

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. Section includes passenger elevators including but not limited to:
  - 1. Pre-engineered MRL Traction passenger elevator.
  - 2. Elevator Car enclosure, hoistway entrances and signal equipment.
  - 3. MRL Equipment
  - 4. Operation and control systems.
  - 5. Accessibility provisions for physically handicapped persons.
  - 6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated capacity and speed.
  - 7. Materials and accessories as required to complete the elevator installation.

## 1.03 RELATED SECTIONS:

- A. Section 015000 - Temporary Facilities and Controls: protection of openings and personnel barriers, temporary power and lighting.
- B. Section 033000 - CAST-IN PLACE CONCRETE for setting sleeves, inserts, and anchoring devices in concrete.
- C. Section 042200 - CONCRETE UNIT MASONRY for setting sleeves, inserts, and anchoring devices and coordinating wall openings for oil line and wiring ducts in masonry and for grouting elevator entrance frames installed in masonry walls.
- D. Section 051200 - Structural Steel Framing for the following:
  - 1. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
  - 2. Divider beams.
  - 3. Hoist beams.
  - 4. Structural-steel shapes for subsills that are part of steel frame.
- E. Section 055000 - METAL FABRICATIONS for the following:
  - 1. Attachment plates and angle brackets for supporting guide-rail brackets.
  - 2. Divider beams.
  - 3. Hoist beams.
  - 4. Structural-steel shapes for subsills.
  - 5. Pit ladders.
  - 6. Cants in hoistways made from steel sheet.
- F. Division 07: Waterproofing: waterproofing of elevator pits.
- G. Division 09 for finish flooring in elevator cars.
- H. Section 099123 - INTERIOR PAINTING for field painting of hoistway entrance doors and frames.
- I. Section 221429 - SUMP PUMP for sump pumps, oil interceptors, sumps, and sump covers in elevator pits.

- J. Division 26 for:
  - 1. Smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
  - 2. Providing electrical service to elevator, including fused disconnect switches.
  - 3. Emergency power supply, transfer switch and auxiliary contacts.
  - 4. Convenience outlets and illumination in Machine Room, hoistway and pit.
  - 5. Light outlet in the center of hoistway as indicated by the elevator contractor.
  - 6. Standby Power Supply Systems: emergency generator for elevator operations.
  - 7. Telephone Systems: ADAAG required emergency communications systems.
  - 8. Provision of telephone and convenience outlet on control panel.
- K. Division 23: Heating, Ventilating and Air Conditioning:
  - 1. Heating and Ventilating of hoistways and Machine Rooms.

#### 1.04 REGULATORY REQUIREMENTS

- A. ADA Standards - Americans with Disabilities Act Accessibility Guidelines.
- B. ASME A17.1 - Safety Code for Elevators and Escalators; 2016.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- D. ISO 9001 - Quality management systems -- Requirements; 2015.
- E. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- H. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- I. ICC A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.

#### 1.05 SYSTEM DESCRIPTION

- A. Application: Machine Room Less (MRL).
- B. Machine Location: Top of the hoistway mounted on car and counterweight guide rails.
- C. Control Space Location: Top landing entrance frame or entrance frame at one floor below the top landing.
- D. Elevator Types and Performance Requirements:

- |                           |                    |
|---------------------------|--------------------|
| 1. Quantity of Elevators: | Two (2)            |
| 2. Elevator Model:        | Kone MonoSpace 300 |

3. Operation System: Microprocessor Single Car Automatic Operation
4. Elevator Numbers: Elevator No. No. 1 and No. 2
5. Service: General Service
6. Number of stops /opgs.  
Elevator No. 1 Four (4) stops, All front.  
Elevator No. 2 Four (4) stops, All front.
7. Travel:  
Both Elevators 35'-6"
8. Rated Capacity:  
All Elevators 3500 lb. capacity
9. Speed:  
All Elevators 150 fpm
10. Cab Size:  
All Elevators 6'-5" wide by 5'-6 7/8" deep
11. Cab Heights: All 7'-6" height nominal or as indicated.
12. Hoistway Entrance Size: All 3'-6" wide x 7'-0" high
13. Door Type: Two Speed Side-Slide
14. Power Characteristics: 208 volts, 3 Phase, 60 Hz.
15. Seismic: No
16. Fixture and Button Style: Stainless Steel 301 Push Buttons.
17. Special Operations: Fire Service Phase 1 and Fire Service Phase 2

1. Quantity of Elevators: One (1)
2. Elevator Model: Kone MonoSpace 500
3. Operation System: Microprocessor Single Car Automatic Operation
4. Elevator Numbers: Elevator No. No. 3
5. Service: Hospital Service
6. Number of stops /opgs.  
Elevator No. 3 Four (4) stops, All front.
7. Travel:  
Both Elevators 35'-6"
8. Rated Capacity:  
All Elevators 4000 lb. capacity
9. Speed:  
All Elevators 150 fpm
10. Cab Size:  
All Elevators 5'-7" wide by 7'-8" deep
11. Cab Heights: All 8'-0" height nominal or as indicated.
12. Hoistway Entrance Size: All 4'-0" wide x 7'-0" high
13. Door Type: Two Speed Side-Slide
14. Power Characteristics: 208 volts, 3 Phase, 60 Hz.
15. Seismic: No
16. Fixture and Button Style: Stainless Steel 301 Push Buttons.
17. Special Operations: Fire Service Phase 1 and Fire Service Phase 2

## E. Ride Quality:

1. Vertical Vibration (maximum): 25 mg
2. Horizontal Vibration (maximum): 15 mg

- 3. Vertical Jerk (maximum): 2 ft/sec<sup>3</sup>
- 4. Acceleration (maximum): 1.6 ft/sec<sup>2</sup>
- 5. In Car Noise: 53-60 dB(A)
- 6. Stopping Accuracy: ±5mm
- 7. Starts per hour (maximum): 180

F. Elevator Operation:

- 1. a. Simplex Collective Operation: Using a microprocessor based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.

G. Operating Features - Standard:

- 1. Door Light Curtain Protection
- 2. Static AC Drive
- 3. Phase Monitor Relay
- 4. Cab Overload with Indicator
- 5. Load-weighing
- 6. Central Alarm
- 7. Remote Monitoring
- 8. Firefighter's Operation
- 9. Automatic Evacuation
  - a. When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. If the car is at a floor when the power fails, it remains at that floor, opens its doors, and shuts down. If the car is between floors, it is raised or lowered to the first available landing, opens its doors, and shuts down.
- 10. Independent Service

## 1.06 ACTION SUBMITTALS

A. Comply with Section 013300 - SUBMITTALS.

B. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.

C. Shop Drawings:

- 1. Include plans, elevations, sections, and large-scale details indicating service at each landing, pit and hoistway, erection and anchorage, details of assembly and coordination with building structure, relationships with other construction, and locations of equipment.
- 2. Include equipment arrangements in the control space, pit and hoistway.
- 3. Include large-scale layout of car-control station.
- 4. Indicate floors served, travel distances, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- 5. Indicate electrical power requirements, Horsepower, starting current, running current, machine and control heat release and branch circuit protection devices recommended.

D. Samples for Initial Selection: For finishes involving color selection such as powder coating, plastic laminates, metals and other exposed finishes requiring selection.

E. Operation and Maintenance Manual: Submit manufacturer/installer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; renewal parts catalogs; and electrical wiring diagrams.

F. Warranty: Submit manufacturer/installer's standard warranty.

## 1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service including standby power generator, as shown and specified, are adequate for elevator system being provided.
- C. Sample Warranty: For special warranty.

## 1.08 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals, wiring diagrams and Parts list with recommended parts inventory.
  - 1. In addition to items specified in Section 017823 - OPERATING AND MAINTENANCE DATA include 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.

## 1.09 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen (15) years experience in manufacturing, installing, and servicing elevators of the type required for the project.
  - 1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
    - a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
    - b. All safety components must be certified by a qualified 3rd party certification body (ie. Safety, governor, brakes, rope grippers, ascending car protection, and door locks).
  - 2. The manufacturer shall have a documented, on-going quality assurance program.
  - 3. ISO 9001:2000 Manufacturer Certified
  - 4. ISO-14001:2004 Environmental Management System Certified.
- B. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer. Installer shall have a least fifteen (15) years of satisfactory experience installing elevators equal in scope, character and performance to the project elevators.
- C. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL 10B, and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory.
- D. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
  - 1. Arrange for inspections and make required tests.
  - 2. Deliver to the Owner upon completion and acceptance of elevator work.

### 1.10 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.
- B. Manufacturer will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site in accordance with manufacturer/installer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

### 1.11 PROJECT CONDITIONS

- A. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.
- B. General Construction Contractor shall coordinate the provisions for temporary electric and GFCI-protected electricity to be available for the installation of elevator components.
- C. General Construction Contractor shall provide a temporary work platform at the top floor of the hoistway compliant with applicable codes and in accordance with the layout drawing specification provided by the approved elevator manufacturer.

### 1.12 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of other work relating to the elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, and pits.
- C. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

### 1.13 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: One (1) year from date of Substantial Completion.

## 1.14 MAINTENANCE

- A. Furnish maintenance and 24-hour, 7 days a week call back service for a period of 12 months for each elevator from date of Substantial Completion during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
  - 1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.
  - 2. Elevator maintenance service shall be performed by elevator manufacturer/installer.
- B. Elevator Control System:
  - 1. Include built-in remote diagnostic module to relay constant status of elevators and control system to a 24-hour, 7-days-a-week central-monitoring facility.
  - 2. Remote Monitoring Device: Transmit information on current status of elevators, including malfunctions, system errors, and shutdown.

## PART 2 - PRODUCTS

## 2.01 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products by Kone Elevator 4225 Naperville Road, Lisle, IL 60532. Phone (630) 577-1650. Website [www.kone.us](http://www.kone.us).
  - 1. Architect approved equivalent.
- B. Source Limitations: Obtain elevators from single manufacturer.
  - 1. Major elevator components, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.
- C. Elevator shall be installed by elevator manufacturer or an manufacturers approved / licensed installer.

## 2.02 MATERIALS, GENERAL

- A. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD and shall be as selected by the Interior Designer.
- B. Colors, patterns, and finishes: As selected by the Architect or Interior Designer from manufacturer's standard colors, patterns, and finish charts.
- C. Steel:
  - 1. Shapes and bars: Carbon.
  - 2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
  - 3. Finish: Factory-applied baked enamel.
- D. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness. Laminate selection shall be based on elevator manufacture's standard selections.
- E. Floor Finish: By others. See Division 09 and indicated finish on the drawings.

## 2.03 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1.
- B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

## 2.04 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

- A. Controller: Provide microprocessor based control system to perform all of the functions of safe elevator operation, as well as perform car and group operational control.
  - 1. All high voltage (110v or above) contact points inside the inspection and test panel shall be protected from accidental contact in a situation where the access panels are open.
  - 2. The controller shall be distributed throughout the elevator system located in the overhead, cab and inspection and test panel. The inverter will be mounted in the overhead adjacent to the hoist machine and an inspection and test panel will be located in the door jamb at the top floor or one floor below the top floor. No elevator equipment mechanical rooms or closets are required.
  - 3. Provide multi-bus control architecture to reduce cabling, material and waste.
- B. Drive: Provide a Variable Voltage Variable Frequency AC Closed Loop drive system. Provide stable start without high peak current, quickly reaching a low energy consumption level.
- C. Inspection and Test Panel: Integrated control equipment, main inspection and test panel in door frame at top level served or at one floor below the top level served.

## 2.05 EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine:
  - 1. Gearless asynchronous AC motor with integral drive sheave, service and emergency brakes.
  - 2. Design machine to enable direct power transfer, thereby avoiding loss of power.
  - 3. Design machine to be compact, lightweight and durable to optimize material usage and save space.
  - 4. Mount to structural support channels on top of guide rail system as applicable in hoistway overhead.
- B. Governor:
  - 1. Tension type over-speed governor with remote manual reset.
  - 2. Mount to structural support channels as applicable in hoistway overhead.
- C. Buffers, Car and Counterweight: Compression spring type buffers to meet code.
- D. Hoistway Operating Devices:
  - 1. Emergency Stop switch in the pit.
  - 2. Terminal stopping switches.
  - 3. Emergency stop switch on the machine.
- E. Positioning System: System consisting of proximity sensors and door zone vanes.
- F. Guide Rails and Attachments: Provide Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.



- G. Suspension System: Non circular Elastomeric coated suspension media with high tensile grade steel cords.
- H. Governor rope: Steel wire rope with 6 mm diameter.

## 2.06 EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Doors and Frames:
  - 1. UL rated with required fire rating.
  - 2. Doors: Rigid flush panel construction with reinforcement ribs.
  - 3. Frames: Securely fasten at corners to form unit frame. Frames shall be bolted.
- B. Finish:
  - 1. Exposed Areas of Corridor Frames: #4 Brushed Stainless Steel - All Floors
  - 2. Doors: #4 Brushed Stainless Steel - All Floors
  - 3. Sills: Aluminum - All Floors
- C. Entrance Markings and Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

## 2.07 EQUIPMENT: CAR COMPONENTS

- A. Car Frame and Safety: Provide car frame with adequate bracing to support the platform and car enclosure. The safety shall be integral to the car frame and shall be flexible guide clamp type.
- B. Platform: Provide platform of steel construction with plywood subfloor and aluminum threshold.
- C. Car Guides: Provide sliding guide shoes mounted to top and bottom of both car and counterweight frame. Arrange each guide shoe assembly to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Provide central guiding system to reduce mechanical friction and energy consumption.
- E. Steel Cab:
  - 1. Fire rating: Provide Class B fire rating for cab, or Class A fire rating where required by local Code.
  - 2. Car wall finish: Plastic Laminate Panels for Elevators 1 & 2. Textured Stainless Steel for Elevator 3.
  - 3. Base and frieze: #4 Brushed Stainless Steel.
  - 4. Car front finish: #4 Brushed Stainless Steel.
  - 5. Car door finish: #4 Brushed Stainless Steel.
  - 6. Ceiling: Canopy ceiling, Down light type, Stainless Steel metal pans with suspended LED down lights.
  - 7. Handrail: Provide 1 1/2 inch Round on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a #4 Brushed Stainless Steel finish.
  - 8. Flooring: By others. Not to exceed 3/8" finished depth.
  - 9. Ventilation: Provide one-speed fan in canopy.
  - 10. Emergency Car Lighting: Provide an emergency power unit employing a 12 volt sealed rechargeable battery and static circuits to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
  - 11. Emergency Siren: Provide siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged.

12. Emergency Exit Switch: Provide an electrical contact to open the safety circuit when the emergency car top exit is opened. When the exit door is opened, the top exit switch shall signal the control and the car will be unable to move.
13. Emergency Exit Lock: Provide an emergency exit lock where required by local code.
14. Emergency Exit Guard: Provide emergency exit guard on top of car when required for hoistway wall to platform clearance exceeds 12" or for multiple cars in hoistway.

## 2.08 DOOR OPERATOR AND REOPENING DEVICES

- A. Door Operator: Provide a closed loop VVVF high performance door operator with frequency controlled drive for fast and reliable operation to open and close the car and hoistway doors simultaneously.
- B. In case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Provide emergency devices and keys for opening doors from the landing as required by local code.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. Provide door open button in the car operating panel. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Provide door hangers and tracks for each car and hoistway door. Contour tracks to match the hanger sheaves. Design hangers for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed for life bearings.
- E. Electronic Door Safety Device: Equip car doors with concealed transmitter and receiver infrared beam devices to detect presence of object in process of passing through hoistway entrance and car doorway (light curtain device).
  1. Use multi-beam scanning without moving parts to detect obstructions in door opening.
  2. Detector Device: Prevent doors from closing, or if they have already started closing, cause doors to reopen and remain open while object is within detection zone.
  3. Horizontal Beams: Minimum of 33 infra red beams to fill doorway from ground level to a height of 6 feet.

## 2.09 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: Provide a car operating panel with all push buttons, key switches and message indicators for elevator operation.
  1. Full height car operating panel shall be surface-mounted on front return.
  2. Comply with handicap requirements.
  3. Push Buttons: Mechanical, illuminating using long-lasting LEDs for each floor served.
  4. Emergency Buttons: Provide in accordance with code. Emergency alarm button, door open and door close buttons.
- B. Features of the Car Operating Panel Shall Include:
  1. Audible chime to signal that the car is either stopping at or passing a floor served by the elevator.
  2. Raised markings and Braille provided to the left hand side of each push button.
  3. Car Lantern: Provide LED illuminated car lantern with direction arrows to comply with local code when hall lanterns are not provided.
  4. Door open and close push buttons.
  5. Firefighter's hat and Phase 2 Key-switch
  6. Inspection key-switch.
  7. Key-switch for optional Independent Service Operation

8. Illuminated alarm button with raised marking.
  9. Elevator Data Plate marked with elevator capacity and car number.
  10. Help Button: Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
- C. Hall Fixtures: Provide hall fixtures with necessary push buttons and key switches for elevator operation.
1. Push buttons: Metallic tactile push buttons, up button and down button at intermediate floors, single button at each terminal floor.
  2. Height: Comply with handicap requirements.
  3. Illumination: Illuminating using long-lasting low power LEDs.
- D. Hall Lanterns and Position Indicators.
1. LED illuminated direction arrows with audible and visible call acknowledgement.
- E. Hoistway access switches: Provide key-switch at top and/or bottom floor in entrance jamb as required by local code.
- F. Firefighter's Phase 1 Service: Key switch in brushed stainless steel cover plate.
- G. Fixture Cover Plates: For push buttons, hall lanterns and position indicators, resistant white back-printed glass, no screws required for mounting. Provide stainless steel cover plates for Firefighter's Phase I switch and hoistway access switches, with tamper resistant screws in same finish.
- H. Mounting: Mount hall fixtures in entrance frames.

## 2.10 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.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Verify hoistway is clear and plumb, with variations not to exceed -0 to +1 inch at any point. Verify projections greater than 4" must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

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

### 3.02 INSTALLATION

- A. Install elevator systems components and coordinate installation of hoistway wall construction.
  - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
  - 2. Comply with the National Electrical Code for electrical work required during installation.
- B. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- C. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing. Verify hoistway is clear and plumb, with variations not to exceed -0 to +1 inch at any point. Verify projections greater than 4" must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.
- D. Lubricate operating parts of systems as recommended by manufacturers.
- E. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- F. Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, nonmetallic grout.
- G. Locate hall signal equipment for elevators as follows, unless otherwise indicated:
  - 1. Place hall lanterns either above or beside each hoistway entrance.
  - 2. Mount hall lanterns at a minimum of 72 inches above finished floor.

### 3.03 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 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.

### 3.04 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.
- B. Adjust elevators for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- C. Adjust doors to prevent opening of doors at landing on corridor side, unless car is at rest at that landing, or is in leveling zone and stopping at that landing.
- D. Adjust automatic floor leveling feature at each floor to within 1/4 inch of landing.

### 3.05 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.
- B. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

### 3.06 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, adjustments, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions, adjusting and maintaining.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.
- C. 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.

### 3.07 CLEANING

- A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.
- B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoist way. Remove trash and debris.

### 3.08 MAINTENANCE

- 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. 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**