SECTION 14 21 00
ELECTRIC TRACTION ELEVATORS

PART 1 GENERAL

1.1 DESCRIPTION

A. This section specifies the engineering, furnishing and installation of a complete and ready for operation additional door and controls for the existing electric traction service elevator system as described herein and as indicated on the contract drawings.

1.2 RELATED WORK

A. Section 01 33 23 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.

B. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire-rated construction.

C. SECTION 09 06 00, SCHEDULE FOR FINISHES: As a master format for construction projects, to identify interior and exterior material finishes for type, texture, patterns, color and placement.

D. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section.

E. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low Voltage power and lighting wiring.

F. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

G. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits for cables and wiring.

H. VA Barrier Free Design Handbook (H-18-13)

1.3 QUALIFICATIONS

A. Approval by the Contracting Officer is required for products and services of proposed manufacturers, suppliers and installers and shall be contingent upon submission by Contractor of certificates stating the following:

1. Elevator contractor is currently and regularly engaged in the installation of elevator equipment as one of his principal products.
2. Elevator contractor shall have three years of successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.

3. The installers shall be Certified Elevator Mechanics with technical qualifications of at least five years of successful experience and Apprentices actively pursuing certified mechanic status. Certificates shall be submitted for all workers employed in this capacity.
4. Elevator contractor shall submit a list of two or more prior hospital installations where all the elevator equipment he proposes to furnish for this project functioned satisfactorily to serve varying hospital traffic and material handling demands. Provide a list of hospitals that have the equipment in operation for two years preceding the date of this specification. Provide the names and addresses of the Medical Centers and the names and telephone numbers of the Medical Center Administrators.

B. Approval of Elevator Contractor’s equipment will be contingent upon their identifying an elevator maintenance service provider that shall render services within four hours of receipt of notification, together with certification that the quantity and quality of replacement parts stock is sufficient to warranty continued operation of the elevator installation.

C. Approval will not be given to elevator contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record for unsatisfactory elevator installations, have failed to complete awarded contracts within the contract period, and do not have the requisite record of satisfactorily performing elevator installations of similar type and magnitude.

D. All electric traction elevators shall be the product of the same manufacturer.

E. The Contractor shall provide and install only those types of safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures supplies or installs the equipment.

F. Welding at the project site shall be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS Dl.1 to perform the type of work required. Certificates shall be submitted for all workers employed in this capacity. A welding or hot work permit is required for

each day and shall be obtained from the COTR of safety department. Request permit one day in advance.

G. Electrical work shall be performed by Licensed Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification. Elevator installation shall meet the requirements of the latest editions published and adopted by the United States Department of Veterans Affairs on the date contract is signed.

B. Federal Specifications (Fed. Spec.):

J-C-30B.....Cable and Wire, Electrical (Power, Fixed Installation)

W-C-596F.....Connector, Plug, Electrical; Connector, Receptacle, Electrical

W-F-406E.....Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

HH-I-558C.....Insulation, Blankets, Thermal (Mineral Fiber, Industrial Type)

W-F-408E.....Fittings for Conduit, Metal, Rigid (Thick- Wall and Thin-wall (EMT) Type)

RR-W-410.....Wire Rope and Strand

TT-E-489J.....Enamel, Alkyd, Gloss, Low VOC Content

QQ-S-766 .....Steel, Stainless and Heat Resisting, Alloys, Plate, Sheet and Strip

C. International Building Code (IBC)

D. American Society of Mechanical Engineers (ASME):

A17.1-07.....Safety Code for Elevators and Escalators

A17.2-07.....Inspectors Manual for Electric Elevators and Escalators

E. National Fire Protection Association:

NFPA 13-10.....Standard for the Installation of Sprinkler Systems

NFPA 70-11.....National Electrical Code (NEC)

NFPA 72-10.....National Fire Alarm and Signaling Code

NFPA 101-09.....Life Safety Code

NFPA 252-08.....Fire Test of Door Assemblies

F. American Society for Testing and Materials (ASTM):

A1008/A1008M-10.....Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Farability

E1042-02(R2008).....Acoustically Absorptive Materials Applied by Trowel or Spray

G. Society of Automotive Engineers, Inc. (SAE)

J517-10.....Hydraulic Hose, Standard

H. Gauges:

For Sheet and Plate: U.S. Standard (USS)

For Wire: American Wire Gauge (AWG)

I. American Welding Society (AWS):

D1.1-10.....Structured Welding Code Steel

J. National Electrical Manufacturers Association (NEMA):

LD-3-05.....High-Pressure Decorative Laminates

K. Underwriter's Laboratories (UL):

486A-03.....Safety Wire Connectors for Copper Conductors

797-07.....Safety Electrical Metallic Tubing

L. Institute of Electrical and Electronic Engineers (IEEE)

M. Regulatory Standards:

Uniform Federal Accessibility Standards

Americans with Disabilities Act

1.5 SUBMITTALS

A. Submit in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

B. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating) and corresponding specification reference (Federal or project specification number and paragraph). All submitted drawings and related elevator material shall be forwarded to the Contracting Officer.

C. Shop Drawings:

1. Drawings of hoistway entrance and doors showing details of construction and method of fastening to the structural members of the building.

a. If drywall construction is used to enclose hoistway, submit details of interface fastenings between entrance frames and drywall.

b. Sill details including sill support.

D. Dimensioned drawings showing details of:

1. All signal and operating fixtures.
2. Hoistway door tracks, hangers, and sills.

E. Furnish certificates as required under: Paragraph "QUALIFICATIONS".

1.6 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway, machine room and fixtures. Install one set coated with an approved plastic sealer and mounted in the elevator machine room as directed by the Resident Engineer.

B. In the event field modifications are necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered to the Resident Engineer within thirty (30) days of final acceptance.

C. Provide the following information relating to the specific type of microprocessor controls installed:

1. Owner's information manual, containing job specific data on major components, maintenance, and adjustment.
2. System logic description.
3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.7 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate the specified equipment manufactured and supplied for this installation shall be furnished and installed by the contractor. The cost of the equipment shall be included in the base bid.

B. Equipment not required by specification, which would improve the operation, may be installed in conjunction with the specified equipment by the contractor at his option at no additional cost to the Government, provided prior approval is obtained from the Contracting Officer’s Technical Representative.

1.8 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry.

1.9 WARRANTY

A. Submit all labor and materials furnished in connection with elevator system and installation to terms of "Warranty of Construction" articles of FAR clause 52.246-21. The one year Warranty shall commence after final inspection, completion of performance test, and upon full acceptance of the installation and shall concur with the guarantee period of service.

B. During warranty period if a device is not functioning properly or in accordance with specification requirements, or if in the opinion of the Contracting Officer’s Technical Representative, excessive maintenance and attention must be employed to keep device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Federal Specification QQ-S-766, Class 302 or 304, Condition A with Number 4 finish on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and surfaces shall be smooth and without waves. During installation all stainless steel surfaces shall be protected with suitable material.

B. Where cold rolled steel is specified, it shall be low-carbon steel rolled to stretcher leveled standard flatness, complying with ASTM A109.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices, and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but meet technical specifications which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more devices of the same class of materials or equipment are required, these units shall be products of one manufacturer.

C. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit.

1. Individual components of assembled units shall be products of the same manufacturers.
2. Parts which are alike shall be the product of a single manufacturer.
3. Components shall be compatible with each other and with the total assembly for the intended service.

D. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish four (4) keys for each individual switch or lock. Provide different key tumblers for different switch and lock functions. Each and every key shall have a tag bearing a stamped or etched legend identifying its purpose. Barrel key switches are not acceptable, except where required by code.

E. If the elevator equipment to be installed is not known to the Resident Engineer, the Contractor shall submit drawings in triplicate for approval to the Resident Engineer, Contracting Officer, and VA CFM Elevator Engineer showing all details and demonstrate that the equipment to be installed is in strict accordance with the specifications.

2.3 CONDUIT AND WIREWAY

A. Unless otherwise specified or approved, install electrical conductors, except traveling cable connections to the car, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than 3/4 inch or electrical metallic tubing smaller than 1/2 inch electrical trade size shall not be used. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. Wireway (duct) shall be installed in the hoistway and to the controller and between similar apparatus in

the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.

B. All conduits terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.

C. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment shall not be used. All fittings shall be steel or malleable iron.

D. Connect motor or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

2.4 CONDUCTORS

A. Unless otherwise specified, conductors, excluding the traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal Specification J-C-30B for Type RHW or THW. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables in accordance with Federal Specification J-C-580 for Type TF may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cable shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

B. Provide all conduit and wiring between machine room, hoistway and fixtures.

C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.

D. Where size of conductor is not given, voltage and amperes shall not exceed limits set by NEC.

E. Provide equipment grounding. Ground the conduits, supports, controller enclosure, motor, platform and car frame, and all other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, green insulated and sized as required by NEC. Bond the grounding wires to all junction boxes, cabinets, and wire raceways.

F. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors in accordance with Federal Specification W-S-610. The Elevator Contractor may, at his option, make these terminal connections on 10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.5 MAIN CAR OPERATING PANEL

A. Modify the existing main car operating panel in the car enclosure to include a keyed switch for service to the south door on the sixth floor.

2.6 CORRIDOR OPERATING DEVICE FACEPLATES

A. Fabricate faceplates for elevator operating and signal devices from not less than 3 mm (1/8 in.) thick flat stainless steel with all edges beveled 15 degrees. Install all faceplates flush with surface on which they are mounted.

B. Corridor push button faceplates shall be at least 127 mm (5 in.) wide by 305 mm (12 in.) high. The centerline of the landing push buttons shall be 1067 mm (42 in.) above the corridor floor.

C. Elevator Corridor Call Station Pictograph shall be engraved in the faceplate.

D. Fasten all car and corridor operating device and signal device faceplates with stainless steel tamperproof screws.

E. Design corridor push button faceplates so that pressure on push buttons shall be independent of pressure on push button contacts.

F. Engraved legends in faceplates shall have lettering 6 mm (1/4 in.) high filled with black paint.

G. Provide a corresponding Braille plate on the left side of each button. The handicapped markings with contrasting background shall be recessed .030 inch in the faceplate, square or rectangular in shape, with the finished face of the 12 mm (1/2 in.) numerals and markings flush with the faceplates. Surface mounted plates are not acceptable.

2.7 CORRIDOR OPERATING DEVICES FOR PASSENGER/SERVICE ELEVETORS

A. Fixtures for intermediate landings shall contain "UP" and "DOWN" buttons. Fixtures for terminal landings shall contain a single "UP" or "DOWN" button.

B. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.

D. The direction of each button shall be legibly and indelibly identified by arrows not less than 12 mm (1/2 in.) high in the face of each button.

E. Landing push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.

F. Modify existing sixth floor corridor operating device on south door to provide service with keyed switch only.

2.8 DIGITAL CORRIDOR LANTERN/POSITION INDICATOR

A. Provide each car with combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each and every floor. Provide each terminal landing with "UP" or "DOWN", minimum 64 mm (2 1/2 in.) high digital arrow lanterns and each intermediate landing with "UP" and "DOWN" digital arrow lanterns. Each lens shall be LED illuminated of proper intensity, so shielded to illuminate individual lens only. The lenses in each lantern shall be illuminated green to indicate "UP" travel and red to indicate "DOWN" travel. Lanterns shall signal in advance of car arrival at the landing indicating the direction of travel whether or not corridor button has been operated at that floor. Hall calls shall receive immediate assignment to individual cars and hall lantern shall sound and illuminate. Corridor lanterns shall not be illuminated when a car passes a floor without stopping. Each lantern shall be equipped with a clearly audible electronic chime

which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.

B. Provide alpha-numeric digital position indicators directly over hoistway landing entranceways between the arrival lanterns at each and every floor. Indicator faceplate shall be stainless steel. Numerals shall be not less than 50 mm (2 in.) high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.

C. Provide LED illumination in each compartment to indicate the position and direction the car is traveling by illuminating the proper alpha-numeric symbol. When the car is standing at a landing without direction established, arrows shall not be illuminated.

2.9 HOISTWAY ACCESS SWITCHES

A. Provide hoistway access switches for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Elevators with side slide doors, mount the access key switch 1830 mm (6 ft) above the corridor floor in the wall next to the strike jamb. Exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions. Submit design and location of access switches for approval. Each access switch shall be a constant pressure cylinder type lock having not less than five pins or five stainless steel disc combination with key removable only when switch is in the "OFF" position. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the VA Medical Center. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor.

B. Provide emergency access for all hoistway entrances, keyways for passenger and service elevators and locked door release system (key access) for freight elevators.

2.10 HOISTWAY ENTRANCES: PASSENGER/SERVICE ELEVATORS

A. Provide entrances of metal construction using cold rolled steel. Door frames shall be constructed of stainless steel. Complete entrances with sills, hanger supports, hangers, tracks, angle struts, unit frames, door panels, fascia plates, toe guards, hardware, bumpers, sight guards, and wall anchors.

B. Provide one piece extruded aluminum sills with non-slip wearing surface, grooved for door guides and recessed for fascia plates. Sills shall have overall height of not less than 19 mm (3/4 in.), set true, straight, and level, with hoistway edges plumb over each other, and top surfaces flush with finished floor. Grout sills full length after installation.

C. Construct hanger supports of not less than 4.5 mm (3/16 in.) thick steel plate, and bolted to strut angles.

D. Structural steel angles shall extend from top of sill to bottom of floor beam above, and shall be securely fastened at maximum 457 mm (18 in.) on center and at each end with two bolts.

E. Provide jambs and head soffits, of not less than 14-gauge stainless steel, for entrances. Jambs and head soffits shall be bolted or welded construction, and provided with three anchors each side. Side jambs shall be curved type. Radius of curvature shall be 89 mm (3 1/2 in.). Head jamb shall be square type, and shall overhang corridor face of side jambs by 6 mm (1/4 in.). Rigidly fasten jambs and head soffits to building structure. Provide jambs with protective covering. After installation, protect jambs and head soffits with wood framing to prevent damage to finish during construction. Solidly grout jambs.

F. Provide 14-gauge sheet steel fascia plates in hoistway to extend vertically from head of hanger support housing to sill above. Plates shall be the same width as the door opening of elevator and adequately reinforced to prevent waves and buckles. Below bottom terminal landing and over upper terminal landing provide shear guards beveled back to and fastened to the wall. Where rear openings are used, provide shear guards and fascia plates as required by ASME A17.1.

G. Provide hoistway entrance with flush two speed side slide hoistway doors. Door panels shall be not less than 16-gauge stainless steel, flush type construction, and not less than 32 mm (1 1/4 in.) thick. Wrap stainless steel around the leading and trailing edges of the door

panel. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be approximately 1.0 mm (0.04 in.) in thickness and of the hat section type. At bottom of each and every panel, provide two removable laminated phenolic gibs or other approved material guides and a separate fire gib. Reinforce each door panel for hangers, interlock mechanism, drive assembly, and closer. One door panel for each entrance shall bear a BOCA label, Underwriters' label, or in lieu of this, labels from other accredited test laboratories may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the COTR. Fasten sight guard of 14-gauge stainless steel, extending full height of panel, to leading edge of fast speed panel of two-speed doors. Field verify entrance door requirements to match existing service elevator construction.

H. Provide hangers for hoistway door panels and provide relating devices to transmit motion from one door panel to the other. Fasten the hangers to the door sections. Provide reinforcements at the point of attachment. The hanger shall have provisions for vertical and lateral adjustments. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with rubber or non-metallic sound-reducing tires mounted on a malleable iron or steel bracket. The hanger sheaves shall operate at a relatively low rotational speed, and shall roll on a high-carbon, cold-rolled or drawn steel track shaped to permit free movement of sheaves without regard to vertical adjustment of sheave, bracket or housing. Beneath the track and each hanger sheave, provide a hardened steel up-thrust roller capable of withstanding a vertical thrust equal to the carrying capacity of adjacent upper sheave. The up-thrust shall have fine vertical adjustments, and the face of the roller shaped so as to permit free movement of the hanger sheave. The up-thrust roller shall have ball or roller bearings. Provide the hanger sheaves with steel fire stops to prevent disengagement from tracks.

I. Do not use hangers that are constructed integrally with the door panels.

J. Provide raised numerals on cast, rear mounted plates for all openings. Numerals shall be a minimum of 50 mm (2 in.) high, located on each side

of entrance frame, with centerline of 1524 mm (5 ft) above the landing sill. The number plates shall contain Braille.

K. Provide unique car number on every elevator entrance at designated main fire service floor level, minimum 76 mm (3 in.) in height.

2.11 ELECTRIC INTERLOCKS

A. Equip each hoistway door with an interlock, functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position. Hoistway door interlocks shall not be accepted unless they meet the requirements of ASME A17.1 Section 2.12.

B. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.

1. Type SF-2 cable terminations in the interlock housing shall be sleeved with glass braid fillers or equivalent.

C. Provide devices, either mechanical or electrical, that shall prevent operation of the elevator in event of damaged or defective door equipment that has permitted an independent car or hoistway door panel to remain in the "unclosed" and "unlocked" position.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine work of other trades on which the work of this Section depends. Report defects to the Resident Engineer in writing that may affect the work of this trade or equipment operation dimensions from site for preparation of shop drawings.

B. Ensure that shafts and openings for moving equipment are plumb, level and in line, and that pit is to proper depth, waterproofed and drained with necessary access doors, ladder and guard.

C. Before fabrication, take necessary job site measurements, and verify where work is governed by other trades. Check measurement of space for equipment, and means of access for installation and operation. Obtain dimensions from site for preparation of shop drawings.

D. Supply for installation, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.

3.2 SPACE CONDITIONS

A. Attention is called to overhead clearance, pit clearances, overall space in machine room, and construction conditions at building site in connection with elevator work. Addition or revision of space

requirements, or construction changes that may be required for the complete installation of the elevators must be arranged for and obtained by the Contractor, subject to approval by Resident Engineer. Include cost of changes in bid that become a part of the contract. Provide proper, code legal installation of equipment, including all construction, accessories and devices in connecting with elevator, mechanical and electrical work specified.

B. Where concrete beams, floor slabs, or other building construction protrude more than 50 mm (2 in.) into hoistway, bevel all top surfaces of projections to an angle of at 75 degrees with the horizontal.

3.3 INSTALLATION

A. Perform work with competent Certified Elevator Mechanics and Apprentices skilled in this work and under the direct supervision of the Elevator Contractor’s experienced foreman.

B. Set hoistway entrances in alignment with car openings, and true with plumb sill lines.

C. Erect hoistway sills, headers and frames prior to erection of rough walls and doors. Erect fascias and toe guards after rough walls are finished.

D. Install controls and all equipment and accessories in accordance with manufacturer's instructions, applicable codes and standards.

E. Grout sills and hoistway entrance frames.

3.4 ARRANGEMENT OF EQUIPMENT

A. Clearance around elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC.

3.5 WORKMANSHIP AND PROTECTION

A. Installations shall be performed by Certified Elevator Mechanics and Apprentices to best possible industry standards. Details of the installation shall be mechanically and electrically correct. Materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing to accommodate installation of equipment shall be included in the Contractor's work. All new holes in concrete shall be core drilled.

C. Structural members shall not be cut or altered. Work in place that is damaged or defaced shall be restored equal to original new condition.

D. Finished work shall be straight, plumb, level, and square with smooth surfaces and lines. All machinery and equipment shall be protected

against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Beams, slabs, or other building construction protruding more than four inches into the hoistway, all top surfaces shall be beveled at an angle of at least 75 degrees to the horizontal.

F. Sleeves for conduit and other small holes shall project 50 mm (2 in.) above concrete slabs.

G. Exposed gears, sprockets, and sheaves shall be guarded from accidental contact in accordance with ASME A17.1 Section 2.10.

3.6 CLEANING

A. Clean machine room and equipment.

B. Perform hoistway clean down.

C. Prior to final acceptance; remove protective coverings from finished or ornamental surfaces. Clean and polish surfaces with regard to type of material.

3.7 PAINTING AND FINISHING

A. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleaned of grease, oil, cement, plaster and other debris. All equipment, except that otherwise specified as to architectural finish, shall then be given two coats of paint of approved color, conforming to manufacturer's standard.

B. Stencil or apply decal floor designations not less than 100 mm (4 in.) high on hoistway doors, fascias or walls within door restrictor areas as required by ASME A17.1 Rule 2.29.2. The color of paint used shall contrast with the color of the surfaces to which it is applied.

C. Hoistway Entrances of Passenger, and Service Elevators:

1. Door panels shall be parkerized or given equivalent rust resistant treatment and a factory finish of one coat of baked-on primer and one factory finish coat of baked-on enamel.

2. Fascia plates, top and bottom shear guards, dust covers, hanger covers, and other metalwork, including built-in or hidden work and structural metal, (except stainless steel entrance frames and surfaces to receive baked enamel finish) shall be given one approved prime coat in the shop, and one field coat of paint of approved color.

3.8 PRE-TESTS AND TESTS

A. Pre-test the elevators and related equipment in the presence of the Resident Engineer or his authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by Resident Engineer.
   1. Procedure outlined in the Inspectors Manual for Electric Elevators, ASME A17.2 shall apply.
      a. Final test shall be conducted in the presence of and witnessed by an ASME QEI-1 Certified Elevator Inspector.
      b. Government shall furnish electric power including necessary current for starting, testing, and operating machinery of each elevator.
   2. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked test weights, voltmeter, amp probe, thermometers, direct reading tachometer, megohm meter, vibration meter, sound meter, light meter, stop watch, and a means of two-way communication.

B. Inspect workmanship, equipment furnished, and installation for compliance with specification.

C. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and ground faults and the insulation resistance of the system shall be determined by use of megohm meter, at the discretion of the Elevator Inspector conducting the test.

D. Safety Devices and Governor Tests: The safety devices and governor shall be tested as required by ASME A17.1 Section 8.10.

E. Overload Devices: Test all overload current protection devices in the system at final inspection.

D. Setting of Car Door Contacts: The position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by ASME A17.1. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative.

E. Setting of Interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed ASME A17.1 requirements.

F. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic

floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration.

G. Evidence of malfunction in any tested system or parts of equipment that occurs during the testing shall be corrected, repaired, or replaced at no additional cost to the Government, and the test repeated.

H. If equipment fails test requirements and a re-inspection is required, the Contractor shall be responsible for the cost of re-inspection; salaries, transportation expenses, and per-diem expenses incurred by the representative of the Resident Engineer.

3.9 INSTRUCTION OF VA PERSONNEL

A. Provide competent instruction to VA personnel regarding the operation of equipment and accessories installed under this contract, for a period equal to one eight hour day. Instruction shall commence after completion of all work and at the time and place directed by the Resident Engineer.

B. Written instructions in triplicate relative to care, adjustments and operation of all equipment and accessories shall be furnished and delivered to the Resident Engineer in independently bound folders. DVD recordings will also be acceptable. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electrical apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts list with descriptive literature, and identification and diagrammatic cuts of equipment and parts. Information shall also include electrical operation characteristics of all circuits, relays, timers, and electronic devices, as well as R.P.M. values and related characteristics for all rotating equipment.

C. Provide supplementary instruction for any new equipment that may become necessary because of changes, modifications or replacement of equipment or operation under requirements of paragraph entitled "Warranty of Construction".

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