickness.
  2. Floor Finish: As indicated in Interior Finish Schedule or Finish Plans on Drawings, and as specified in applicable Division 09 Section.
  3. Stainless Steel Wall Panels: Flush, formed-metal construction; fabricated from textured stainless steel sheet.
  4. Fabricate car with recesses and cutouts for signal equipment.
  5. Fabricate car door frame integrally with front wall of car.
  6. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.

7. Sight Guards: Provide sight guards on car doors.
8. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
9. Metal Ceiling: Flush panels, with LED downlights in the center of each panel. Align ceiling panel joints with joints between wall panels.
10. Light Fixture Efficiency: Not less than 35 lumens/W.
11. Ventilation Fan Efficiency: Not less than 3.0 cfm/W (1.4 L/s per W).
12. Handrails: Manufacturer's standard, of shape, material, and finish indicated.

## 2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
  1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
  1. Fire-Protection Rating: Match rating of wall assembly in which hoistway entrances are installed, with 30-minute temperature rise of 450 deg F (250 deg C).
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
  1. Stainless Steel Frames: Formed from stainless steel sheet.
  2. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches (76 mm) high, on both jambs of hoistway door frames.
  3. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.
  4. Sight Guards: Provide sight guards on doors matching door edges.
  5. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
  6. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

## 2.9 SIGNAL EQUIPMENT

- A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide buttons and lighted elements illuminated with LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
  1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.

2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
  - D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet and telephone jack in each car, and required conductors in traveling cable for firefighters' two-way telephone communication service as specified in applicable Division 28 Fire-Alarm System specification section.
  - E. 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. Include travel direction arrows if not provided in car-control station.
  - F. Hall Push-Button Stations: Provide one hall push-button station at each landing.
    1. Provide manufacturer's standard units with flat faceplate for mounting with body of unit recessed in wall.
    2. Equip units with buttons for calling elevator and for indicating desired direction of travel.
      - a. Provide for connecting units to building security access system so a card reader can be used to register calls.
    3. Provide telephone jack in each unit for firefighters' two-way telephone communication service specified in applicable Division 28 Fire-Alarm System specification section.
  - G. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide the following:
    1. Manufacturer's standard wall-mounted, flat-faceplate units, for mounting with body of unit recessed in wall above entrance frames.
  - H. 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.
    1. At manufacturer's option, audible signals may be placed on cars.
  - I. Hall Position Indicators: For elevators with more than two floors/stops, provide illuminated, digital-display-type position indicators, located above hoistway entrance at each floor. Provide units with flat faceplate and with body of unit recessed in wall.
    1. Integrate ground-floor hall lanterns with hall position indicators.

- J. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.
- K. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used, unless facility has no Area of Refuge / Rescue Assistance, and AHJ allows elevator to be used as fire egress. Provide one sign at each hall push-button station unless otherwise indicated.

## 2.10 FINISH MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304.
- D. Textured Stainless Steel Sheet: ASTM A240/A240M, Type 304 with embossed texture rolled into exposed surface.
  - 1. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
  - 2. Metal Surface: Satin relieved after texturing, color as selected by Architect from sheet manufacturer's full range of colors.
- E. Stainless Steel Bars: ASTM A276, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- G. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500 or UNS No. C77600.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Examine hoistways, hoistway openings, and pits as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions.
- B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- D. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.
- E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- F. Leveling Tolerance: 1/8 inch (3 mm), up or down, regardless of load and travel direction.
- G. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- H. Locate hall signal equipment for elevators as follows unless otherwise indicated:
  - 1. Place hall lanterns above each hoistway entrance.
  - 2. Mount hall lanterns at a minimum of 72 inches (1829 mm) above finished floor.

### 3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

### 3.4 PROTECTION

- A. Temporary Use: Comply with the following requirements for 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 strippable protective film on entrance and car doors and frames.
3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
5. Do not load elevators beyond their rated weight capacity.
6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
7. 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.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator(s).
- B. Check operation of elevator with Owner's personnel present before date of Substantial Completion, and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

### 3.6 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 24 months' full maintenance 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. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
  1. Perform maintenance during normal working hours.
  2. Perform emergency callback service during normal working hours with response time of two hours or less.

**END OF SECTION**

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