

SECTION 14 21 23

MACHINE ROOMLESS ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Machine roomless electric traction passenger elevators.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Product Data: Technical data including capacities, sizes, performances, operations, safety features, finishes, and similar information. Include manufacturer's model specific data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings: Submit plans, elevations, sections, and large scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.
 - 1. Include large scale layout of Firefighter's Phase II Emergency In Car Operation Controls.
 - 2. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples: Submit 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.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit data for Installer.
- B. Seismic Qualification Data: Submit 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, pit, and machine room layout and dimensions, indicated on Drawings, and electrical service as shown and specified, are adequate for elevator system being provided.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit for elevators to include in emergency, operation, and maintenance manuals.
 1. Submit operation and maintenance manual, according to ASME A17.1/CSA B44, including diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one 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.
- D. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner with terms, conditions, and obligations commencing on date initial maintenance service is concluded.

1.6 QUALITY ASSURANCE

- A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following codes, laws, and/or authorities, including revisions and changes in effect:
 1. All Project Codes as Indicated on the Drawings.
 2. ASME A17.1 Current version required by LAHJ.
 3. ASME A17.2
 4. ASME A17.5
 5. ASME A17.6
 6. ASME A17.7
 7. CSA B44-16 Safety Code For Elevators and Escalators.
 8. NFPA 70
 9. ANSI A117.1 2010 ADA Standards for Accessible Design
 10. Local Fire Authority
 11. Requirements of most stringent provision of Local Authority Having Jurisdiction.
 12. NFPA101
- B. Installer Qualifications: Elevator manufacturer or an authorized representative having minimum 5 years documented experience who is trained and approved by manufacturer.

- C. Source Limitations: Obtain passenger and service 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

1.7 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 related work 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, pits, and machine rooms.
- C. Elevator Communications Monitoring: Coordinate with the Owner for Code required elevator communications monitoring, connections and integration with building management. Emergency Operation and Signaling Devices: Coordinate elevator systems and components to ensure compliance with ASME A17.2 and all requirements of the Local Authority Having Jurisdiction.
 - 1. Ensure all Firefighters' emergency operations of Phase I and Phase II as defined by ASME 17.1 have been met.

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. Written warranty signed by manufacturer in which 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: 5 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1//CSA B44.

- B. 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 and the system will be fully operational after the seismic event."
 - 2. Project Seismic Design Category: As indicated on the Drawings
 - 3. Elevator Component Importance Factor: 1.5 unless otherwise noted on the Drawings.
 - 4. Provide earthquake equipment required by ASME A17.1/CSA B44.
 - 5. Provide seismic switch required by ASCE/SEI 7.
- C. Accessibility Requirements: Comply with requirements for accessible elevators in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

2.2 SYSTEMS AND COMPONENTS

- A. Basis of Design: Provide Schindler 3300XL Machine room-less (MRL) in configurations indicated with all components and accessories as required for complete, fully functional elevators. Subject to compliance with all requirements, and Owner endorsement in writing prior to bid, products by one of the following may also be acceptable:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. KONE Inc.
 - 2. Minnesota Elevator, Inc.
 - 3. Mitsubishi Electric Corporation.
 - 4. Otis Elevator Co.
 - 5. ThyssenKrupp Elevator.
- C. Elevator System: Elevator system utilizing standard components included in elevator systems and as required for complete system.
- D. Elevator Description:
 - 1. Elevator Number(s): as indicated on Drawings.
 - 2. as indicated on Drawings.
 - 3. Rated Load: 5000 lb (2270 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. Battery powered automatic evacuation.
 - b. Automatic dispatching of loaded car.
 - c. Nuisance call cancel.
 - d. Loaded car bypass.
 - e. Distributed parking.
 - f. Off peak operation.

- g. Automatic operation of lights and ventilation fans.
- h. Independent service for one car in group.
- 8. Security Features: Card reader operation Car to lobby feature.
- 9. Car Enclosures:
 - a. Inside Width: Not less than 64 inches (1626 mm) clear from side wall to side wall.
 - b. Inside Depth: Not less than 104 inches (2641 mm) clear from back wall to front wall (return panels).
 - c. Inside Height: Not less than 93 inches (2362 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: Satin stainless steel, ASTM A480/480M, No. 4 finish.
 - 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: Aluminum refer to Section 05 50 00.
 - j. Ceiling: Satin stainless steel, ASTM A480/480M, No. 4 finish.
 - k. Handrails: 1/2 inches by 2 inches (13 mm by 50 mm) rectangular satin stainless steel, at sides and rear of car.
 - l. Floor prepared to receive finishes as indicated in the finish schedule. Provide plywood subfloor, 5/8 inch thickness nominal and configure final floor finish to be at the same elevation as the Lobby flooring at each landing. Contractor shall coordinate all finishes, dimensions and provide all required items for coordination.
- 10. Hoistway Entrances:
 - a. Width: As indicated on the Drawings.
 - b. Height: As indicated on the Drawings.
 - c. Type: Two speed side sliding.
 - d. Frames: Satin stainless steel, ASTM A480/480M, No. 4 finish.
 - e. Doors Satin stainless steel, ASTM A480/480M, No. 4 finish.
 - f. Sills: Aluminum.
- 11. Hall Fixtures: Satin stainless steel, ASTM A480/480M, No. 4 finish.
- 12. 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 all cars and two complete set(s) of full height protective pads.

2.3 TRACTION SYSTEMS

- A. Elevator Machines: Permanent magnet, variable voltage, variable frequency, ac-type hoisting machines and solid-state power converters.
 - 1. Provide regenerative 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 line filters or chokes to prevent electrical peaks or spikes from feeding back into building power system.

- B. Fluid for Hydraulic Buffers: 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 elsewhere.
- D. Machine Beams: Provide steel framing to support elevator hoisting machine and deflector sheaves from the building structure. Comply with Section 05 50 00 for materials and fabrication.
- E. Car Frame and Platform: Bolted or welded steel units.
- F. Guides: Roller guides or polymer coated, nonlubricated sliding guides. Provide guides at top and bottom of car and counterweight frames.

2.4 OPERATION SYSTEMS

- A. Provide microprocessor operation systems required to provide type of operation indicated.
- B. Auxiliary Operations:
 - 1. 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.
 - 2. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors begin closing.
 - 3. 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.
 - 4. Loaded Car Bypass: When car load exceeds 80 percent of rated capacity, car responds only to car calls, not to hall calls.
 - 5. 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.
 - 6. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are deenergized after five minutes and are re-energized before car doors open.
 - 7. 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.
- C. 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 shall be as indicated on the Drawings.
2. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car control stations and hall push button 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.

2.5 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.

2.6 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:
 1. Subfloor:
 - a. Exterior, underlayment grade plywood, not less than 5/8 inch (15.9 mm) nominal thickness.
 2. Floor Finish:
 - a. As indicated in the finish schedule for each elevator. Provide subfloor and coordinate final elevations to match all landings.
 3. Stainless Steel Wall Panels: Flush, formed metal construction; fabricated from 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. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.
 10. Metal Ceiling: Flush panels, with LED low voltage downlights in each panel. Align ceiling panel joints with joints between wall panels.
 11. Light Fixture Efficiency: Not less than 35 lumens/W.
 12. Ventilation Fan Efficiency: Not less than 3.0 cfm/W (1.4 L/s per W).

2.7 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: 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: 1 hour with 30 minute temperature rise of 450 degrees F (250 degrees C) unless otherwise noted on the Drawings.
- C. Materials and Fabrication:
 - 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.

2.8 SIGNAL EQUIPMENT

- A. Provide hall call and car call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal resistant buttons and lighted elements illuminated with LEDs.
- B. Car Control Stations: Provide 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 Control Stations Firefighters' Phase II Emergency In-Car operation: Provide recessed or semi-recessed car control stations accessible only to emergency responders meeting ASME 17.1 – 2019 and the requirements of the Local Authority Having Jurisdiction. The emergency in-car operation interface shall include but not be limited to the following:
 - 1. Provide secure cabinet accessible only to emergency responders as confirmed by the local Fire Department.

2. Provide a three-position, "OFF", "HOLD" and "ON" (in that order) clockwise configuration key-operated switch that will not change position without deliberate action by the user.
 3. Label Controls with "FIRE OPERATION" red text no less than 0.25 inches high.
 4. Keys shall be removable in "OFF" or "HOLD" positions.
 5. All modes of operation shall meet the requirements of ASME 17.1 – 2019 and the requirements of the Local Authorities.
- D. Emergency Communication Systems:
1. Two-way communication and signaling devices compliant with ASME A17.1-2016 and the requirements of the Local Authority Having Jurisdiction shall be provided.
 2. Two-way communication instrument in car with automatic dialing, tracking, and recall features, with shielded wiring to car controller in equipment space. Provide dialer with automatic rollover capability with minimum two numbers.
 - a. Actuate two-way communication via "Help" button.
 - b. Button or adjacent light jewel shall illuminate and flash when call is acknowledged.
 - c. Button shall match car operating panel pushbutton design.
 - d. Provide "Help" button tactile symbol, engraved signage, and Braille adjacent to button mounted integral with car front return panel.
 3. Firefighters' communication jack in car and firefighters' panel jack bezel shall match adjacent controls.
 4. Provide two-way communication between car and equipment space.
- E. Car Position Indicator: Provide illuminated, digital type car position indicator, located above car door or above car-control station. 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 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.
- G. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide the following:
1. Units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
- 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. 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. Where standby power is required, 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.
- J. 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 instead. Provide one sign at each hall push button station unless otherwise indicated.

2.9 COMMUNICATION

A. Car Communication System:

1. Hands-Free Phone System:

- a. Two-way communication instrument in car with automatic dialing, tracking, and recall features, with shielded wiring to car controller in equipment space.
- b. Provide dialer with automatic rollover capability with minimum two numbers:
 - 1) Actuate two-way communication via "Help" button.
 - 2) Adjacent light jewel illuminates and flash when call is acknowledged.
 - 3) Button matches car operating panel pushbutton design.
 - 4) Provide "Help" button tactile symbol, engraved signage, and Tactile marking adjacent to button mounted integral with car front return panel.

2. Emergency Personnel Communication:

- a. Communication system is provided allowing emergency personnel to establish communications with each elevator individually.
- b. Emergency Personnel Communication overrides any existing connection outside of building.
- c. Adjacent light jewel illuminates and flashes when call is acknowledged.
- d. Provide operating instructions.
- e. On the same car operating panel as the phone push button, provide capability to communicate with and obtain responses from passengers.
- f. Provide display video capability for entrapment assessment.

3. Communication for deaf, hearing and speech impaired:

- a. On the same car operating panel as the phone push button, provide capability to communicate visually with and obtain responses from passengers, including those passengers who cannot communicate verbally or hear.
- b. Provide shielded twisted pair wiring to communicate to equipment space network box.
- c. Device shall be open-sourced and capable of being monitored by any entity as selected by the owner. All software, hardware, and training cost associated with the device shall be included within this project. Associated monthly monitoring costs will not be accepted.

B. Basic Equipment:

1. Amplifier providing static-free voice transmission with adequate volume and minimum distortion at all stations, with pre-amplifier capable of receiving voice and music inputs from building and emergency building communication system.
2. Activation of emergency building communication system overrides all other conversations and permits one-way conversation to all master stations in system.
3. Master Stations:
 - a. Speaker-microphone combination and/or handset for two-way communication.
 - b. Selection buttons to enable communication with all master stations. Maintain continual reception of hands-free reply from station when a selected button is depressed.
 - c. Two-Position "Talk/Listen" Button: Press to talk; release to listen.
 - d. Illuminate "in use" light when any master station is being used.
 - e. Reset button to make system available for use by any master station.
 - f. Volume control knob for adjustment of incoming volume.
 - g. Button to establish communications with all stations.
 - h. Distress light in lobby panel that illuminates when "push to call" button or alarm button in car is actuated. Energize distress light and buzzer or chime until intercom selection button for that car has been depressed. Sound buzzer or chime in lobby panel simultaneously with illumination of distress light.
4. Remote Stations:
 - a. Station in car shall be activated by "Help" two-way communication button.
 - b. Actuate two-way communication via "Help" button. Button or adjacent light jewel shall illuminate and flash when call is acknowledged. Button shall match car operating panel pushbutton design. Provide "Help" button tactile symbol, engraved signage, and Braille adjacent to button mounted integral with car front return panel.
 - c. Locate car microphone and speaker or transceiver/speaker combination in car canopy behind front return panel, with shielded wiring to machine room junction box.

C. Station Housings:

1. House master station in machine room in a metal compartment with baked enamel finish. Attach to the group elevator supervisory control panel or wall mount. Provide communication handset with 25'-0" long cord.
2. Provide control center master intercoms with No. 4 satin finish stainless steel faceplates and engraved operating instructions.

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. Stainless Steel Bars: ASTM A276, Type 304.
- E. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- F. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas 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 listing conditions detrimental to performance of the work.
- C. Proceed with installation after coordinating unsatisfactory conditions.

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 either above or beside 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 each elevator 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. Test and Certify functionality of the Emergency Communications System: Certify that all Two-way communication and signaling devices and components are compliant with ASME A17.1, the requirements of the Local Authority Having Jurisdiction and function as intended prior to Substantial Completion.
- D. 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, adjust, and maintain 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 12 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.
 - 3. Include 24 hour per day, 7 day per week emergency callback service with response time of two hours or less.

END OF SECTION